



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

RAM AIR VALVE - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

1. General

- A. The ram air valves are installed to the forward wing-to-fuselage attachment fairing, aft of each NACA air inlet.
- B. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
21-25-01-000-801-A	RAM AIR VALVE - REMOVAL	ALL
21-25-01-400-801-A	RAM AIR VALVE - INSTALLATION	ALL
21-25-01-040-801-A	RAM AIR VALVE - DEACTIVATION PROCEDURES	ALL
21-25-01-440-801-A	RAM AIR VALVE - REACTIVATION PROCEDURES	ALL



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TASK 21-25-01-000-801-A

EFFECTIVITY: ALL

2. RAM AIR VALVE - REMOVAL

A. General

- (1) This task gives the procedures to remove the ram air valve.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-01/100	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
191	191EL	Forward wing-to-fuselage fairing
191	191FR	Forward wing-to-fuselage fairing
191	191GL	Forward wing-to-fuselage fairing

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Forward wing-to-fuselage fairing

I. Preparation

SUBTASK 841-002-A

- (1) Remove access panels (AMM MPP 06-41-01/100):
- 191EL (LH ram air valve).
 - 191FR (RH ram air valve).
- (2) On the overhead circuit breaker panel, open the RAM AIR circuit breaker and attach a DO-NOT-CLOSE tag to it (Location tip: ESSENTIAL DC BUS 1/AIR COND/PNEU/RAM AIR).



J. Removal ([Figure 401](#))

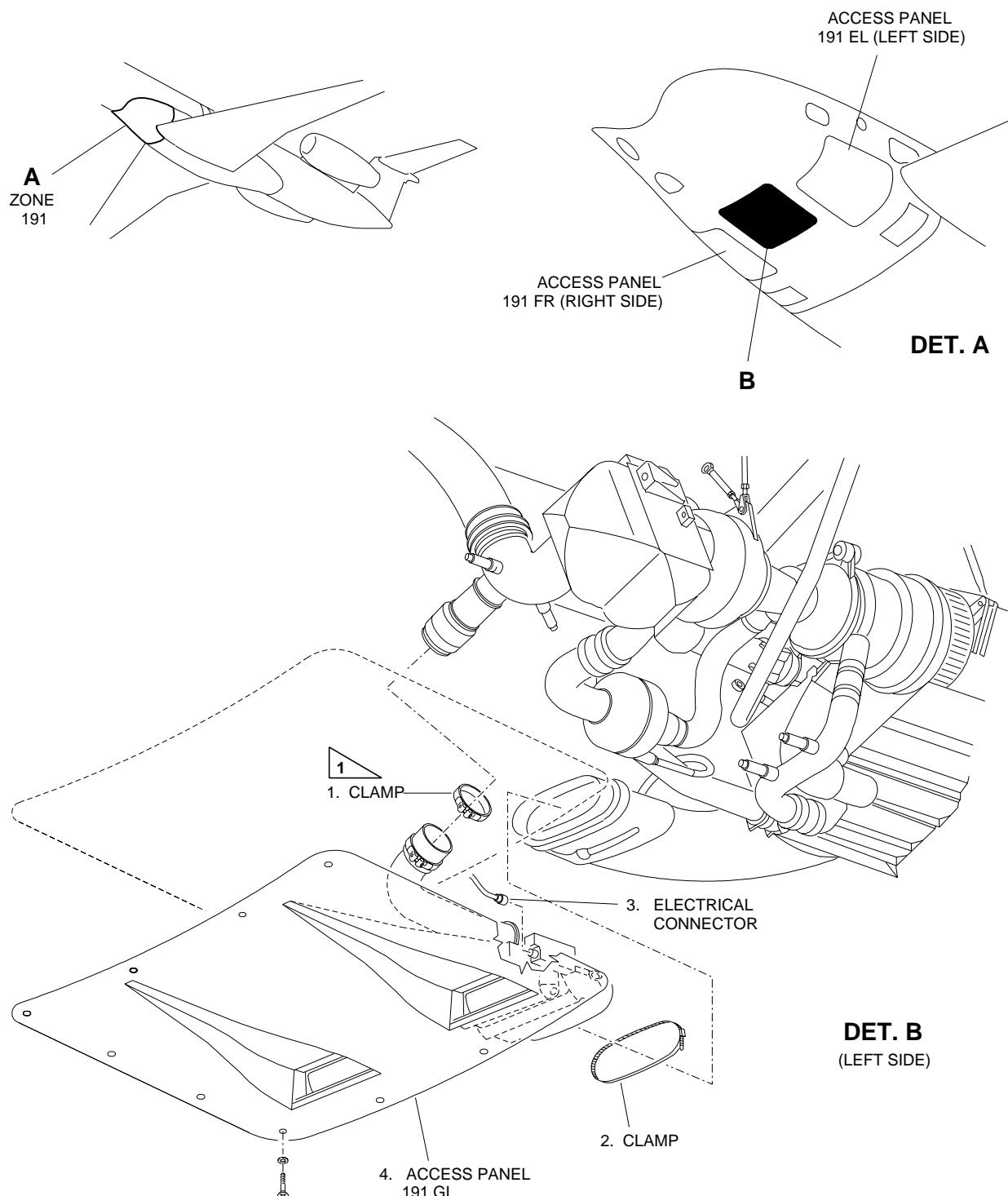
SUBTASK 020-002-A

- (1) Through accesses 191EL and 191FR ([Figure 401](#), sheet 1):
 - Loosen the clamps (1) and move the connections apart.
 - Loosen the clamps (2) and move the couplings apart.
 - Disconnect the electrical connectors (3).
- (2) Remove access panel 191GL (4) (AMM MPP 06-41-01/100).
- (3) Remove the clamp (5) ([Figure 401](#), sheet 2).
- (4) Remove the bolt (6), washers (7) and (8) (if applicable), and nut (9) to release the primary-adjustment rod end (10).
- (5) Remove the screws (11) and the washers (12).
- (6) Remove the ram air valve (13).

EFFECTIVITY: ALL

Ram Air Valve - Removal/Installation

Figure 401 - Sheet 1



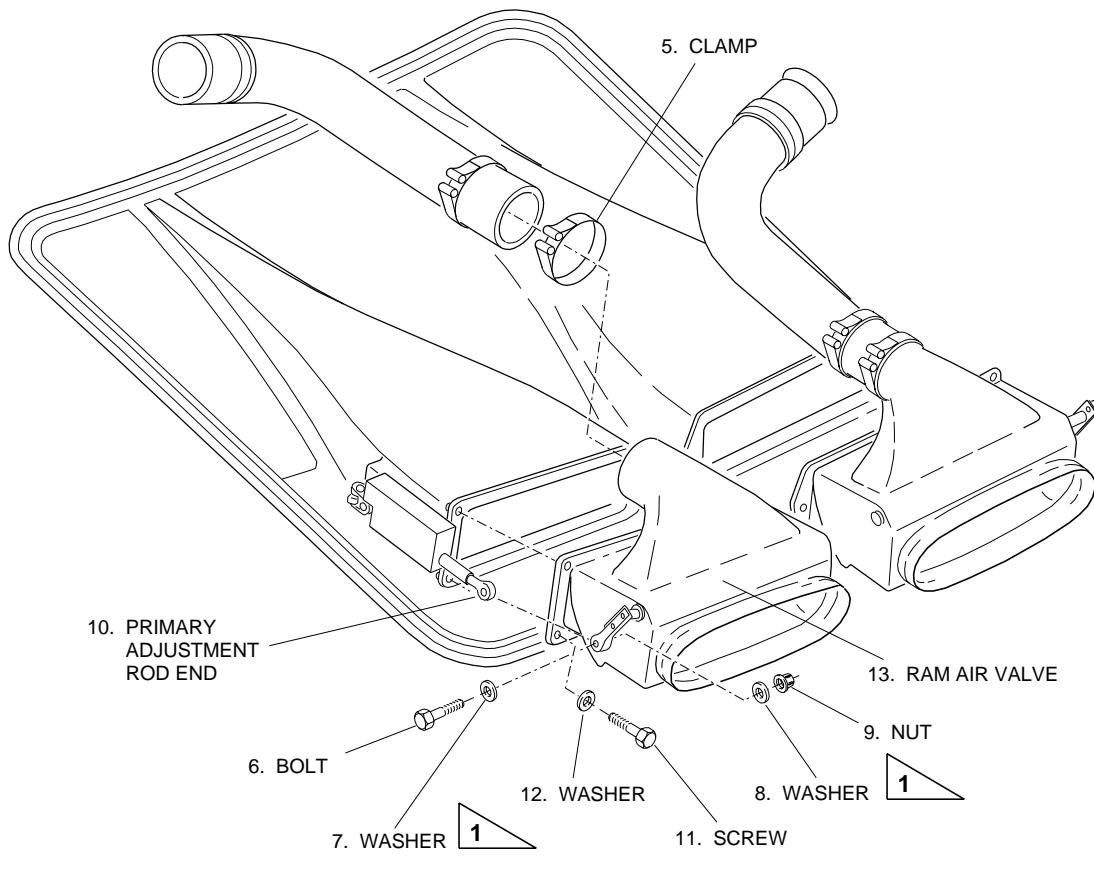
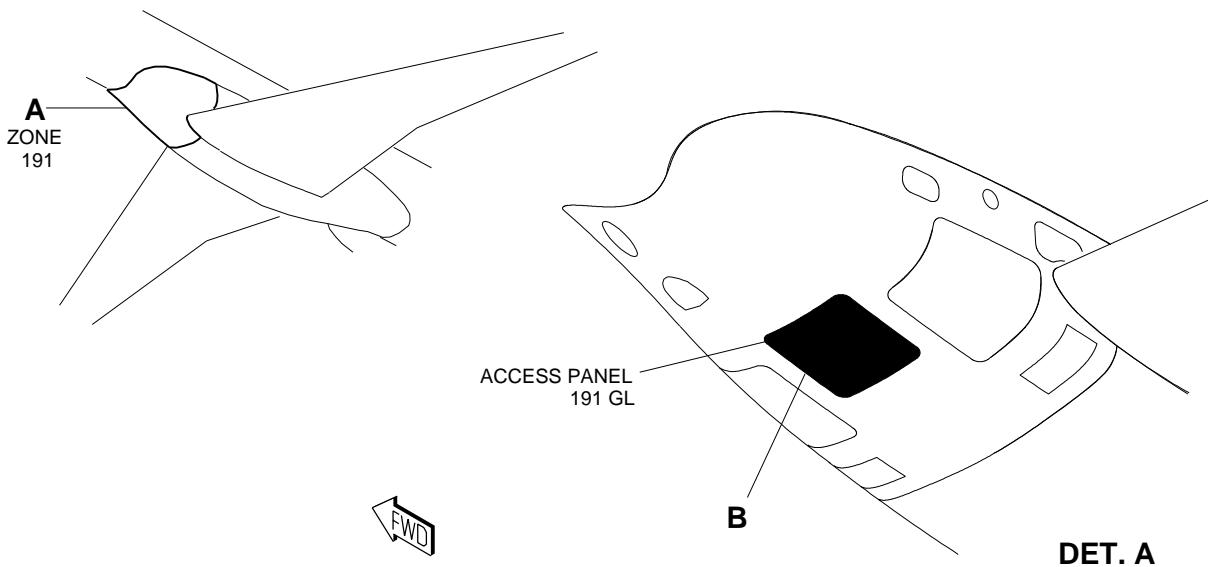
1 TORQUE: 2.9 Nm (25 lb.in).

145AMM210057.MCE D

EFFECTIVITY: ALL

Ram Air Valve - Removal/Installation

Figure 401 - Sheet 2



APPLICABLE ONLY TO AIRCRAFT S/N 060 THRU 196.

145AMM210015.MCE B



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TASK 21-25-01-400-801-A

EFFECTIVITY: ALL

3. RAM AIR VALVE - INSTALLATION

A. General

- (1) This task gives the procedures to install the ram air valve.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-01/100	-
AMM TASK 21-25-01-700-801-A/500	RAM AIR VALVE - OPERATIONAL CHECK
AMM TASK 28-41-00-200-801-A/600	-

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
191	191EL	Forward wing-to-fuselage fairing
191	191FR	Forward wing-to-fuselage fairing
191	191GL	Forward wing-to-fuselage fairing

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Forward wing-to-fuselage fairing

I. Preparation

SUBTASK 841-003-A

- (1) Make sure that the RAM AIR circuit breaker, on the overhead circuit breaker panel, is open and with a DO-NOT-CLOSE tag attached to it (Location tip: ESSENTIAL DC BUS 1/AIR COND/PNEU/RAM AIR).

J. Installation (Figure 401)

SUBTASK 420-002-A

- (1) Put the ram air valve (13) in the installation position (Figure 401), sheet 2).

- (2) Install the screws (11) and the washers (12).
- (3) Attach the primary-adjustment rod end (10) of the linear actuator with the bolt (6), washers (7) and (8) (if applicable), and nut (9).
- (4) Install the clamp (5).
- (5) Install access panel 191GL (4) (AMM MPP 06-41-01/100).
- (6) Through accesses 191EL and 191FR (Figure 401), sheet 1:
 - Connect the electrical connectors (3).
 - Attach the couplings and tighten the clamps (2).
 - Attach the connections and tighten the clamps (1).

K. Follow-on

SUBTASK 842-002-A

- (1) On the overhead circuit breaker panel, remove the DO-NOT-CLOSE tag from the RAM AIR circuit breaker and close it (Location tip: ESSENTIAL DC BUS 1/AIR COND/PNEU/RAM AIR).
- (2) Do the [AMM TASK 21-25-01-700-801-A/500](#).
- (3) Do an inspection on the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of fuel quantity indication harness is a part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations (Section 6) of the Maintenance Review Board Report (MRB).

- (4) Install access panels (AMM MPP 06-41-01/100):
 - 191EL (LH ram air valve).
 - 191FR (RH ram air valve).



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TASK 21-25-01-040-801-A

EFFECTIVITY: ALL

4. RAM AIR VALVE - DEACTIVATION PROCEDURES

A. General

(1) Applicable to FAA certified aircraft:

(a) Airplanes equipped with conventional electromechanical standby instruments:

- 1 It is permitted to dispatch the airplane with one ram air valve inoperative, if:
 - associated air conditioning pack remains off.
 - affected ram air valve is verified to be in emergency ram air position.
 - flight is conducted at or below FL 250.
- 2 It is permitted to dispatch the airplane with the two ram air valves inoperative, if:
 - flight is conducted in unpressurized configuration.
 - ram air valves are verified to be in emergency ram air position.
 - ambient temperature on the ground is below ISA + 21°C.

(b) Airplanes equipped with Integrated Standby Instrument System (ISIS):

- 1 It is permitted to dispatch the airplane with one ram air valve inoperative, if:
 - associated air conditioning pack remains off.
 - affected ram air valve is verified to be in emergency ram air position.
 - flight is conducted at or below FL 250.
 - ambient temperature on the ground is below ISA + 25°C.

(2) Applicable to CTA and IAC-AR certified aircraft:

(a) It is permitted to dispatch the airplane with one ram air valve inoperative, if:

- associated air conditioning pack remains off.
- affected ram air valve is verified to be in emergency ram air position.
- flight is conducted at or below FL 250.

(b) It is permitted to dispatch the airplane with the two ram air valves inoperative, if:

- the two air conditioning pack valves remain off.
- ram air valves are verified to be in emergency ram air position.
- flight is conducted in unpressurized configuration.

B. References

<i>REFERENCE</i>	<i>DESIGNATION</i>
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 21-25-01-000-801-A/400	RAM AIR VALVE - REMOVAL
AMM TASK 21-31-03-040-801-A/400	ELECTROPNEUMATIC OUTFLOW VALVE - DEACTIVATION PROCEDURE
AMM TASK 21-31-04-040-801-A/400	PNEUMATIC OUTFLOW VALVE - DEACTIVATION PROCEDURE

C. Zones and Accesses

<i>ZONE</i>	<i>PANEL/DOOR</i>	<i>LOCATION</i>
272	272DR	Rear fuselage I

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

Not Applicable

I. Deactivation
SUBTASK 040-002-A
(1) Air Conditioning Pack(s) Deactivation:

- (a) On the circuit breaker panel, open the related air conditioning pack valve circuit breaker, PACK 1 (Location tip: DC BUS 1/AIR COND/PNEU/PACK 1) and/or PACK 2 (Location tip: DC BUS 2/AIR COND/PNEU/PACK 2), and attach (a) DO-NOT-CLOSE tag(s) to it(them).

(2) One Ram Air Valve in Emergency Ram Air Position:

NOTE: With the valve in this position, a RAM AIR VLV FAIL message will come into view on the EICAS during ground operation.

- (a) Open access panels 191EL and 191FR and disconnect the electrical connector of the ram air valve linear actuator that is operating properly.
- (b) Energize the aircraft with External DC Power Supply ([AMM TASK 20-40-01-860-801-A/200](#)).
- (c) Put the aircraft in the flight configuration (AIR) as follows:

- 1 On the ELECTRICAL control panel, on the overhead panel, set the BATT 1 and BATT 2 switches to OFF.
- 2 On the ICE PROTECTION control panel, on the overhead panel, set the SENSORS (PITOT 1 / TAT 1 / AOA 1, PITOT 3 and PITOT 2 / TAT 2 / AOA 2) pushbuttons to OFF (lights ON). Attach DO-NOT-SET-ON tags to them.
- 3 On the circuit breaker panel, make sure that the SENSORS HTG circuit breaker is closed.
- 4 On the STALL PROTECTION control panel, on the control pedestal, set the CUTOUT 1 and CUTOUT 2 pushbuttons to ON (lights ON).
- 5 On the circuit breaker panel, open the AIR/GND A, the AIR/GND B, the AIR/GND C, and the AIR/GND D circuit breakers.
 - (d) On the circuit breaker panel, open the RAM AIR circuit breaker.
 - (e) Disconnect the electrical connector of the ram air valve linear actuator that is not operating properly.
 - (f) Attach the electrical connector close to the wiring clamp.
 - (g) Make sure that the flap valve of the ram air valve is in the down position (which permits the airflow to go to the cockpit or to the cabin). If the flap valve is not in the down position, do as follows:
 - 1 Disconnect the linear actuator primary adjustment rod end from the ram air valve operation lever ([AMM TASK 21-25-01-000-801-A/400](#)).
 - 2 Move the flap valve of the ram air valve to the down position and, with a lock wire, attach the operation lever to the clamp which secures the dual heat exchanger ram air duct to the ram air valve.
 - (h) On the circuit breaker panel, close the RAM AIR circuit breaker.
 - (i) Return the aircraft to the ground configuration (GND) as follows:

NOTE: The time necessary for you to close all the four AIR/GND A, B, C, and D circuit breakers must not be more than 10 seconds.

 - 1 On the circuit breaker panel, close the AIR/GND A, the AIR/GND B, the AIR/GND C, and the AIR/GND D circuit breakers.
 - 2 On the STALL PROTECTION control panel, on the control pedestal, set the CUTOUT 1 and CUTOUT 2 pushbuttons to OFF (lights OFF).
 - 3 On the ICE PROTECTION control panel, on the overhead panel, remove the DO-NOTSET- ON tags from the SENSORS (PITOT 1 / TAT 1 / AOA 1, PITOT 3 and PITOT 2 / TAT 2 / AOA 2) pushbuttons and set them to ON (lights OFF).
 - 4 On the ELECTRICAL control panel, on the overhead panel, set the BATT 1 and BATT 2 switches to AUTO.

- (j) Remove the External DC Power Supply from the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
 - (k) Connect the electrical connector of the ram air valve linear actuator that is operating properly and close access panels 191EL and 191FR.
- (3) The two Ram Air Valves in Emergency Ram Air Position
- NOTE:** With the valve in this position, a RAM AIR VLV FAIL message will come into view on the EICAS during ground operation.
- (a) Energize the aircraft with External DC Power Supply ([AMM TASK 20-40-01-860-801-A/200](#)).
 - (b) Put the aircraft in the flight configuration (AIR) as follows:
 - 1 On the ELECTRICAL control panel, on the overhead panel, set the BATT 1 and BATT 2 switches to OFF.
 - 2 On the ICE PROTECTION control panel, on the overhead panel, set the SENSORS (PITOT 1 / TAT 1 / AOA 1, PITOT 3 and PITOT 2 / TAT 2 / AOA 2) pushbuttons to OFF (lights ON). Attach DO-NOT-SET-ON tags to them.
 - 3 On the circuit breaker panel, make sure that the SENSORS HTG circuit breaker is closed.
 - 4 On the STALL PROTECTION control panel, on the control pedestal, set the CUTOUT 1 and CUTOUT 2 pushbuttons to ON (lights ON).
 - 5 On the circuit breaker panel, open the AIR/GND A, the AIR/GND B, the AIR/GND C, and the AIR/GND D circuit breakers.
 - (c) On the circuit breaker panel, open the RAM AIR circuit breaker.
 - (d) Open access panels 191EL and 191FR and disconnect both ram air valve linear actuator electrical connectors.
 - (e) Attach the electrical connectors close to the wiring clamps.
 - (f) Make sure that the flap valves of the ram air valves are in the down position (which permit the airflow to go to the cockpit and to the cabin). If either or both of the flap valves is (are) not in the down position, do as follows:
 - 1 Disconnect the linear actuator primary adjustment rod end from the ram air valve operation lever ([AMM TASK 21-25-01-000-801-A/400](#)).
 - 2 Move the flap valve of the ram air valve to the down position and, with a lockwire, attach the operation lever to the clamp which secures the dual heat exchanger ram air duct to the ram air valve.
 - (g) Close access panels 191EL and 191FR.
 - (h) On the circuit breaker panel, close the RAM AIR circuit breaker.
 - (i) Return the aircraft to the ground configuration (GND) as follows:

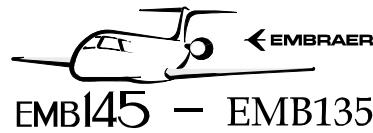


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NOTE: The time necessary for you to close all the AIR/GND A, B, C, and D circuit breakers must not be more than 10 seconds.

- 1 On the circuit breaker panel, close the AIR/GND A, the AIR/GND B, the AIR/GND C, and the AIR/GND D circuit breakers.
 - 2 On the STALL PROTECTION control panel, on the control pedestal, set the CUTOUT 1 and CUTOUT 2 pushbuttons to OFF (lights OFF).
 - 3 On the ICE PROTECTION control panel, on the overhead panel, remove the DO-NOTSET- ON tags from the SENSORS (PITOT 1 / TAT 1 / AOA 1, PITOT 3 and PITOT 2 / TAT 2 / AOA 2) pushbuttons and set them to ON (lights OFF).
 - 4 On the ELECTRICAL control panel, on the overhead panel, set the BATT 1 and BATT 2 switches to AUTO.
- (j) Remove the External DC Power Supply from the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (4) Unpressurized Configuration
- (a) Refer to Electropneumatic and Pneumatic Outflow Valves Deactivation Procedures ([AMM TASK 21-31-03-040-801-A/400](#) and [AMM TASK 21-31-04-040-801-A/400](#)) for outflow valves secured open, if required.
- (5) Write in the aircraft technical logbook that you did the deactivation procedure for the Ram Air Valve.



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TASK 21-25-01-440-801-A

EFFECTIVITY: ALL

5. RAM AIR VALVE - REACTIVATION PROCEDURES

A. General

- (1) This task gives the procedures to reactivate the Ram Air Valve.
- (2) This task refers to item 21-25-01 - Ram Air Valves - of DDPM.

B. References

REFERENCE	DESIGNATION
AMM TASK 21-31-03-440-801-A/400	ELECTROPNEUMATIC OUTFLOW VALVE - REACTIVATION PROCEDURE
AMM TASK 21-31-04-440-801-A/400	PNEUMATIC OUTFLOW VALVE - REACTIVATION PROCEDURE

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

Not Applicable

I. Reactivation

SUBTASK 440-002-A

- (1) Do the troubleshooting and the applicable corrective maintenance procedure for the Ram Air Valve.
- (2) Refer to Electropneumatic and Pneumatic Outflow Valves Reactivation Procedures ([AMM TASK 21-31-03-440-801-A/400](#) and [AMM TASK 21-31-04-440-801-A/400](#)), if required.

