



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

ELEVATOR AND TAB - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to remove and install the elevators.
- B. These procedures are applicable to the LH and RH elevators.
- C. On aircraft PRE-MOD. [S.B.145-27-0075](#), before you replace the elevator from different aircraft, you must do as follows:
 - On aircraft PRE-MOD. [S.B.145-55-0020](#), elevators are interchangeable.
 - On aircraft POST-MOD. [S.B.145-55-0020](#), make sure that the flight data recorder supports are installed on the elevators. Refer to [AMM TASK 31-31-06-400-804-A/400](#).
- D. On aircraft POST-MOD. [S.B.145-27-0075](#), before you replace the elevator from different aircraft, you must do as follows:
 - Make sure that the aircraft is POST-MOD. [S.B.145-55-0020](#) and the flight data recorder supports are installed on the elevators. Refer to [AMM TASK 31-31-06-400-804-A/400](#).
- E. If it is necessary to remove/install the elevator surface because of the removal of the horizontal stabilizer ([AMM TASK 55-10-00-000-801-A/400](#)), you must do as follows:
 - If you replaced the horizontal stabilizer with a new one or if you replaced it with an horizontal stabilizer used on other aircraft, do a calibration of the elevator with the control-column position transducer ([AMM TASK 27-30-00-700-801-A/500](#)).
 - If you installed the same horizontal stabilizer on the same aircraft, do not do the calibration of the elevator with the control-column position transducer ([AMM TASK 27-30-00-700-801-A/500](#)).
- F. 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 |
|------------------------------------|-------------------------|-------------|
| 27-30-00-000-801-A | ELEVATOR - REMOVAL | ALL |
| 27-30-00-400-801-A | ELEVATOR - INSTALLATION | ALL |



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TASK 27-30-00-000-801-A

EFFECTIVITY: ALL

2. ELEVATOR - REMOVAL

A. General

- (1) This procedure gives the instructions to remove the elevator.

B. References

| REFERENCE | DESIGNATION |
|---------------------------------|------------------------------------|
| AMM MPP 06-42-00/100 | - |
| AMM TASK 31-31-06-000-802-A/400 | FDR ELEVATOR RVDTS/RVITS - REMOVAL |
| AMM TASK 55-36-00-000-801-A/400 | TAIL BOOM - REMOVAL |
| S.B.145-31-0045 | - |

C. Zones and Accesses

| ZONE | PANEL/DOOR | LOCATION |
|------|------------|-----------------------|
| 333 | | Horizontal stabilizer |
| 334 | | Horizontal stabilizer |

D. Tools and Equipment

| ITEM | DESCRIPTION | PURPOSE | QTY |
|---------|---------------------|---|-----|
| GSE 058 | Rig Pin Kit | To lock the control surface in the neutral position | |
| GSE 196 | Elevator Lock Clamp | To lock the elevator in the neutral position | |

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 | Horizontal stabilizer |
| 1 | Helps the other technician | Horizontal stabilizer |

I. Preparation

SUBTASK 841-002-A

- (1) Remove rear fairings 321 of the vertical stabilizer ([AMM TASK 55-36-00-000-801-A/400](#)).

- (2) Remove access panels 335CB, 335DB, 335EB, 335FB, 335GB, and 335HB or 336CB, 336DB, 336EB, 336FB, 336GB and 336HB (AMM MPP 06-42-00/100).
- (3) Install GSE 196 on the elevator surface, near the servo-tab ([Figure 403](#)).

J. Removal ([Figure 401](#)) ([Figure 402](#))

SUBTASK 020-002-A

WARNING: MAKE SURE THAT THE RUDDER CANNOT BE OPERATED ACCIDENTALLY.
AN ACCIDENTAL OPERATION OF THE RUDDER CAN CAUSE INJURY TO PERSONS.

CAUTION: BE CAREFUL NOT TO DAMAGE THE ELEVATOR DURING THE REMOVAL.

- (1) (For aircraft with RVDTS/RVITS and mechanical gust lock without provisions for electromechanical gust lock) Disconnect the RVDTS/RVITS electrical connector and remove the washer (4) and nut (3) to remove the rod from the elevator surface. Refer to ([Figure 407](#)).
- (2) (For aircraft with RVDTS/RVITS and electromechanical gust lock or with provisions for it PRE-MOD. [S.B.145-31-0045](#)) Disconnect the RVDTS/RVITS electrical connector and remove the bolt (2), washer (3), and nut (4), and then, carefully disconnect the elevator FDR adapter from the stabilizer structure. Refer to ([Figure 408](#)).
- (3) (For aircraft with RVDTS/RVITS and electromechanical gust lock or with provisions for it POST-MOD. [S.B.145-31-0045](#)) Remove the RVDTS/RVITS ([AMM TASK 31-31-06-000-802-A/400](#)) and remove the bolt (2), washer (3), RVDT/RVIT harness support (5), and nut (4), to disconnect the elevator FDR adapter from the stabilizer structure. Refer to ([Figure 408](#)).
- (4) Install the rig pin to the rear sector ([Figure 404](#)).
- (5) Remove GSE 196 from the elevator ([Figure 403](#)).
- (6) Remove the nut, washers, and bolt (5) to disconnect the end of the bonding strap (6) from the bellcrank (3) at the elevator (1). Refer to DET. B, ([Figure 401](#)) or ([Figure 402](#)).
- (7) Remove the cotter pin, nut, washer, bushing, and bolt (7) to disconnect the end of the rod (2) from the bellcrank (3) at the elevator (1). Refer to DET. B, ([Figure 401](#)) or ([Figure 402](#)).
- (8) Remove the cotter pin, nut, washers, bushing, and bolt (12) to disconnect the end of the rod (13) from the support (11) at the stabilizer structure. Refer to DET. D, ([Figure 401](#)) or ([Figure 402](#)).
- (9) Remove the nut, washers, and bolt (17) to disconnect the ends of the bonding straps (15) (2 positions) and (8) from the elevator (1). Refer to DET. F, DET.E and DET.C, ([Figure 401](#)) or ([Figure 402](#)).
- (10) Remove the nuts, washers, and bolts (4) (4 positions) and, if you find shims, remove them but do not discard them, to release the torque tube of the elevator (1) from the stabilizer structure. Refer to DET. B, ([Figure 401](#)) or ([Figure 402](#)).



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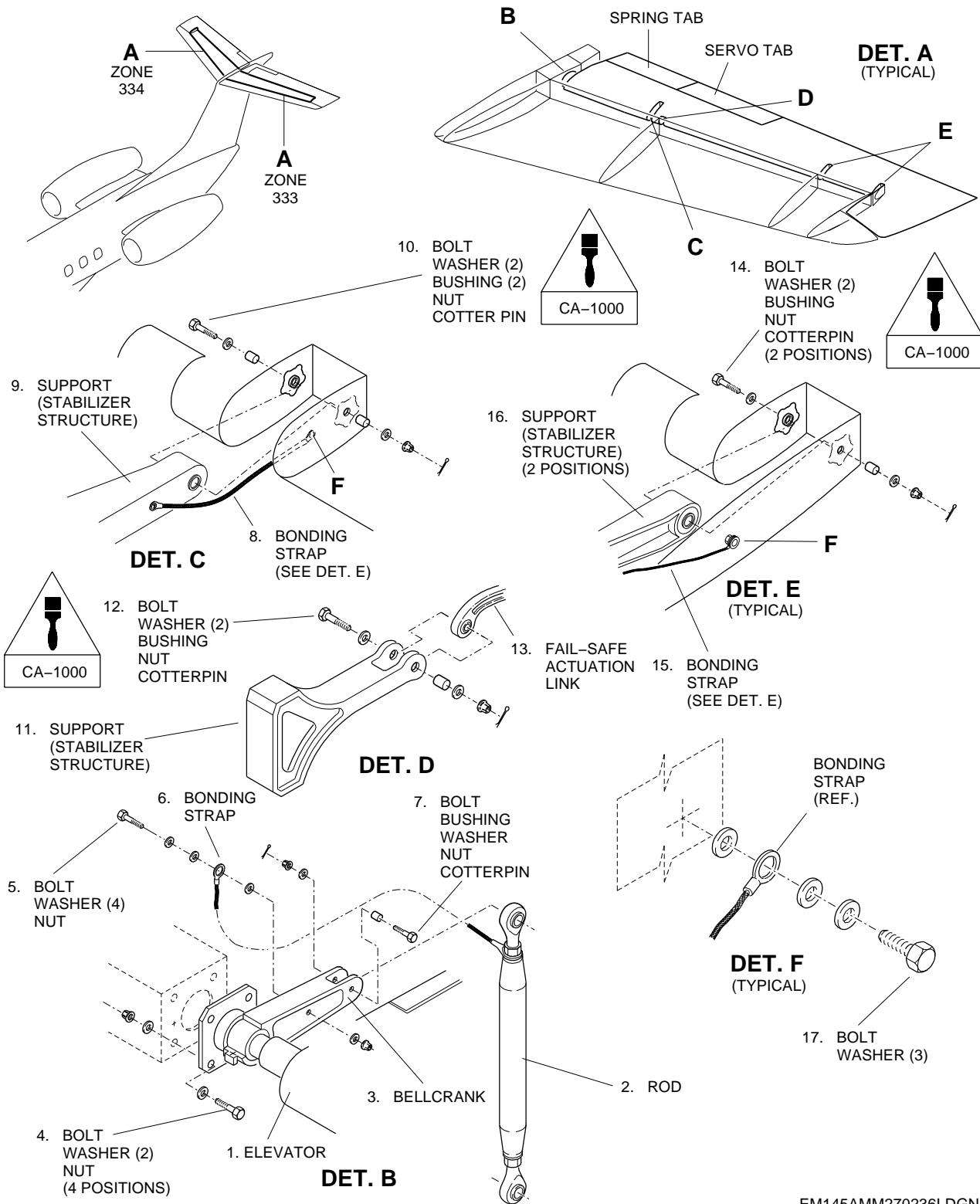
NOTE: If you find shims between the elevator torque tube and the stabilizer structure, make sure that you know their correct position so that you can install them back in the same position.

- (11) Hold the elevator (1).
- (12) Remove the cotter pin, nut, washers, bushing, and bolt (14) to disconnect the elevator (1) from the support (16) at the stabilizer structure (2 positions). Refer to DET. E, ([Figure 401](#)) or ([Figure 402](#)).
- (13) Remove the cotter pin, nut, washers, two bushings, and bolt (10) to disconnect the elevator (1) from the support (9) at the stabilizer structure. Refer to DET. C, ([Figure 401](#)) or ([Figure 402](#)).
- (14) Remove the elevator (1).

EFFECTIVITY: ON AIRCRAFT S/N UP TO 43

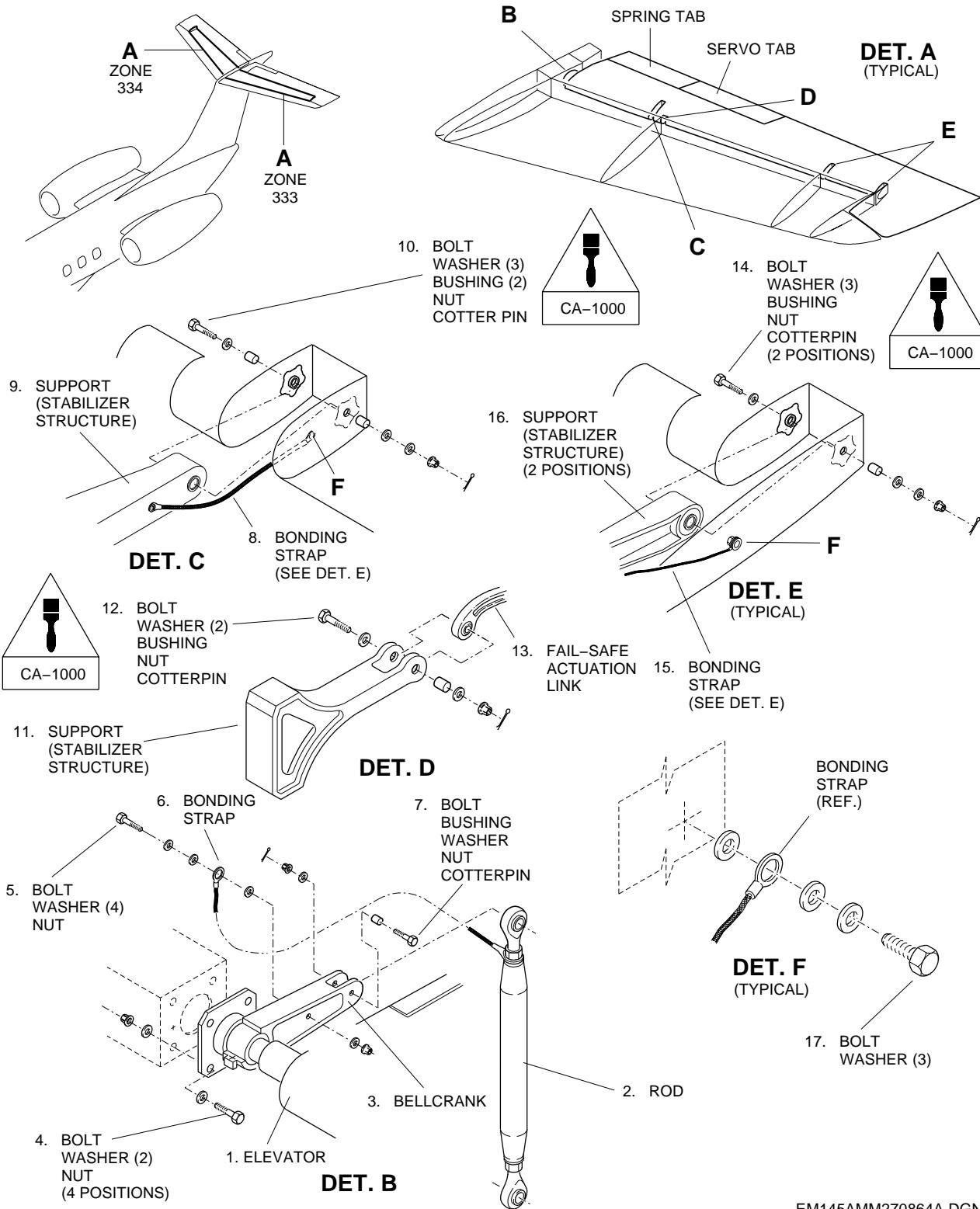
Elevator - Removal/Installation

Figure 401



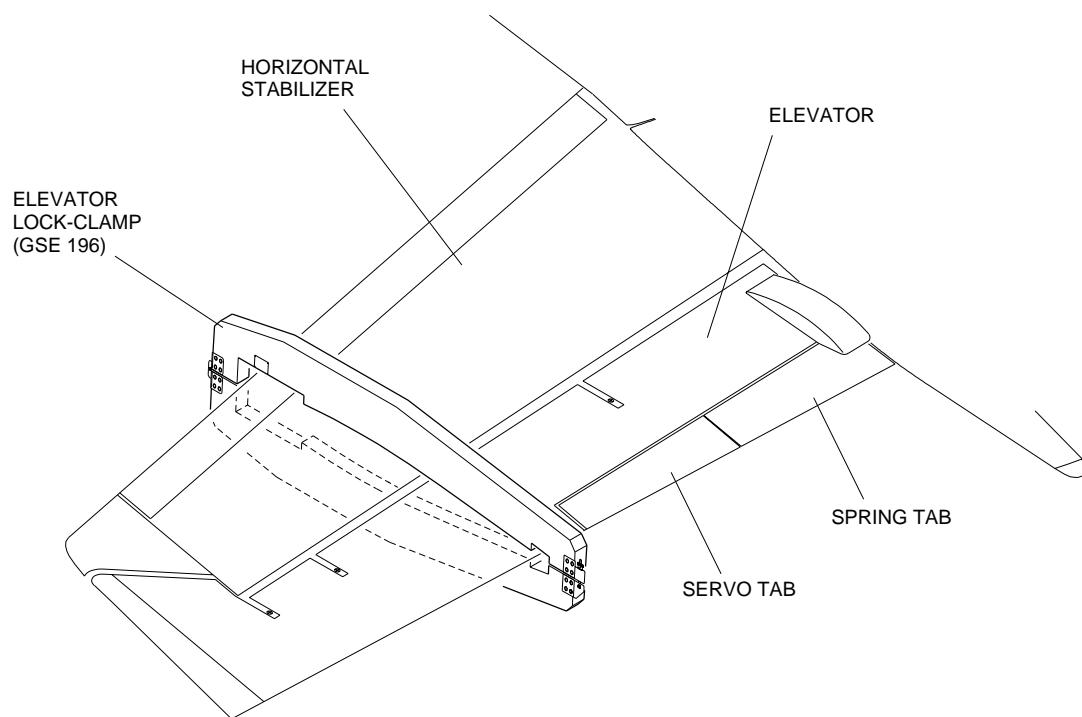
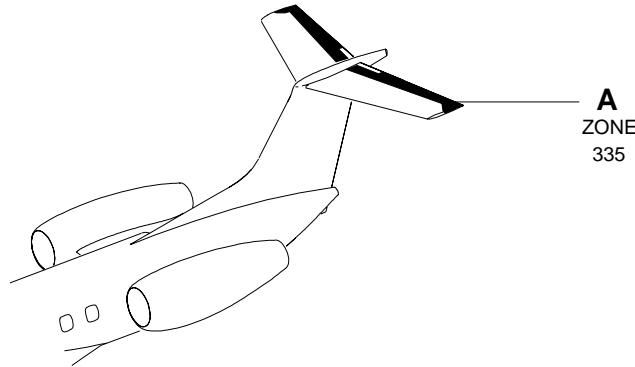
EM145AMM270236I.DGN

EFFECTIVITY: ON AIRCRAFT S/N 44 AND ON
Elevator - Removal/Installation
Figure 402



EM145AMM270864A.DGN

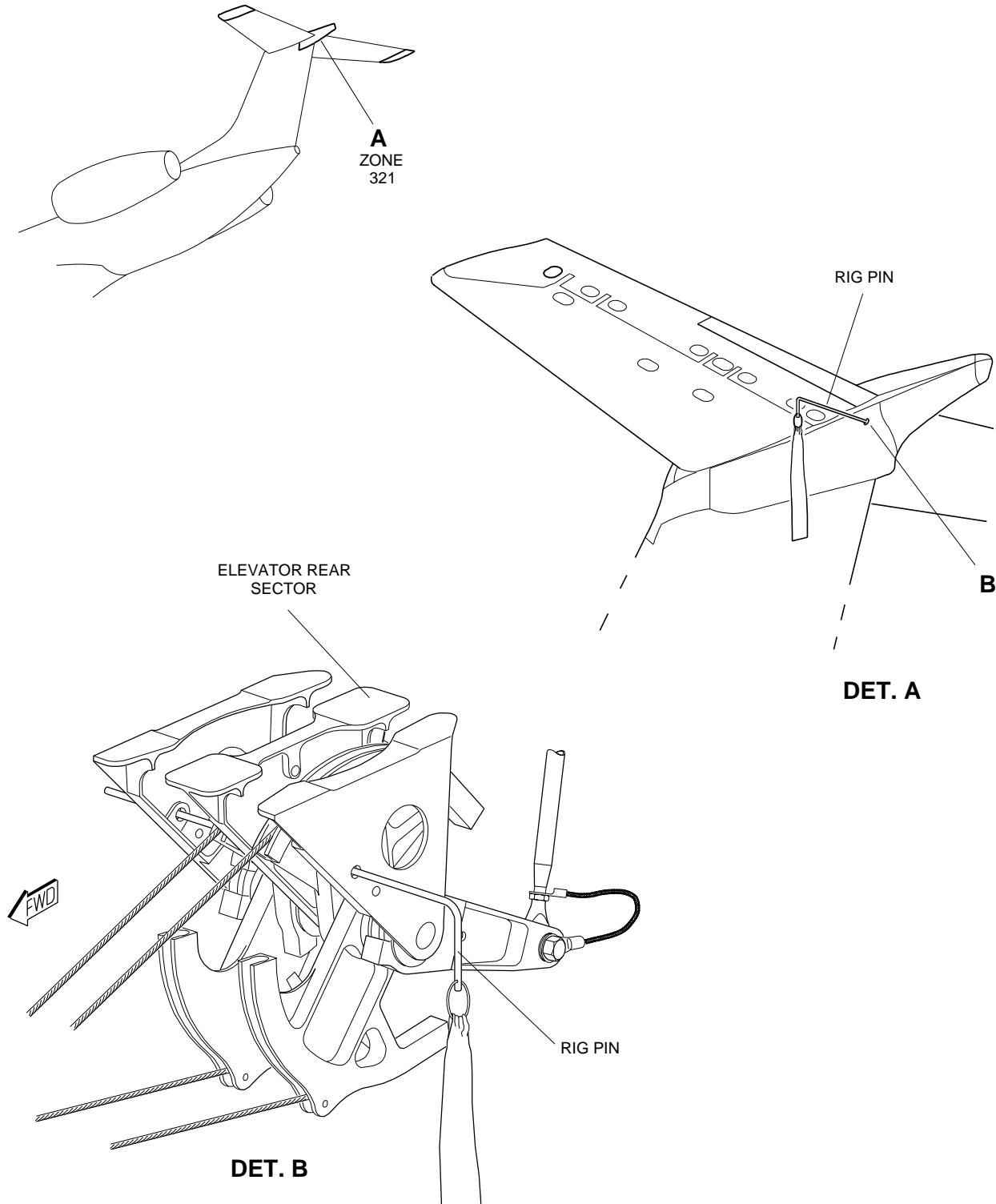
EFFECTIVITY: ALL
Elevator Lock Clamp - Installation
Figure 403



DET. A

145AMM270468.MCE

EFFECTIVITY: ALL
Rig Pin - Location
Figure 404

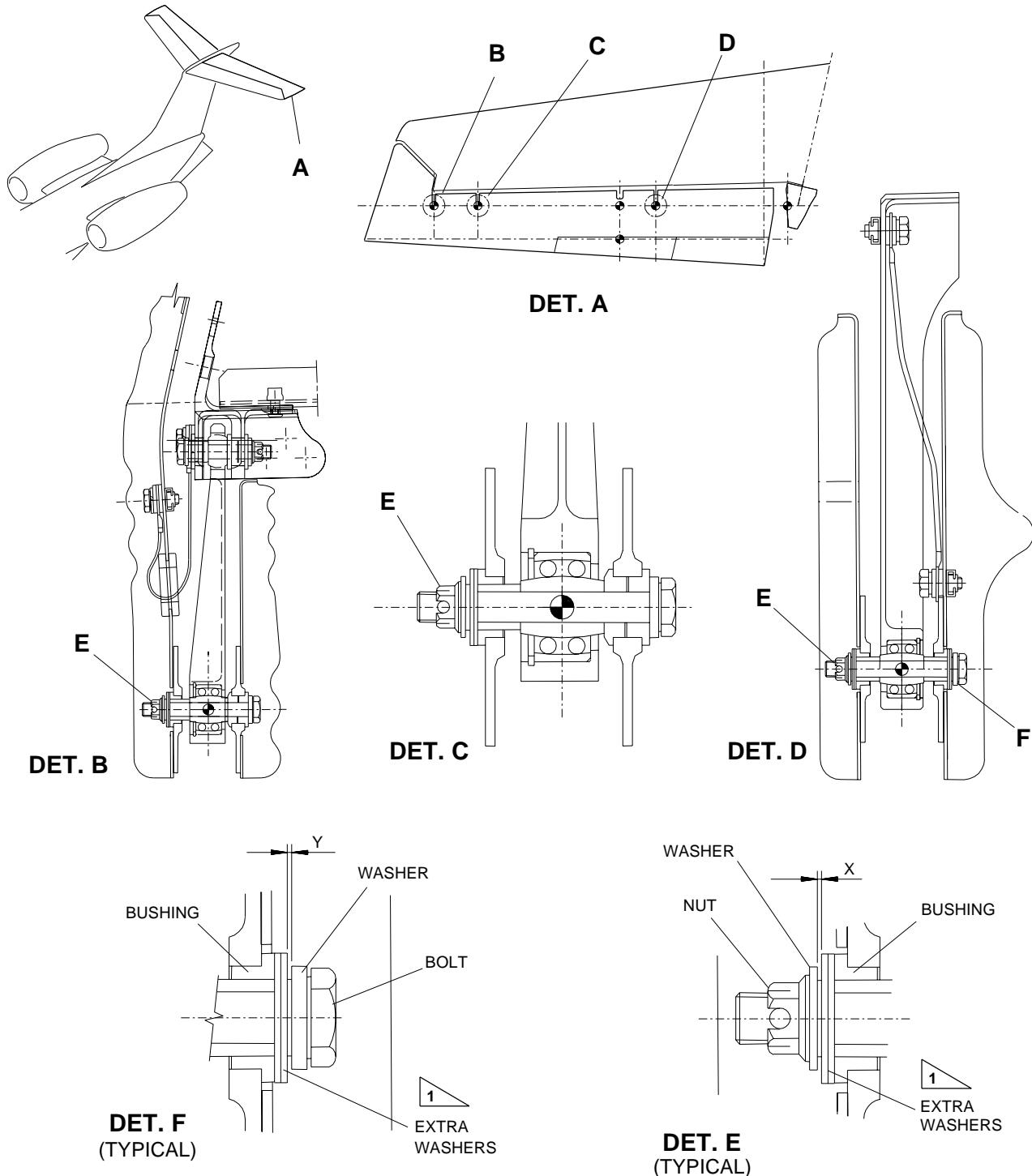


145AMM270424.MCE A

EFFECTIVITY: ON AIRCRAFT S/N UP TO 43 AND POST-MOD SB 145-55-0032

Elevator Hinge Fittings - Adjustment

Figure 405



 **INSTALL EXTRA WASHERS AS REQUIRED.**

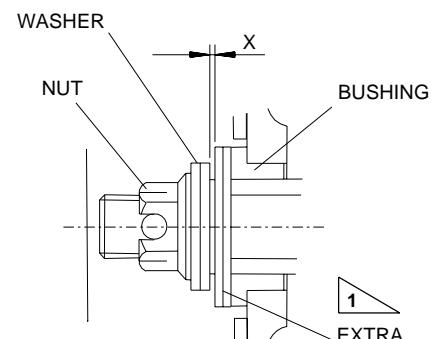
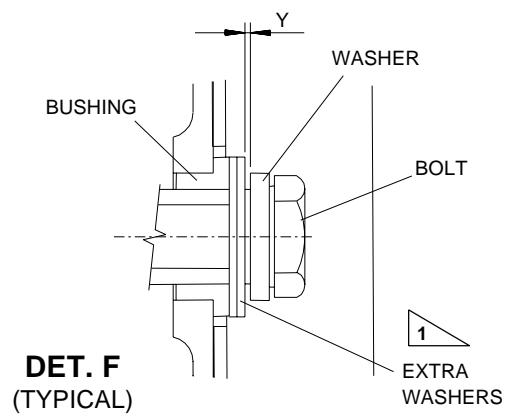
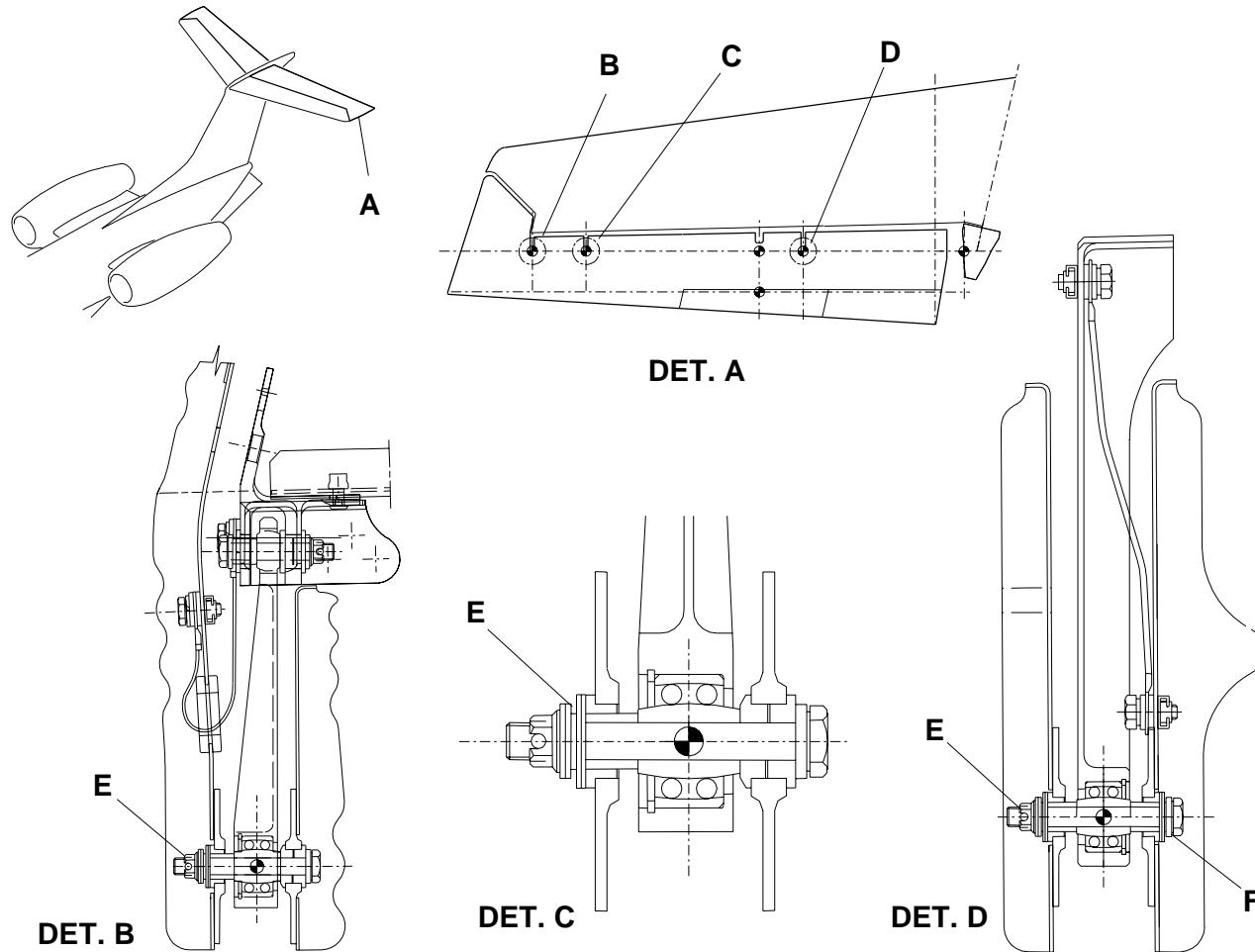
EM145AMM270884A.DGN

EFFECTIVITY: ON AIRCRAFT S/N 44 UP TO 725 and POST-MOD SB 145-55-0032 or AIRCRAFT S/N 726

UP TO 791 27-30-00-400-801-A

Elevator Hinge Fittings - Adjustment

Figure 406



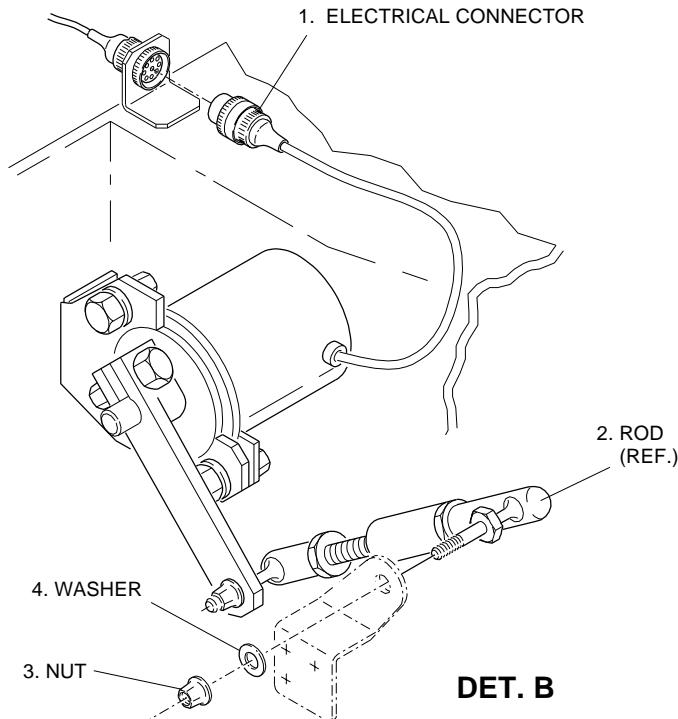
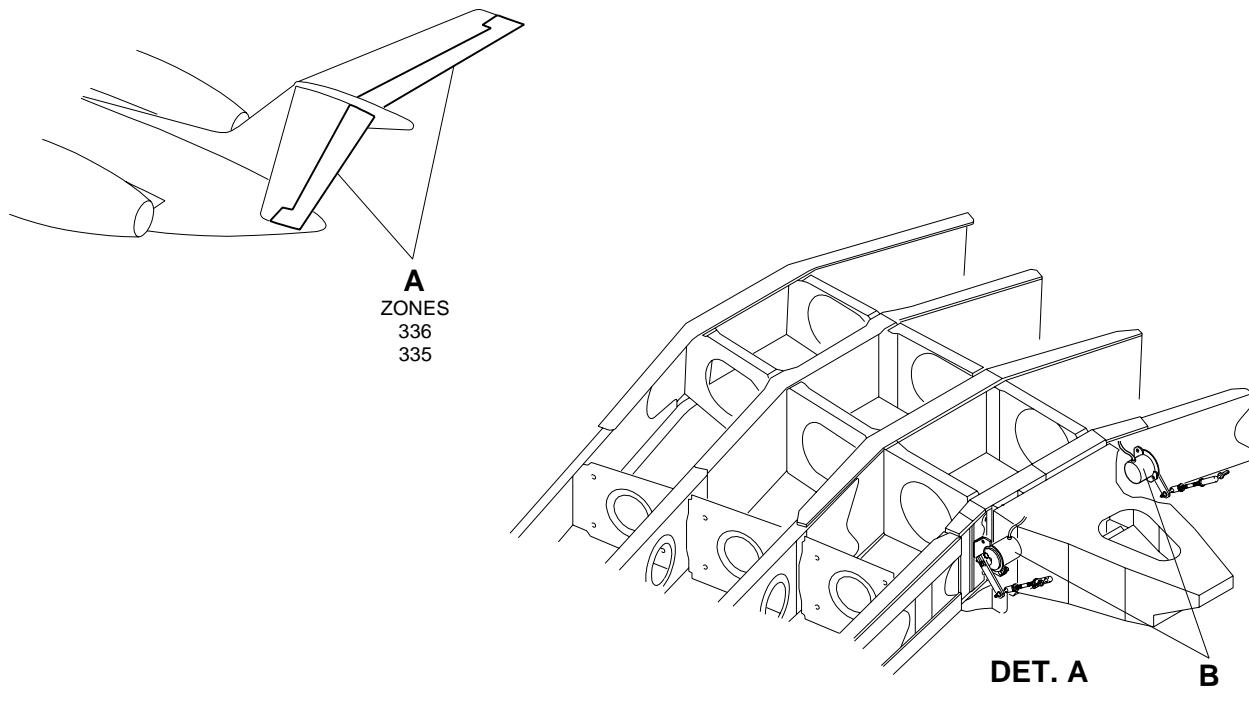
 **INSTALL EXTRA WASHERS AS REQUIRED**

145AMM270635.MCE

EFFECTIVITY: For aircraft with RVDTS/RVITS and mechanical gust lock

RVDTS/RVITS - Mechanical Gust Lock

Figure 407

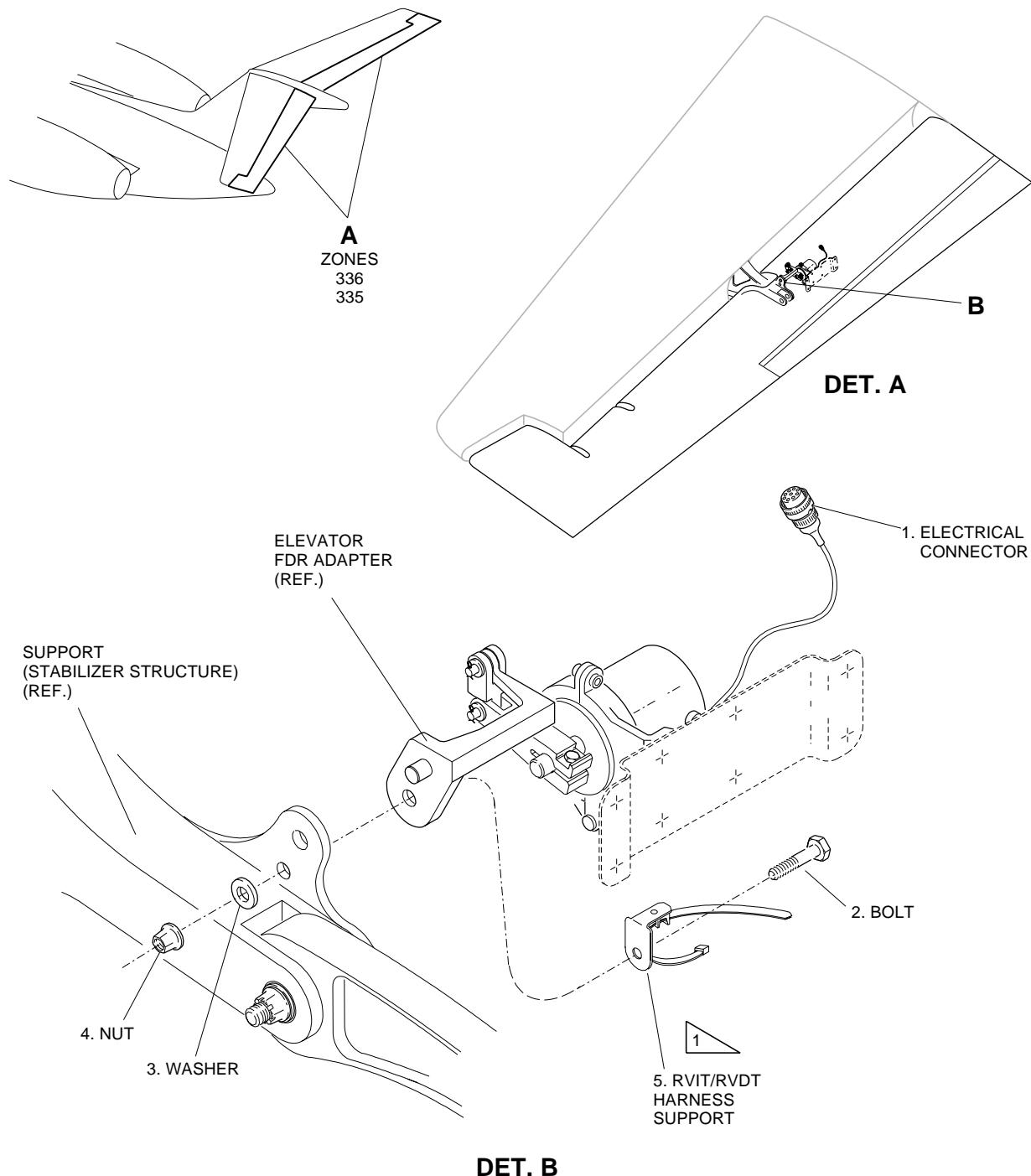


145AMM270651.MCE

EFFECTIVITY: For aircraft with RVDTS/RVITS and electromechanical gust lock

RVDTS/RVITS - Electromechanical Gust Lock

Figure 408



1 POST – MOD S.B.145-31- 0045

145AMM270650A.MCE

TASK 27-30-00-400-801-A
EFFECTIVITY: ALL
3. ELEVATOR - INSTALLATION
A. General

- (1) This procedure gives the instructions to install the elevator.

B. References

| <i>REFERENCE</i> | <i>DESIGNATION</i> |
|---------------------------------|---|
| AMM MPP 06-42-00/100 | - |
| AMM TASK 20-13-21-910-801-A/200 | TYPES OF ELECTRICAL BONDING AND SURFACE PREPARATION - STANDARD PROCEDURES |
| AMM TASK 27-30-00-700-801-A/500 | ELEVATOR CALIBRATION WITH CONTROL-COLUMN POSITION TRANSDUCERS |
| AMM TASK 27-31-00-700-801-A/500 | ELEVATOR PRIMARY MECHANICAL CONTROL BACKLASH - FUNCTIONAL CHECK |
| AMM TASK 27-31-00-700-803-A/500 | ELEVATOR - DEFLECTIONS |
| AMM TASK 27-31-00-700-804-A/500 | ELEVATOR CONNECTING ROD - ADJUSTMENT/CHECK |
| AMM TASK 27-31-04-700-802-A/500 | SERVO-TAB - DEFLECTION |
| AMM TASK 27-31-08-700-801-A/500 | SPRING TAB - ADJUSTMENT |
| AMM TASK 31-31-06-400-802-A/400 | FDR ELEVATOR RVDTS/RVITS - INSTALLATION |
| AMM TASK 31-31-06-820-802-A/500 | FDR ELEVATOR RVDTS/RVITS - CALIBRATION |
| AMM TASK 51-60-00-700-801-A/500 | ELEVATOR STATIC BALANCING |
| AMM TASK 55-20-02-000-802-A/400 | ELEVATOR TORSION-BAR BEARING - REMOVAL |
| AMM TASK 55-36-00-400-801-A/400 | TAIL BOOM - INSTALLATION |
| IPC 27-31-00 | ELEVATOR PRIMARY MECHANICAL CONTROL |
| IPC 27-31-02 | ELEVATOR |
| S.B.145-31-0045 | - |
| SB145-55-0032 | - |

C. Zones and Accesses

| <i>ZONE</i> | <i>PANEL/DOOR</i> | <i>LOCATION</i> |
|-------------|-------------------|-----------------------|
| 333 | | Horizontal stabilizer |
| 334 | | Horizontal stabilizer |

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

| <i>ITEM</i> | <i>DESCRIPTION</i> | <i>PURPOSE</i> | <i>QTY</i> |
|------------------------|--------------------|--------------------------|------------|
| Commercially available | Rubber Gloves | Protection for the hands | 1 |



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(Continued)

| ITEM | DESCRIPTION | PURPOSE | QTY |
|------------------------|-------------|-------------------------|-----|
| Commercially available | Goggles | Protection for the eyes | 1 |

F. Consumable Materials

| SPECIFICATION (BRAND) | DESCRIPTION | QTY |
|--------------------------|---|-----|
| MS24665-153 | Cotter pin | 1 |
| MEP 09-060 | Corrosion-Inhibiting Compound (CA-1000) | AR |
| MEP 09-075 | Corrosion-Inhibiting Compound (COR-BAN 27L) | AR |

G. Expendable Parts

| ITEM | IPC REFERENCE (VENDOR REFERENCE) | QTY |
|------------|-------------------------------------|-----|
| Cotter pin | IPC 27-31-00 | 1 |
| Cotter pin | IPC 27-31-02 | 3 |

H. Persons Recommended

| QTY | FUNCTION | PLACE |
|-----|----------------------------|-----------------------|
| 1 | Does the task | Horizontal stabilizer |
| 1 | Helps the other technician | Horizontal stabilizer |

I. Preparation

SUBTASK 841-003-A

- (1) Make sure that the elevator is statically balanced ([AMM TASK 51-60-00-700-801-A/500](#)).

WARNING: CA-1000 OR COR-BAN 27L CORROSION-INHIBITING COMPOUND IS TOXIC TO SKIN, EYES, AND RESPIRATORY TRACT. USE GOGGLES AND PROTECTIVE GLOVES. USE ONLY IN WELL VENTILATED AREAS. OBEY THE MANUFACTURER'S HEALTH AND SAFETY INSTRUCTIONS.

- (2) Apply CA-1000 or COR-BAN 27L as shown in (Figure 401) or (Figure 402).

J. Installation Figure 401 Figure 402 (Figure 403) (Figure 404) (Figure 405) (Figure 406) (Figure 407) (Figure 408)

SUBTASK 420-002-A

WARNING: BEFORE YOU INSTALL AN ELEVATOR OF AN "ER"-CONFIGURED AIRCRAFT ON AN "LR"-CONFIGURED AIRCRAFT, MAKE SURE THAT THIS ELEVATOR ALREADY INCORPORATES SB 145-27-0034.

- (1) Put the elevator (1) on the stabilizer structure.

- (2) Install the bolt, washers, two bushings, and nut (10) to connect the elevator (1) to the support (9) at the stabilizer structure. Refer to DET. C, (Figure 401) or (Figure 402).

NOTE: Make sure that the bushings of the support (9) at the stabilizer structure are correctly installed and facing the support. If not, install them correctly.

- (3) Install the bolt, washers, bushing, and nut (14) to connect the elevator (1) to the supports (16) at the stabilizer structure (2 positions). Refer to DET. E, (Figure 401) or (Figure 402).

NOTE: Make sure that the bushings of the supports (16) at the stabilizer structure are correctly installed and facing the support. If not, install them correctly.

- (4) ON AIRCRAFT S/N 44 UP TO 725 and POST-MOD **SB145-55-0032** or AIRCRAFT S/N 726 UP TO 791, refer to (Figure 405) or (Figure 406) do as follows:

- (a) Refer to DET. B and DET. C and measure the gap between the bushing and the nut at the left end of pivot bolt, to define the quantity of extra washer(s) to be installed.

- (b) If the gap is greater than 0.5 mm (0.020 in), do as follows:

- 1 Install extra washer(s) in the gap, as shown in DET. E.

- 2 Refer to DET. E and measure the dimension "x" (between the washer and extra washer(s) at the bushing-nut side). This dimension must be between 0.2 mm (0.008 in) and 0.5 mm (0.020 in).

- (c) If the gap is less than 0.2 mm (0.008 in), do as follows:

- 1 Remove extra washer(s) in the gap, as shown in DET. E.

NOTE: If there is (are) no extra washer(s) in the gap, make sure that the bushings of the support (9) at the stabilizer structure are correctly installed and facing the support. Refer to DET.C, (Figure 401) or (Figure 402).

- 2 Refer to DET. E and measure the dimension "x" (between the bushing and washer at the bushing-nut side). This dimension must be between 0.2 mm (0.008 in) and 0.5 mm (0.020 in).

- (5) ON AIRCRAFT S/N 44 UP TO 725 and POST-MOD **SB145-55-0032** or AIRCRAFT S/N 726 UP TO 791, refer to (Figure 405) or (Figure 406) do as follows:

- (a) Refer to DET. D and measure the gap between the bushing and the nut and between the bushing and the bolt head side, to define the quantity of extra washer(s) to be installed.

- (b) If the gaps are greater than 0.5 mm (0.020 in), do as follows:

- 1 Install extra washer(s) in the gap, as shown in DET. E and DET. F.

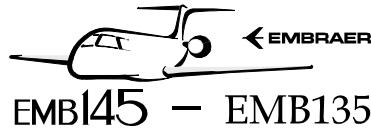
- 2 Refer to DET. E and DET. F and measure the dimensions "x" (between the washer and extra washer(s) at the bushing-nut side) and "y" (between the washer and extra washer(s) at the bushing-bolt head side). These dimensions must be between 0.2 mm (0.008 in) and 0.5 mm (0.020 in).

- (c) If the gap is less than 0.2 mm (0.008 in), do as follows:
- 1 Remove extra washer(s) in the gap, as shown in DET. E and DET. F.

NOTE: If there are no extra washer(s) in the gap, make sure that the bushings of the supports (16) at the stabilizer structure are correctly installed and facing the support. Refer to DET.C, (Figure 401) or (Figure 402).
 - 2 Refer to DET. E and DET. F and measure the dimensions "x" (between the bushing and the washer at bushing-nut side) and "y" (between the bushing and the washer at the bushing-bolt head side). These dimensions must be between 0.2 mm (0.008 in) and 0.5 mm (0.020 in).
- (6) Attach the torque tube of the elevator (1) to the stabilizer structure with the bolts, washers, and nuts (4) (4 positions) and, if you removed shims, install them back in the same position. Refer to DET. B, (Figure 401) or (Figure 402).
- (7) Install cotter pins to the bolts (14) (2 positions) and (10). Refer to , DET. E and DET. C, (Figure 401) or (Figure 402).
- (8) Put the end of the rod (13) in the support (11) at the stabilizer structure and attach it with the bolt, washers, bushing, nut, and cotter pin (12). Refer to , DET. D, (Figure 401) or (Figure 402).
- (9) Do the check of the rod (2) that connects the elevator to the rear quadrant and adjust it if necessary ([AMM TASK 27-31-00-700-804-A/500](#)).
- (10) Put the end of the rod (2) in the bellcrank (3) of the elevator (1) and attach it with the bolt, washer, bushing, nut, and cotter pin (7). Refer to DET. B, (Figure 401) or (Figure 402).
- (11) Connect the bonding strap (6) to the bellcrank (3) of the elevator (1) with the bolt, washers and nut (5). Refer to DET. B, (Figure 401) or (Figure 402).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding strap (6).
- (12) Connect the bonding straps (15) (2 positions) and (8) to the supports (16) (2 positions) and (9) at the stabilizer structure with the bolt, washers and nut (17). Refer to DET. F, (Figure 401) or (Figure 402).

NOTE: Refer to [AMM TASK 20-13-21-910-801-A/200](#) for the correct installation of the bonding straps (15) and (8).
- (13) Remove the rig pin from the rear sector.
- (14) (For aircraft with RVDTS/RVITS and mechanical gust lock without provisions for electromechanical gust lock) Reconnect the RVDTS/RVITS electrical connector and install the washer (4) and nut (3) to connect the rod to the elevator surface. Refer to (Figure 407).
- (15) (For aircraft with RVDTS/RVITS and electromechanical gust lock or with provisions for it PRE-MOD. [S.B.145-31-0045](#)) Reconnect the RVDTS/RVITS electrical connector and



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install the bolt (2), washer (3) and nut (4), and then, carefully reconnect the elevator FDR adapter to the stabilizer structure. Refer to (Figure 408).

- (16) (For aircraft with RVDTS/RVITS and electromechanical gust lock or with provisions for it POST-MOD. [S.B.145-31-0045](#)) Install the bolt (2), washer (3), RVDT/RVIT harness support (5), and nut (4), to reconnect the elevator FDR adapter to the stabilizer structure and install the RVDTS/RVITS ([AMM TASK 31-31-06-400-802-A/400](#)). Refer to (Figure 408).

K. Follow-on

SUBTASK 842-002-A

- (1) Adjust the spring-tab ([AMM TASK 27-31-08-700-801-A/500](#)).

- (2) Do the elevator deflection test ([AMM TASK 27-31-00-700-803-A/500](#)).

- (3) Do the servo-tab deflection test ([AMM TASK 27-31-04-700-802-A/500](#)).

NOTE: Do this step only if you replaced the elevator with a new one or if you replaced it with an elevator used on other aircraft, or if you changed the shims of the servo-tab support.

- (4) Do the RVDTS/RVITS calibration procedure ([AMM TASK 31-31-06-820-802-A/500](#)).

- (5) Do a check of the elevator primary mechanical control backlash ([AMM TASK 27-31-00-700-801-A/500](#)).

NOTE: Do this step only if you replaced the elevator with a new one, if you replaced it with an elevator used on other aircraft or if you replace any bearings elevator torsion bar, refer to ([AMM TASK 55-20-02-000-802-A/400](#)).

- (6) Install access panels 335CB, 335DB, 335EB, 335FB, 335GB, and 335HB or 336CB, 336DB, 336EB, 336FB, 336GB and 336HB (AMM MPP 06-42-00/100).

- (7) Install front fairings 321 of the vertical stabilizer ([AMM TASK 55-36-00-400-801-A/400](#)).

- (8) Do the elevator calibration with the control-column position transducers ([AMM TASK 27-30-00-700-801-A/500](#)).

NOTE: Do this step only If you replaced the elevator and/or the horizontal stabilizer with a new one or if you replaced them with an elevator and/or an horizontal stabilizer used on other aircraft

