SECTION 1-01

LIMITATIONS

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NOTE: Items marked with an asterisk (*) may not be present in this manual.
INTRODUCTION

The 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 the AFM, except as modified by such Supplement or Appendix. The information contained in this section is derived from the Approved Airplane Flight Manual. Flight crewmembers should have all limitations committed to memory (except tables and charts). Some items may not be included herein, as they may be identified in a panel/placard or annunciated by some kind of alarm/warning. Compliance to the Emergency and Abnormal Procedures will also assure that certain limitations are complied with. In the event that a limitation in this manual disagrees with the AFM limitation, the AFM must prevail. In the event that a placard or instrument marking disagrees with the limitations shown in this manual, the more restrictive limitation must prevail.
GENERAL

MINIMUM CREW

Minimum Flight Crew .................................................... PILOT AND COPILOT

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.

NOTE: The CAT II operation is not approved for ERJ-140 and EMB-145 XR Pre-Mod. SB 145-31-0040 airplanes.

MAXIMUM NUMBER OF SEATS (NON-AFM)

The maximum number of available seats is 42 on the EMB-135, 49 on the ERJ-140, and 55 on the EMB-145. It includes 2 seats for pilots, 2 for attendants (1 optional), 1 for cockpit observer, and up to 37 passenger seats on the EMB-135, up to 44 passenger seats on the ERJ-140, and up to 50 passenger seats on the EMB-145.
### WEIGHT AND CENTER OF GRAVITY

**EMB-145 EP MODEL WITH FLAPS 9° AND 18°**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Ramp Weight</td>
<td>21090 kg</td>
<td>20990 kg</td>
<td>18700 kg</td>
<td>17100 kg</td>
</tr>
</tbody>
</table>

**CG POSITION - %MAC**

- MRW: 15.3%
- MTOW: 17.4%
- MLW: 39.5%
- MZFW: 43%

**WEIGHT LIMITS**

- **Max. Ramp Weight (MRW):** 21090 kg
- **Max. Takeoff Weight (MTOW):** 20990 kg
- **Max. Landing Weight (MLW):** 18700 kg
- **Max. Zero Fuel Weight (MZFW):** 17100 kg
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, the design limits.

The takeoff weight (weight at brake release or at start of takeoff run) is the lowest among MTOW and the following weights:

- Maximum takeoff weight for altitude and temperature determined from Maximum Takeoff Weight - Climb Limited chart.
- Maximum takeoff weight, as limited by (dry or wet) runway length and determined from Maximum Takeoff Weight - Field Length Limited chart (if applicable, determined from Takeoff Distance on Contaminated Runway and Accelerate Stop Distance on Contaminated Runway charts).
- 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:

- Maximum approach and landing weight for altitude and temperature determined from Maximum Landing Weight - Climb Limited charts.
- Maximum landing weight, as limited by (dry or wet) runway length and determined from Maximum Landing Weight - Field Length Limited chart (if applicable, determined from Landing Distance on Contaminated Runway charts).

LOADING

The airplane must be loaded in accordance with the information contained in the Weight and Balance Manual.
NOTE: - In the event of a landing below -40°C, the airplane may not takeoff without further maintenance inspection.
- Total Air Temperature in cruise flight above 25000 ft is limited to -45°C.
NOTE: - In the event of a landing below -40°C, the airplane may not takeoff without further maintenance inspection.
- Total Air Temperature in cruise flight above 25000 ft is limited to -45 °C.
- Only APU T-62T-40C14 is allowed for operations on ground above 8000 ft.
APPLICABLE ONLY TO EMB-145LR MODEL EQUIPPED WITH THE PLACARD P/N 145-11727-001 THAT CONTAINS THE STATEMENT “AIRPLANE CERTIFIED FOR HIGH ALTITUDE OPERATIONS UP TO 13500 FT”

NOTE: - In the event of a landing below -40°C, the airplane may not takeoff without further maintenance inspection.
- Total Air Temperature in cruise flight above 25000 ft is limited to -45°C.
- Only APU T-62T-40C14 is allowed for operations on ground above 8000 ft.
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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:  
- $V_{LO}$ for retraction is the maximum speed at which the landing gear can be safely retracted.
- $V_{LO}$ for extension is the maximum speed at which the landing gear can be safely extended.
- $V_{LE}$ is the maximum speed at which the airplane can be safely flown with the landing gear extended and locked.

MANEUVERING SPEED ($V_{A}$)

$V_{A}$ ................................................................................ 200 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 OPERATING SPEED

APPLICABLE TO ALL MODELS EXCEPT EMB-145 XR MODEL
POST-MOD. SB 145-31-0038

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

MAXIMUM FLAP EXTENDED SPEED (V<sub>FE</sub>) - FOR EMB-135, ERJ-140 AND EMB-145 MODELS, EXCEPT EMB-145 XR

<table>
<thead>
<tr>
<th>Flaps</th>
<th>Speed (KIAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9°</td>
<td>250</td>
</tr>
<tr>
<td>18°</td>
<td>200</td>
</tr>
<tr>
<td>22°</td>
<td>200</td>
</tr>
<tr>
<td>45°</td>
<td>145</td>
</tr>
</tbody>
</table>

MAXIMUM FLAP EXTENDED SPEED (V<sub>FE</sub>) - FOR EMB-145 XR MODEL

<table>
<thead>
<tr>
<th>Flaps</th>
<th>Speed (KIAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9°</td>
<td>250</td>
</tr>
<tr>
<td>18°</td>
<td>200</td>
</tr>
<tr>
<td>22°</td>
<td>200</td>
</tr>
<tr>
<td>45°</td>
<td>160</td>
</tr>
</tbody>
</table>

Above 10000 ft with Yaw Damper disengaged:

<table>
<thead>
<tr>
<th>Flaps</th>
<th>Speed (KIAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22°</td>
<td>180</td>
</tr>
<tr>
<td>45°</td>
<td>145</td>
</tr>
</tbody>
</table>

ELECTROMECHANICAL GUST LOCK

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

MAXIMUM FLAP EXTENDED ALTITUDE

Maximum Altitude for Flap Extension .......................20000 ft

PITCH TRIM

Maximum Airspeed after Takeoff/During Climb without Retrimming ...........................................160 KIAS
TAILWIND
Maximum Takeoff and Landing Tailwind Component....... 10 kt

DIRECT VISION WINDOW (AFM PROCEDURES)
Maximum recommended speed to remove direct vision windows is 140 KIAS.

UNPRESSURIZED FLIGHT (NON-AFM)
Maximum altitude for operation after an in-flight depressurization, is 10000 ft MSL unless MEA or otherwise required.
Maximum altitude for dispatch for an unpressurized flight is 10000 ft.

TURBULENT AIR PENETRATION SPEED (AFM PROCEDURES)
At or below 10000 ft ...................................................... 200 KIAS
Above 10000 ft .............................................................. 250 KIAS/0.63M, WHICHEVER IS LOWER

MAXIMUM RECOMMENDED CROSSWIND (NON-AFM)
Embraer aerodynamics analysis have resulted in the following maximum recommended crosswinds for takeoff and landing:
 Dry runway ............................................................... 30 kt
 Wet runway ............................................................... 30 kt
 Runway with Compacted Snow ......................... 25 kt
 Runway with Standing Water/Slush ..................... 20 kt
 Runway with Ice (no melting) ......................... 10 kt
MANEUVERING FLIGHT LOAD FACTORS

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

<table>
<thead>
<tr>
<th>LOAD FACTOR LIMIT</th>
<th>FLAPS UP</th>
<th>FLAPS DOWN (9°,18°, 22° and 45°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>2.56 g</td>
<td>2.00 g</td>
</tr>
<tr>
<td>Negative</td>
<td>-1.00 g</td>
<td>0 g</td>
</tr>
</tbody>
</table>

RUNWAY

Runway Slope ............................................................... -2% TO +2%

Runway Surface Type ..................................................... PAVED

TOWING

Towbarless towing is restricted to the towing vehicles that are specifically accepted for this type of airplane and which are listed in AMM Chapter 9.

NOTE: Compliance with JAR OPS 1.308 must be observed.
MANEUVERING FLIGHT LOAD FACTORS

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

<table>
<thead>
<tr>
<th>LOAD FACTOR LIMIT</th>
<th>FLAPS UP (9°,18°, 22° and 45°)</th>
<th>FLAPS DOWN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>2.56 g</td>
<td>2.00 g</td>
</tr>
<tr>
<td>Negative</td>
<td>-1.00 g</td>
<td>0 g</td>
</tr>
</tbody>
</table>

RUNWAY

Runway Slope ...................................................... -2% TO +2%
Runway Surface Type .......................................... PAVED
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 JAA accepted Operating Manual, must be immediately available to the flight crew.

− 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 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, pilot’s 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.
ELECTRICAL

Maximum Load on Main Generator .............................. 400 A

Maximum Load on APU Generator:
   Up to 30000 ft ................................................... 400 A
   Above 30000 ft .................................................. 300 A

Maximum Battery Temperature ................................. 70°C
FUEL (STD, MK, MP, ER, EU, EP MODELS)

<table>
<thead>
<tr>
<th>Maximum usable quantity per tank</th>
<th>2573 ℓ (2087 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unusable quantity per tank</td>
<td></td>
</tr>
<tr>
<td>(All electric fuel pumps operating)</td>
<td>27 ℓ (22 kg)</td>
</tr>
<tr>
<td>Unusable quantity per tank</td>
<td></td>
</tr>
<tr>
<td>(Any electric fuel pumps inoperative)</td>
<td>Up to 149 ℓ (121 kg)</td>
</tr>
</tbody>
</table>

Maximum permitted imbalance between tanks............. 363 kg

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 values above have been determined for an adopted fuel density of 0.811 kg/ℓ.
- When performing pressure refueling, the usable fuel quantity in each tank may be reduced by 30 liters maximum.

FUEL SPECIFICATION

Brazilian Specification ................................................... QAV1
ASTM Specification ....................................................... D1655-JET A
AND JET A-1
American Specification ................................................. MIL-T-83133A-
JP8
Chinese Specification .................................................. 3 JET FUEL
Russian Specification .................................................. TS-1 KEROSENE

NOTE: - When operating with the TS-1 fuel, the FQIS may display a fuel quantity 2% (two percent) higher than the actual fuel loaded in the airplane.
- The use of Red Dye contaminated fuel is restricted to emergency conditions and must comply with Rolls-Royce’s recommendations.

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

<table>
<thead>
<tr>
<th>APU Model</th>
<th>T-62T-40C11</th>
<th>T-62T-40C14</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER</td>
<td>MIN</td>
<td>MAX</td>
</tr>
<tr>
<td>ALTITUDE FOR START</td>
<td>-</td>
<td>25000 ft or</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>30000 ft (1)</td>
</tr>
<tr>
<td>OPERATION ALTITUDE</td>
<td>-</td>
<td>37000 ft</td>
</tr>
<tr>
<td>TAILWIND FOR START</td>
<td>-</td>
<td>34 kt</td>
</tr>
<tr>
<td>ROTOR SPEED</td>
<td>-</td>
<td>108%</td>
</tr>
<tr>
<td>EGT:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>START</td>
<td>-</td>
<td>884°C (2)</td>
</tr>
<tr>
<td>CONTINUOUS</td>
<td>-</td>
<td>680°C (6)</td>
</tr>
</tbody>
</table>

NOTE: 1) For APU Post-Mod. Sundstrand SB-T-62T-49-152 or equipped with an equivalent modification factory incorporated. In this case, the minimum temperature for APU start is -54°C up to 25000 ft and increases to -48°C above this altitude.

2) May be exceeded up to 925°C above 25000 ft during 10 seconds.

3) Minimum battery temperature for APU start is -20°C.

4) Refer to Fuel Tank Temperature for other APU starting related limits.

5) May be exceeded up to 732°C for 3 seconds, for APU assisted in-flight engine starting.

6) The APU EGT may be exceeded up to 717°C for 5 minutes maximum.

7) The APU Model T-62T-40C14 will be automatically shut down at 104% rotor speed.

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

WARNING: ALL FOUR FADECS INSTALLED ON THE AIRPLANE MUST BE THE SAME PART NUMBER. INCORRECT ENGINE OPERATION CAN RESULT FROM USING FADECS WITH TWO DIFFERENT PART NUMBERS.

OPERATIONAL LIMITS (ROLLS-ROYCE AE3007A, A1/1)

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>-</td>
<td>99.9%</td>
</tr>
<tr>
<td>N2</td>
<td>-</td>
<td>102.4% (7)</td>
</tr>
<tr>
<td>ITT:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>START</td>
<td>-</td>
<td>800°C</td>
</tr>
<tr>
<td>TAKEOFF (1)</td>
<td>-</td>
<td>921°C</td>
</tr>
<tr>
<td>CONTINUOUS</td>
<td>-</td>
<td>868°C</td>
</tr>
<tr>
<td>OIL PRESSURE:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BELOW 88% N2</td>
<td>34 psi</td>
<td>95 psi (2) (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>110 psi (2) (6)</td>
</tr>
<tr>
<td>AT OR ABOVE 88% N2</td>
<td>50 psi</td>
<td>95 psi (5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>110 psi (6)</td>
</tr>
<tr>
<td>OIL TEMPERATURE</td>
<td>21°C (3)</td>
<td>126°C</td>
</tr>
</tbody>
</table>

VIBRATION:

<table>
<thead>
<tr>
<th>SPool</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>LP SPOOL</td>
<td>-</td>
<td>1.8 IPS (4)</td>
</tr>
<tr>
<td>HP SPOOL</td>
<td>-</td>
<td>1.1 IPS (4)</td>
</tr>
</tbody>
</table>

NOTE: 1) Takeoff Thrust is time limited to 5 minutes.

2) May be exceeded during cold day starts, if oil temperature is below 21°C. In this case, engine must be at IDLE until the oil pressure is below 95 psi. For oil temperature above 21°C, oil pressure must be below 95 psi (110 psi for airplanes Post-Mod. SB 145-73-0021 or equipped with an equivalent modification factory incorporated).

3) Minimum oil temperature for starting is -40°C for lubrication oil specified by MIL-L-23699D and -54°C for lubrication oil specified by MIL-L-7808K.

4) Vibration in the amber range below 2.5 IPS is time limited to 5 minutes during the takeoff or go-around phases or 10 seconds during the remainder flight phases.

5) Operation in oil pressure amber range between 96 and 115 psi is permitted in all operational modes and time limited to 5 minutes, or between 116 and 155 psi time limited to 2 minutes. Total time above 95 psi may not exceed 5 minutes.
6) For airplanes Post-Mod. SB 145-73-0021 or equipped with an equivalent modification factory incorporated the upper limit of the oil pressure green band is 110 psi. Operation in oil pressure amber range is permitted between 111 and 115 psi in all operational modes and time limited to 5 minutes, or between 116 and 155 psi in all operational modes time limited to 2 minutes. Total time above 110 psi may not exceed 5 minutes.

7) For airplanes Pre-Mod. SB 145-73-0030 the N2 limit is 102.5%.

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 mode.

For airplanes equipped with FADEC versions previous than B8.0:
    At least once a week a Thrust Assurance Check must be performed by selecting maximum takeoff mode during takeoff and checking engine parameters.
    The Thrust Assurance Check is not required if the owner/operator actively participate in Engine Condition Monitoring, as described Chapter 5 of the AE3007A Series Engine Maintenance Manual.

For airplanes equipped with FADEC versions B8.0 and on, the Thrust Assurance Check is not required.

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.
Selection of thrust reversers in flight or their preselection before touchdown is prohibited.
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. In lieu 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.
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PNEUMATIC, AIR CONDITIONING AND PRESSURIZATION

PRESSURIZATION

Maximum differential pressure................................. 7.8 psi
Maximum differential overpressure............................. 8.1 psi
Maximum differential negative pressure ...................... -0.3 psi
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
Single engine or single bleed maximum altitude operation in icing
conditions................................................................. 15000 ft

Holding configuration:

Landing Gear ........................................................... UP
Flaps ........................................................................ UP
Minimum Airspeed ................................................... 200 KIAS

Normal landing:

Landing gear extension is prohibited at altitudes higher than 3000 ft
above runway elevation.

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.

Anti-icing system must be selected to ENG during all ground
operations when icing conditions exist or are anticipated.
**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.

**WINDSHIELD WIPER OPERATION (AFM PROCEDURES)**

Maximum Airspeed for Windshield Wiper Operation ...... 170 KIAS
NAVIGATION EQUIPMENT

RADAR

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

ATTITUDE AND HEADING REFERENCE SYSTEM

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

For the AH-900 AHRS version the following limits are applicable:

- Maximum latitude for alignment .......... 78°15’ Northern and Southern
- AHRS alignment will complete only after a valid airplane present position (latitude and longitude) is received.
- Time to Alignment:

![Graph showing alignment time and latitude](chart.png)
- The airplanes may not be operated within the following North and South magnetic polar cut-out regions:

<table>
<thead>
<tr>
<th>MAGNETIC CUT-OUT REGIONS</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>Between 70°N and 82°N</td>
<td>Between 80°W and 135°W</td>
</tr>
<tr>
<td></td>
<td>North of 82°N</td>
<td>Between 0° and 180°W/E</td>
</tr>
<tr>
<td>South</td>
<td>Between 60°S and 82°S</td>
<td>Between 118°30’E and 160°E</td>
</tr>
<tr>
<td></td>
<td>South of 82°S</td>
<td>Between 0° and 180°W/E</td>
</tr>
</tbody>
</table>

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

**COMMUNICATION EQUIPMENT**

**HF**
- Do not rely on ADF indications shown on PFD while transmitting in HF.
- Do not transmit through HF Radio during airplane fueling.
TRANSOPONDER MODE S ENHANCED SURVEILLANCE

For airplanes Post-Mod. SB 145-34-0096 or equipped with an equivalent modification factory incorporated, the installed Mode S system satisfies the data requirements of ICAO Doc 7030/4, Regional Supplementary Procedures for SSR Mode S Enhanced Surveillance in designated European airspace.

The system is not capable to transmit the Track Angle Rate parameter.

AUTOPILIOT

The following limitations are applicable to the Autopilot:

- For airplanes Pre-Mod. SB 145-31-0016, the use of the Autopilot below 1500 ft AGL is only permitted when coupled to the captain's Flight Director.
- Minimum Barometric Decision Height
  - During ILS Approach................................. 200 ft
- Minimum Engagement Height After Takeoff........ 1000 ft AGL
- Minimum Use Height..................................... 160 ft
- Malfunction altitude loss:
  - Cruise .................................................. 80 ft
  - Maneuver ............................................... 40 ft
  - ILS Approach ........................................ 15 ft
- The following operation is prohibited when Autopilot is engaged:
  - Single engine go-around.
  - Rudder manual reversion mode.
  - Yaw damper engagement with rudder in manual reversion mode.
  - Aileron manual reversion mode.
- Approach mode selection during localizer capture is allowed only when airplane is inbound.
- Go-around in basic mode (roll and pitch) is allowed only with wings level.

NOTE: Coupled go-around height loss may be 75 ft.
FMZ2000 FLIGHT MANAGEMENT SYSTEM

- The Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number A28-1146-122-00, August 1997 edition (or later revision of the manual) for the software version NZ4.8, Honeywell Publication Number A28-1146-133-00, February 1999 edition (or later revision of the manual) for the software version NZ5.2 or Certification Authority accepted Operating Manual, must be immediately available to the flight crew whenever navigation is predicated on the use of the FMS. The software status stated in the Pilot's Manual must match that displayed on the FMS Control Display Unit (CDU).

- Honeywell software version NZ4.8 (or later approved version) must be installed.

- The pilot must review the complete transition-approach, comparing the waypoints and altitudes displayed on the FMS with those on the published procedure prior to activation to insure that the correct procedure and transition are selected.

- The Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish GPS only approaches.

- FMS vertical guidance is not available. Therefore, during FMS operation with Autopilot coupled, the pilot must use the Flight Guidance Controller for vertical control.

- The FMS is approved for those oceanic and North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) routes requiring only a single FMS and a single GPS in accordance with AC 20-130A.

- During oceanic, NAT MNPS, enroute and terminal area operation with DGR or DR annunciated on the PFD, the flight crew must verify the FMS position using VOR, DME, NDB and/or radar fix.

- During terminal area operation and non-precision approach, the flight crew must cross-check the FMS/GPS data against the VOR, DME, NDB and/or radar fix.

- The aircraft must have other navigation equipment installed and operating, appropriate to the route of flight.

- The pilot must check for leg gaps in the Flight Plan Display on EFIS and input waypoints to fill in any gaps as necessary.
- IFR enroute and terminal navigation is prohibited unless the pilot verifies the currency of the data base or verifies each selected waypoint for accuracy by reference to current approved data.

- Operation above 72° 30.0' north latitude and below 59° 30.0' south latitude is prohibited due to unreliable magnetic heading.

- The fuel flow and fuel used presented on the FMS are supplementary information only. The flight crew must use fuel information primarily from the MFD and EICAS display.

- FMS Performance information is based on data entered by the pilot and calculated by the FMS and is supplementary data only. FMS fuel requirement prediction data must not be used as the sole source of preflight or enroute fuel planning.

- FMS SmartPeri™ Learning must be set to OFF when operating the airplane away from normal routine airline operation, that is during training and testing.

- NBAA (National Business Aircraft Association) fuel reserves do not have any validity in European theatre of operation and must not be selected for preflight or enroute fuel planning.

- During the performance initialization the pilot must not accept the OPTIMUM cruise altitude, but must instead enter with the desired cruise altitude.

- FMS approaches and missed approaches are prohibited. This limitation is not applicable for airplanes equipped with NZ4.8 Mod C, NZ5.2 Mod B or later software version installed.

- FMS missed approaches using the CDU Mode Select Unit are prohibited.

- ALT/ORG DISPLAY configuration must be selected OFF. This limitation is not applicable for airplanes equipped with NZ4.8 Mod C, NZ5.2 Mod B or later software version installed.

NOTE: The NZ4.8 Mod C software version may be identified by checking if the RTN TO SRVC maintenance page is available. This page may be accessed by pressing the NAV mode select button, then NEXT, then selecting the MAINTENANCE submode through the respective line select button, and finally pressing the NEXT mode select button twice. This page is not available for NZ4.8 Mod A.
NAVIGATION AIRWORTHINESS APPROVALS

The single Honeywell FMZ2000 Flight Management System, with the software version NZ4.8 Mod A or Mod C, and the single or dual Honeywell FMZ2000 FMS software version NZ5.2 Mod B and on have been demonstrated to be capable of and have been shown to meet the requirements for the following operations:

- **Oceanic - Oceanic and Remote** - In accordance with JAA Temporary Guidance Leaflet Nº. 3 Revision 1, AC 20-130A and FAA Notice 8110.60 the Dual FMS is approved as a two independent Long Range Navigation (LRN) System on these routes, provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor. The dual FMZ2000 installation with dual GPS sensors as installed has been found to comply with the requirements for GPS primary means of navigation in oceanic and remote airspace, when used in conjunction with Honeywell Off Line RAIM prediction program. For single FMS installation, in accordance with AC 20-130A, along routes requiring a single Long Range Navigation (LRN) System, provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.
- **North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace.**
  - Provided two FMS installations are operating with each receiving information from two inertial reference systems (IRS) or from two global positioning systems (GPS) when used in conjunction with Honeywell Off Line RAIM prediction program, the FMS is capable of unrestricted flight into North Atlantic (NAT) Minimum Navigation Performance Specification (MNPS) airspace and has been shown to meet the accuracy specification in accordance with AC 120-33 or AC 91-49.
  - For single FMS installation as defined in AC 91-49 and AC 91-70, along the special routes requiring a single LRN (Long Range Navigation System), provided it is receiving usable signals from the GPS which meets requirements of AC 90-94 for use as the only LRN System sensor on these routes.

- **RNP-10 - Required Navigation Performance.**
  - The dual FMZ2000 installation with dual Global Positioning Systems (GPS) sensors as installed has been found to comply with the requirements of JAA Order 8400.12A, as amended, as a primary means of navigation with no time limitation, when used in conjunction with Honeywell Off Line RAIM prediction program.
  - The dual FMZ2000 installation with dual Inertial Reference Systems (IRS) as installed has been found to comply with the requirements of JAA Order 8400.12A, as amended, as a primary means of navigation for flights up to 6.2 hours after the system is placed in the navigation mode.
  - The dual FMZ2000 installation with dual Global Positioning Systems (GPS) sensors and dual Inertial Reference Systems (IRS) as installed has been found to comply with the requirements of JAA Order 8400.12A, as amended, as a primary means of navigation with no time limitation.

- **Enroute and Terminal** - In accordance with AC 20-130A and TSO C129 C1 provided it is receiving usable signals from:
  - One VOR/DME or multiple DME's.
  - GPS.
- **Non-Precision Approach** - In accordance with AC 20-130A, TSO C129 C1 and AC 90-94 (* *) (Phase II and III overlay approaches and GPS only approaches), provided:
  - The APP annunciation is set on the PFD at the Final Approach Fix.
  - The DGR or DR is not annunciated on the PFD.
  - The flight director is coupled to the LNAV mode (GPS only approaches).

**NOTE:** (* *) AC 90-94 deals with the use of GPS in the US National Airspace System (NAS) and in oceanic areas. The general approval to use GPS to fly overlay instrument approaches as described in the AC, is initially limited to the NAS. Refer to SECTION II - LIMITATIONS, for use of GPS for non-precision approaches outside the NAS.

- **BRNAV Operations** - In accordance with AC 20-130A, provided it is receiving navigation information from at least one VOR and one DME or from two DME’s.

- **P-RNAV Operations** - Provided FMS is receiving automatic position update from GPS, or from two DME’s or from VOR/DME.

**NOTE:** Compliance with the above regulations does not constitute operational approvals.
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CAT II OPERATION WITH PRIMUS 1000 AUTOMATIC FLIGHT CONTROL SYSTEM

MINIMUM EQUIPMENT REQUIRED

The performance of Category II approaches requires that the following equipment and instruments be in proper operating conditions:

− 2 Attitude and Heading Reference Systems.
− 1 Yaw Damper System.
− 1 Autopilot.
− 2 Flight Director Systems.
− 2 Primary Flight Display (PFD).
− Windshield Wipers.
− 2 VHF/ NAV Systems.
− 1 VHF/COMM System
− Both Engines.
− Cat II Checklist Logic.
− 1 Electrical Trim System.
− 1 Radio Altimeter.
− 1 Ground Proximity Warning System (GPWS).
− 1 Air Data System (ADS).
− 1 Standby Attitude Indicator.
− 1 Standby Airspeed indicator.
− 1 Standby Altimeter.

NOTE: Cat II operation shall be performed by the pilot who has the Flight Director coupled to the Autopilot.
AUTOPilot SYSTEM

Minimum Decision Height (DH) .................................. 100 ft

NOTE: Although the radio altitude setting may be adjusted down to 80 ft, if requested by an ILS Cat II Approved Chart, the approval for CAT II assumes a minimum Decision Height (DH) of 100 ft above runway threshold elevation.

Minimum Use Height (MUH) ................................... 80 ft
Runway Visual Range (RVR) ................................. 300 m (1000 ft)

NOTE: Flight Director monitored manual approaches are restricted to Category I minimums.

WIND COMPONENTS

Maximum Headwind ........................................... 23 kt
Maximum Tailwind ............................................. 10 kt
Maximum Crosswind .......................................... 25 kt

APPROACH AND LANDING FLAPS

CAT II approach and landing must be performed with flaps 22°.