

**2009-23-11 Empresa Brasileira de Aeronautica S.A. (EMBRAER):** Amendment 39-16085; Docket No. FAA-2009-1039; Directorate Identifier 2009-CE-059-AD.

### **Effective Date**

(a) This airworthiness directive (AD) becomes effective December 2, 2009.

### **Affected ADs**

(b) None.

### **Applicability**

(c) This AD applies to Model EMB-500 airplanes, all serial numbers, certificated in any category.

### **Subject**

(d) Air Transport Association of America (ATA) Code 30: Ice and Rain Protection.

### **Reason**

(e) The mandatory continuing airworthiness information (MCAI) states:

``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 cause ice buildup 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, an immediate corrective action is required. Thus, sufficient reason exists to request compliance with this AD in the indicated time limit."

This AD action requires inserting information into the Abnormal Procedures section of the FAA-approved airplane flight manual (AFM).

### **Actions and Compliance**

(f) Unless already done, before further flight, incorporate into the AFM the following procedures section revisions. You may insert a copy of this AD into the appropriate sections of the AFM to comply with the requirements of this AD.

(1) Revise the AFM by replacing the ELECTRICAL EMERGENCY procedures in AFM section 4-08, Abnormal Procedures, pages 3 and 4, 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 (\*)
- DMEs
- 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
- Windshield Heater (\*)
- WX Radar
- Yaw Damper
- Yaw Trim

Figure 1 – AFM Section 4-08, pages 3 and 4, ELECTRICAL EMERGENCY

(2) Revise the AFM by replacing the DC BUS 1 OFF procedure in AFM section 4-08, Abnormal Procedures, pages 6 and 7, with Figure 2:

**DC BUS 1 OFF**

ADS/AOA Knob..... ON  
 Icing Conditions..... EXIT/AVOID

For landing procedures:  
 - Maintain airspeed according to the following:

FLAPS POSITION	MINIMUM AIRSPEED	
	NO ICING	IN ICING/WITH ICE
0	V <sub>REF FULL</sub> + 25 KIAS	V <sub>REF FULL</sub> + 40 KIAS
1	V <sub>REF FULL</sub> + 15 KIAS	V <sub>REF FULL</sub> + 35 KIAS
2	V <sub>REF FULL</sub> + 5 KIAS	V <sub>REF FULL</sub> + 30 KIAS
3 and FULL	V <sub>REF FULL</sub>	V <sub>REF FULL</sub> + 25 KIAS

**NOTE:** - If flaps stop between two positions, use the minimum airspeed associated to the next retracted position and V<sub>FE</sub> 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, Pages 6 and 7, DC BUS 1 OFF

(3) Revise the AFM by replacing the EMERGENCY BUS OFF procedure in AFM section 4-08, Abnormal Procedures, page 9, with Figure 3:

<b>EMERGENCY BUS OFF</b>	
ADS/AOA Knob.....	ON
Airspeed .....	250 KIAS MAXIMUM
Altitude.....	25000 ft MAXIMUM
<p>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:</p>	
- AHRS 1 (*)	- LDG Indication/Warning
- Audio Panel 1 (*)	- Red Beacon
- Autopilot (*)	- Oxygen Transducer
- EFCU 1	- Pax Mask Deploy (Auto)
- Engines Fire Detection (*)	- PFD 1
- Flight Director 1	- Pitch Trim (Back-Up) (*)
- AFCS Control Unit	- PRSOV 1 & 2
- Fuel Booster Pumps	- Transponder 1
- Fuel Shutoff Valves	- Stick Pusher (*)
- Fuel Transfer Valve (*)	- Stall Warning
- GIA 1 (*)	- WOW (*)
- GPS 1/VOR 1/ILS 1	- Yaw Damper

Figure 3 – AFM Section 4-08, Page 9, EMERGENCY BUS OFF

## **FAA AD Differences**

Note: This AD differs from the MCAI and/or service information as follows: No differences.

## **Other FAA AD Provisions**

(g) The following provisions also apply to this AD:

(1) Alternative Methods of Compliance (AMOCs): The Manager, Standards Office, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. Send information to Attn: Karl Schletzbaum, Aerospace Engineer, FAA, Small Airplane Directorate, 901 Locust, Room 301, Kansas City, Missouri 64106; telephone: (816) 329-4146; fax: (816) 329-4090. Before using any approved AMOC on any airplane to which the AMOC applies, notify your appropriate principal inspector (PI) in the FAA Flight Standards District Office (FSDO), or lacking a PI, your local FSDO.

(2) Airworthy Product: For any requirement in this AD to obtain corrective actions from a manufacturer or other source, use these actions if they are FAA-approved. Corrective actions are considered FAA-approved if they are approved by the State of Design Authority (or their delegated agent). You are required to assure the product is airworthy before it is returned to service.

(3) Reporting Requirements: For any reporting requirement in this AD, under the provisions of the Paperwork Reduction Act (44 U.S.C. 3501 et.seq.), the Office of Management and Budget (OMB) has approved the information collection requirements and has assigned OMB Control Number 2120-0056.

## **Related Information**

(h) Refer to MCAI ANAC, AD No.: 2009-10-01R1, dated October 16, 2009, for related information.