



AGÊNCIA NACIONAL DE AVIAÇÃO CIVIL – BRAZIL

BRAZILIAN AIRWORTHINESS DIRECTIVE

AD No.: 2009-10-01R3

Effective Date: 15 Apr. 2011

The following Brazilian Airworthiness Directive (AD), issued by the Agência Nacional de Aviação Civil (ANAC) in accordance with provisions of Chapter IV, Title III of Código Brasileiro de Aeronáutica - Law No. 7,565 dated 19 December 1986 - and Regulamento Brasileiro da Aviação Civil (RBAC) 39, applies to all aircraft registered in the Registro Aeronáutico Brasileiro. No person may operate an aircraft to which this AD applies, unless it has previously complied with the requirements established herein.

AD No. 2009-10-01R3 - EMBRAER / 39-1330.

APPLICABILITY:

This Airworthiness Directive (AD) is applicable to Embraer model EMB-500 airplanes, all serial numbers.

CANCELLATION / REVISION:

This AD cancels and supersedes AD No. 2009-10-01R2, amendment 39-1306, dated 28 July 2010, and is being issued to include a terminating action.

REASON:

It has been found the possibility of heating deactivation of Air Data System (ADS) sensors due to its inadequate automatic logic, when ADS/AOA knob is on AUTO position associated with the following messages:

- DC BUS 1 OFF displayed on Crew Alerting System – CAS in conjunction with STBY HTR FAIL (which means loss of power on DC BUS 1); or
- EMER BUS OFF displayed on CAS (which means loss of power on EMERGENCY BUS); or
- ELEC EMERGENCY displayed on CAS (which means Electrical Emergency).

The loss of airplane air data sensors heating may permit ice to build up on their surfaces, which in turn may cause wrong pressure acquisitions resulting in erroneous flight parameters indication to the flight crew. Since this condition may occur in other airplanes of the same type and affects flight safety, a corrective action is required. Thus, sufficient reason exists to request compliance with this AD in the indicated time limit.

REQUIRED ACTION:

Modification of the approved Airplane Flight Manual (AFM).

COMPLIANCE:

Required as indicated below, unless already accomplished.

PART I: This part applies to airplanes that have not applied SB 500-27-0003 or that do not have an equivalent modification incorporated in the production line.

Within 10 days after 9 Oct. 2009, the effective date of the original issuance of this AD, introduce the following procedures in the Section 4 - Abnormal Procedures of the AFM:

(a) Revise the AFM by replacing the ELECTRICAL EMERGENCY procedure in AFM Section 4-08, with Figure 1:

ELECTRICAL EMERGENCY

Reset both generators.

If message persists:

LAND AS SOON AS POSSIBLE.

ADS/AOA Knob ON

Exit and avoid icing conditions.

Confirm that IESI has reverted. If not, select ADSTBY on PFD.

PRESSURIZATION MODE Selector MAN

CABIN ALT Switch AS REQUIRED

Airspeed 250 KIAS
MAXIMUM

Altitude 25000 ft
MAXIMUM

CAUTION: BATTERIES DURATION IS 45 MINUTES MAXIMUM.

When landing maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0	$V_{REF FULL} + 30$ KIAS
1	$V_{REF FULL} + 15$ KIAS
2	$V_{REF FULL} + 5$ KIAS
3 and FULL	$V_{REF FULL}$

NOTE: - If flaps stop between two positions, use the minimum airspeed associated to the next retracted position and the V_{FE} associated to the next extended position.

- Disregard green circle indication, as it may indicate slower speeds.

During landing run:

Emergency/Parking Brake..... APPLY

CAUTION: WHEN APPLYING EMERGENCY BRAKES, PULL THE HANDLE PROGRESSIVELY, MONITORING THE EMERGENCY/PARKING BRAKE LIGHT.

NOTE: The emergency/parking brake accumulator allows 6 actuations.

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CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS FULL BY ONE OF THE FACTORS BELOW.

FLAPS POSITION	CORRECTION FACTOR
0	2.25
1	1.75
2	1.65
3 and FULL	1.50

If a go-around is required, maintain the minimum airspeed presented in the applicable flaps configuration from the table above, until the acceleration altitude is reached.

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- ADC 1 and 2 (*)
- AHRS 2 (*)
- Air Conditioning
- Anti-Ice/De-Ice Systems
- Audio Panel 2 (*)
- Autopilot (*)
- DME's
- Flap System (*)
- FMS Panel
- GIA 2 (*)
- GPS 2/VOR 2/ILS 2
- Landing/Taxi Lights
- Main Brake (*)
- PFD 2
- Pitch Trim (Main) (*)
- Pressurization Auto (*)
- Roll Trim
- Stick Pusher (*)
- TCAS
- Transponder 2
- VHF 2
- Windshields Heater (*)
- WX Radar
- Yaw Damper
- Yaw Trim

Figura 1 – AFM, Section 4-08, ELECTRICAL EMERGENCY

(b) Revise the AFM by replacing the **DC BUS 1 OFF** procedure in AFM Section 4-08, with Figure 2:

DC BUS 1 OFF

ADS/AOA Knob.....ON

Icing Conditions.....EXIT/AVOID

For landing proceed:

- Maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED	
	NO ICING	IN ICING/WITH ICE
0	$V_{REF FULL} + 25 \text{ KIAS}$	$V_{REF FULL} + 40 \text{ KIAS}$
1	$V_{REF FULL} + 15 \text{ KIAS}$	$V_{REF FULL} + 35 \text{ KIAS}$
2	$V_{REF FULL} + 5 \text{ KIAS}$	$V_{REF FULL} + 30 \text{ KIAS}$
3 and FULL	$V_{REF FULL}$	$V_{REF FULL} + 25 \text{ KIAS}$

NOTE: - If flaps stop between two positions, use the minimum airspeed associated to the next retracted position and the V_{FE} associated to the next extended position.

- Disregard green circle indication, as it may indicate slower speeds.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS FULL BY ONE OF THE FACTORS BELOW.

FLAPS POSITION	CORRECTION FACTOR	
	NO ICING	IN ICING/WITH ICE
0	1.40	1.70
1	1.20	1.60
2	1.10	2.00
3 and FULL	1.00	1.95

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- ADC 1 (*)
- Cockpit FCSOV
- De-Ice System (*)
- DME 1
- Engine 1 Anti-Ice (*)
- Engine 1 Flowmeter
- Flap System (*)
- Left Landing/Taxi Light
- Roll Trim
- Stick Pusher (*)
- VHF 2
- Windshield Heater 1 (*)
- WX Radar
- Yaw Trim

Figure 2 – AFM, Section 4-08, DC BUS 1 OFF

(c) Revise the AFM by replacing the **EMERGENCY BUS OFF** procedure in AFM Section 4-08, with Figure 3:

EMERGENCY BUS OFF

ADS/AOA Knob	ON
Airspeed	250 KIAS MAXIMUM
Altitude	25000 ft MAXIMUM

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- AHRS 1 (*)
- Audio Panel 1 (*)
- Autopilot (*)
- EFCU 1
- Engines Fire Detection (*)
- Flight Director 1
- AFCS Control Unit
- Fuel Booster Pumps
- Fuel Shutoff Valves
- Fuel Transfer Valve (*)
- GIA 1 (*)
- GPS 1/VOR 1/ILS 1
- LDG Indication/Warning
- Red Beacon
- Oxygen Transducer
- Pax Mask Deploy (Auto)
- PFD 1
- Pitch Trim (Back-Up) (*)
- PRSOV 1 & 2
- Transponder 1
- Stick Pusher (*)
- Stall Warning
- WOW (*)
- Yaw Damper

Figure 3 – AFM, Section 4-08, EMERGENCY BUS OFF

PART II: This part applies to airplanes that have been modified in accordance with SB 500-27-0003 or those ones that have incorporated an equivalent modification in the production line.

Before the next flight, after 28 July 2010, the effective date of revision 02 of this AD, introduce the following procedures in the Section 4 - Abnormal Procedures of the AFM:

(a) Revise the AFM by replacing the **ELECTRICAL EMERGENCY** procedure in AFM Section 4-08, with Figure 4:

ELECTRICAL EMERGENCY

NOTE: Applicable to airplanes Post-Mod. SB 500-27-0003 or with an equivalent modification factory incorporated, for airplanes Pre-Mod. SB 500-27-0003, refer to Supplement 2.

Reset both generators.

If message persists:

LAND AS SOON AS POSSIBLE.

ADS/AOA Knob ON

Exit and avoid icing conditions.

Confirm that IESI has reverted. If not, select ADSTBY on PFD.

PRESSURIZATION MODE Selector MAN

CABIN ALT Switch AS REQUIRED

Airspeed 250 KIAS
MAXIMUM

Altitude 25000 ft
MAXIMUM

CAUTION: BATTERIES DURATION IS 45 MINUTES MAXIMUM.

When landing maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED
0	$V_{REF FULL} + 30$ KIAS
1	$V_{REF FULL} + 15$ KIAS
2 and 3	$V_{REF FULL} + 5$ KIAS
FULL	$V_{REF FULL}$

NOTE: - If flaps stop between two positions, use the minimum airspeed associated to the next retracted position and the V_{FE} associated to the next extended position.

- Disregard green circle indication, as it may indicate slower speeds.

During landing run:

Emergency/Parking Brake..... APPLY

CAUTION: WHEN APPLYING EMERGENCY BRAKES, PULL THE HANDLE PROGRESSIVELY, MONITORING THE EMERGENCY/PARKING BRAKE LIGHT.

NOTE: The emergency/parking brake accumulator allows 6 actuations.

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CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS FULL BY ONE OF THE FACTORS BELOW.

FLAPS POSITION	CORRECTION FACTOR
0	2.25
1	1.75
2 and 3	1.65
FULL	1.50

If a go-around is required, maintain the minimum airspeed presented in the applicable flaps configuration from the table above, until the acceleration altitude is reached.

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- ADC 1 and 2 (*)
- AHRS 2 (*)
- Air Conditioning
- Anti-Ice/De-Ice Systems
- Audio Panel 2 (*)
- Autopilot (*)
- DME's
- Flap System (*)
- FMS Panel
- GIA 2 (*)
- GPS 2/VOR 2/ILS 2
- Landing/Taxi Lights
- Main Brake (*)
- PFD 2
- Pitch Trim (Main) (*)
- Pressurization Auto (*)
- Roll Trim
- Stick Pusher (*)
- TCAS
- Transponder 2
- VHF 2
- Windshields Heater (*)
- WX Radar
- Yaw Damper
- Yaw Trim

Figure 4 – AFM, Section 4-08, ELECTRICAL EMERGENCY

(b) Revise the AFM by replacing the **DC BUS 1 OFF** procedure in AFM Section 4-08, with Figure 5:

DC BUS 1 OFF

NOTE: Applicable to airplanes Post-Mod. SB 500-27-0003 or with an equivalent modification factory incorporated, for airplanes Pre-Mod. SB 500-27-0003, refer to Supplement 2.

ADS/AOA Knob.....ON

Icing Conditions.....EXIT/AVOID

For landing proceed:

- Maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED	
	NO ICING	IN ICING/WITH ICE
0	$V_{REF FULL} + 25 \text{ KIAS}$	$V_{REF FULL} + 40 \text{ KIAS}$
1	$V_{REF FULL} + 15 \text{ KIAS}$	$V_{REF FULL} + 35 \text{ KIAS}$
2 and 3	$V_{REF FULL} + 5 \text{ KIAS}$	$V_{REF FULL} + 30 \text{ KIAS}$
FULL	$V_{REF FULL}$	$V_{REF FULL} + 25 \text{ KIAS}$

NOTE: - If flaps stop between two positions, use the minimum airspeed associated to the next retracted position and the V_{FE} associated to the next extended position.

- Disregard green circle indication, as it may indicate slower speeds.

CAUTION: TO DETERMINE THE MINIMUM SUITABLE LANDING DISTANCE, MULTIPLY THE UNFACTORED LANDING DISTANCE FOR FLAPS FULL BY ONE OF THE FACTORS BELOW.

FLAPS POSITION	CORRECTION FACTOR	
	NO ICING	IN ICING/WITH ICE
0	1.40	1.70
1	1.20	1.60
2 and 3	1.10	2.00
FULL	1.00	1.95

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- ADC 1 (*)
- Cockpit FCSOV
- De-Ice System (*)
- DME 1
- Engine 1 Anti-Ice (*)
- Engine 1 Flowmeter
- Flap System (*)
- Left Landing/Taxi Light
- Roll Trim
- Stick Pusher (*)
- VHF 2
- Windshield Heater 1 (*)
- WX Radar
- Yaw Trim

Figure 5 – AFM, Section 4-08, “DC BUS 1 OFF”

(c) Revise the AFM by replacing the **EMERGENCY BUS OFF** procedure in AFM Section 4-08, with Figure 6:

EMERGENCY BUS OFF

ADS/AOA Knob	ON
Airspeed	250 KIAS
	MAXIMUM
Altitude	25000 ft
	MAXIMUM

The list below presents the relevant inoperative equipment. Items marked with an asterisk have dedicated failure procedures, which may have to be performed, at pilot's discretion:

- AHRS 1 (*)
- Audio Panel 1 (*)
- Autopilot (*)
- EFCU 1
- Engines Fire Detection (*)
- Flight Director 1
- AFCS Control Unit
- Fuel Booster Pumps
- Fuel Shutoff Valves
- Fuel Transfer Valve (*)
- GIA 1 (*)
- GPS 1/VOR 1/ILS 1
- LDG indication/Warning
- Red Beacon
- Oxygen Transducer
- Pax Mask Deploy (Auto)
- PFD 1
- Pitch Trim (Back-Up) (*)
- PRSOV 1 & 2
- Transponder 1
- Stick Pusher (*)
- Stall Warning
- WOW (*)
- Yaw Damper

Figure 6 – AFM, Section 4-08, EMERGENCY BUS OFF

Record compliance with this AD in the applicable maintenance log book.

NOTE 1: Inserting a copy of this AD into the applicable section of AFM constitutes an alternative method of compliance with this AD requirements.

NOTE 2: When procedures identical to that in paragraphs (a), (b) and (c), of Parts I and II of this AD have been included in the general revisions of the AFM, the general revisions may be inserted into the AFM, and the copy of this AD may be removed from the AFM.

NOTE 3: The incorporation of ANAC AFM-2655 revision 07, or further revisions approved by ANAC, constitutes a terminating action to the requirements of this AD.

CONTACT:

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NOTE: Original in Portuguese language signed and available in the files of the Aeronautical Products Certification Branch (GGCP) of the National Civil Aviation Agency (ANAC).