



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

PULLEYS - REMOVAL/INSTALLATION

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to remove and install the pulleys of the aircraft.
- B. This procedure is applicable to the pulleys installed in the fuselage, vertical stabilizer, landing-gear free-fall system, and emergency parking brake system.
- C. 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
20-20-02-000-801-A	PULLEYS - REMOVAL (TYPICAL)	ALL
20-20-02-400-801-A	PULLEYS - INSTALLATION	ALL



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TASK 20-20-02-000-801-A

EFFECTIVITY: ALL

2. PULLEYS - REMOVAL (TYPICAL)

A. General

- (1) This task gives the typical procedures to remove pulleys.

B. References

REFERENCE	DESIGNATION
AMM MPP 20-10-02/200	- MAINTENANCE PRACTICES

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

QTY	FUNCTION	PLACE
1	Does the task	N/A

I. Preparation

SUBTASK 841-002-A

- (1) Do the procedure to make the aircraft safe for maintenance [AMM MPP 20-10-02/200](#).

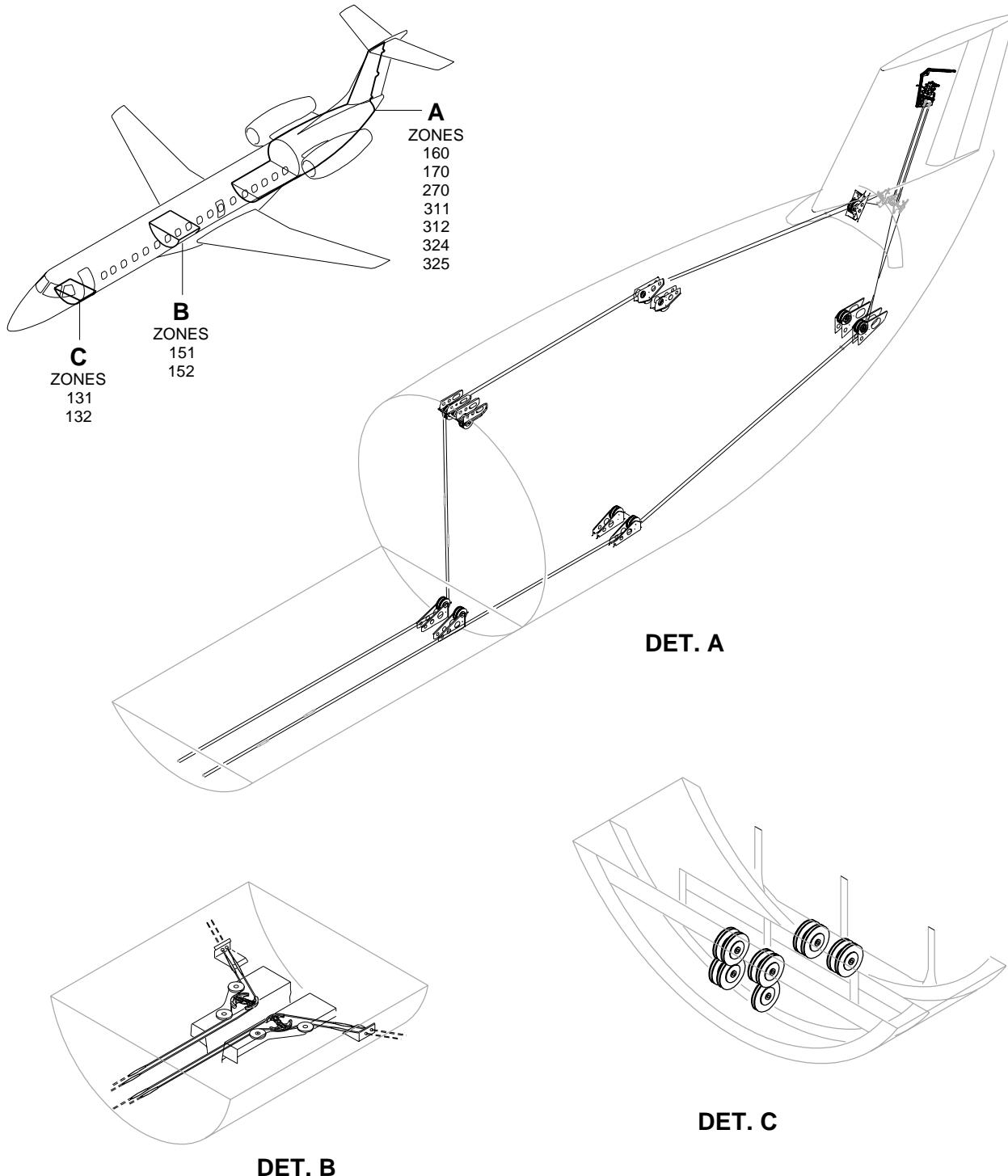
J. Removal (Typical) ([Figure 402](#)) ([Figure 403](#)) ([Figure 404](#)) ([Figure 405](#)) ([Figure 406](#)) ([Figure 407](#))

SUBTASK 020-002-A

- (1) Remove the cotter pin.
- (2) Remove the nut and washer.
- (3) Remove the bolt, spacers, pulley, bushings, and washers as applicable.

NOTE: Mark the position of these components to know how to install them back correctly.

EFFECTIVITY: ALL
 Pulleys - Location
 Figure 401

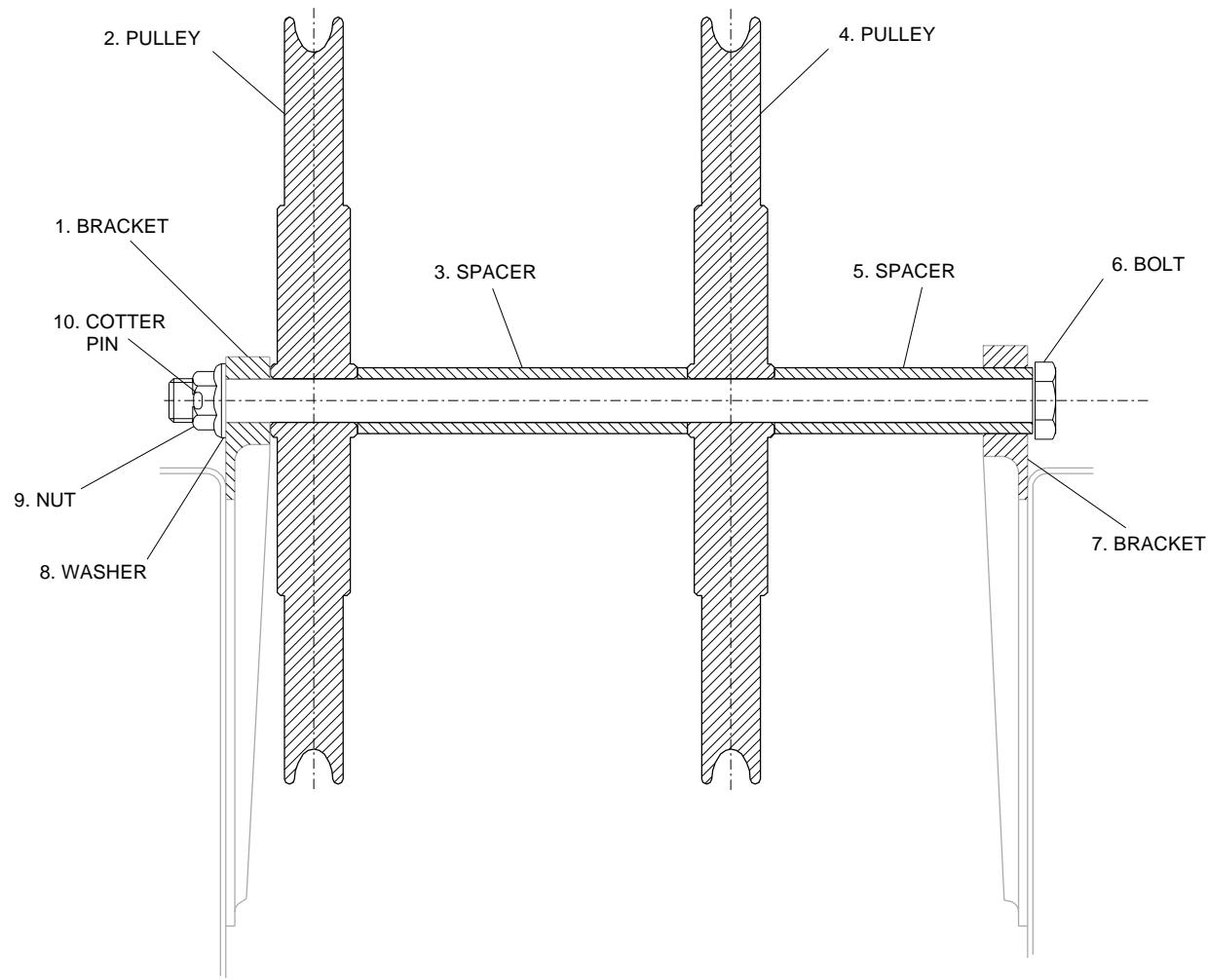


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EFFECTIVITY: ALL

Pulleys Type 1 - Removal/Installation

Figure 402

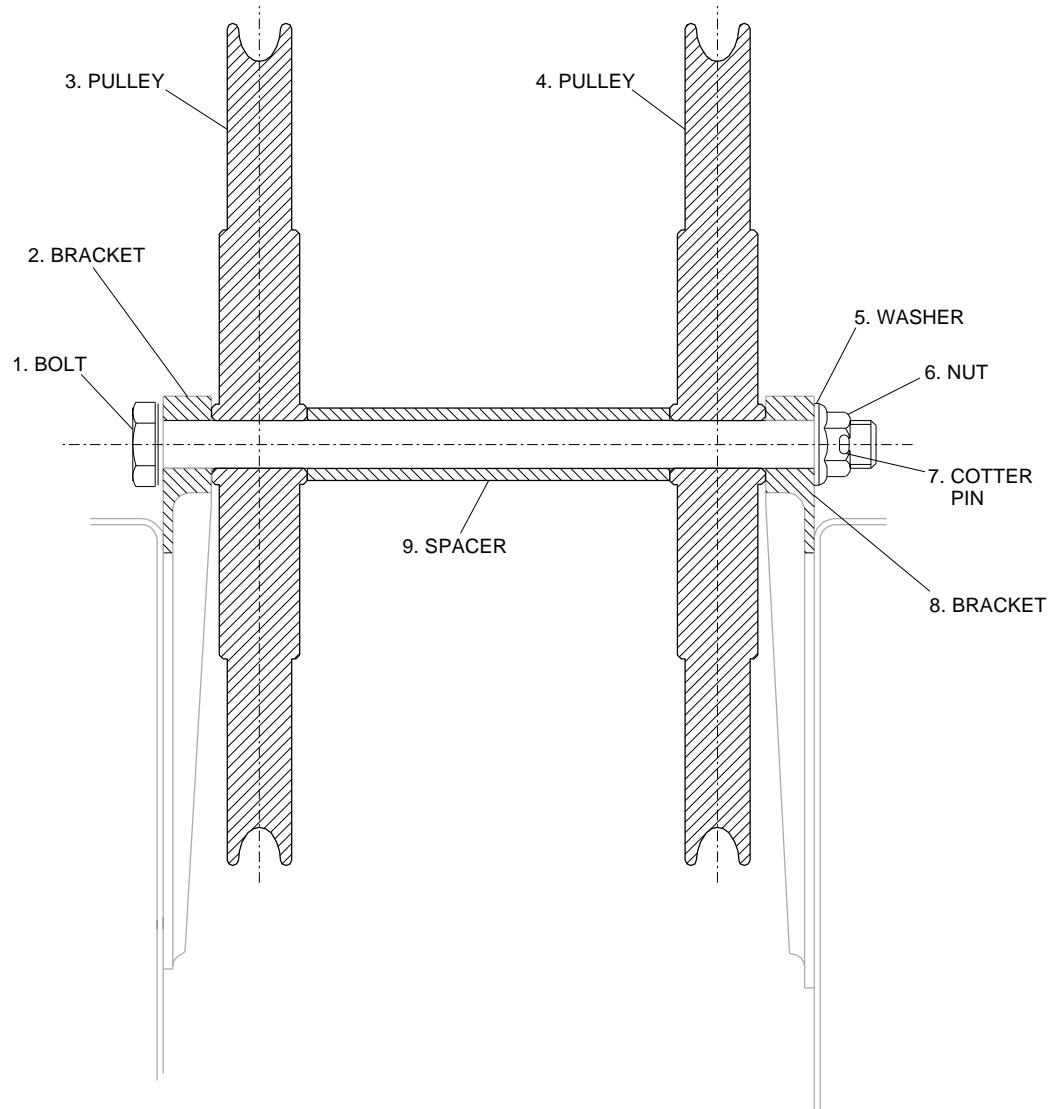


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EFFECTIVITY: ALL

Pulleys Type 2 - Removal/Installation

Figure 403

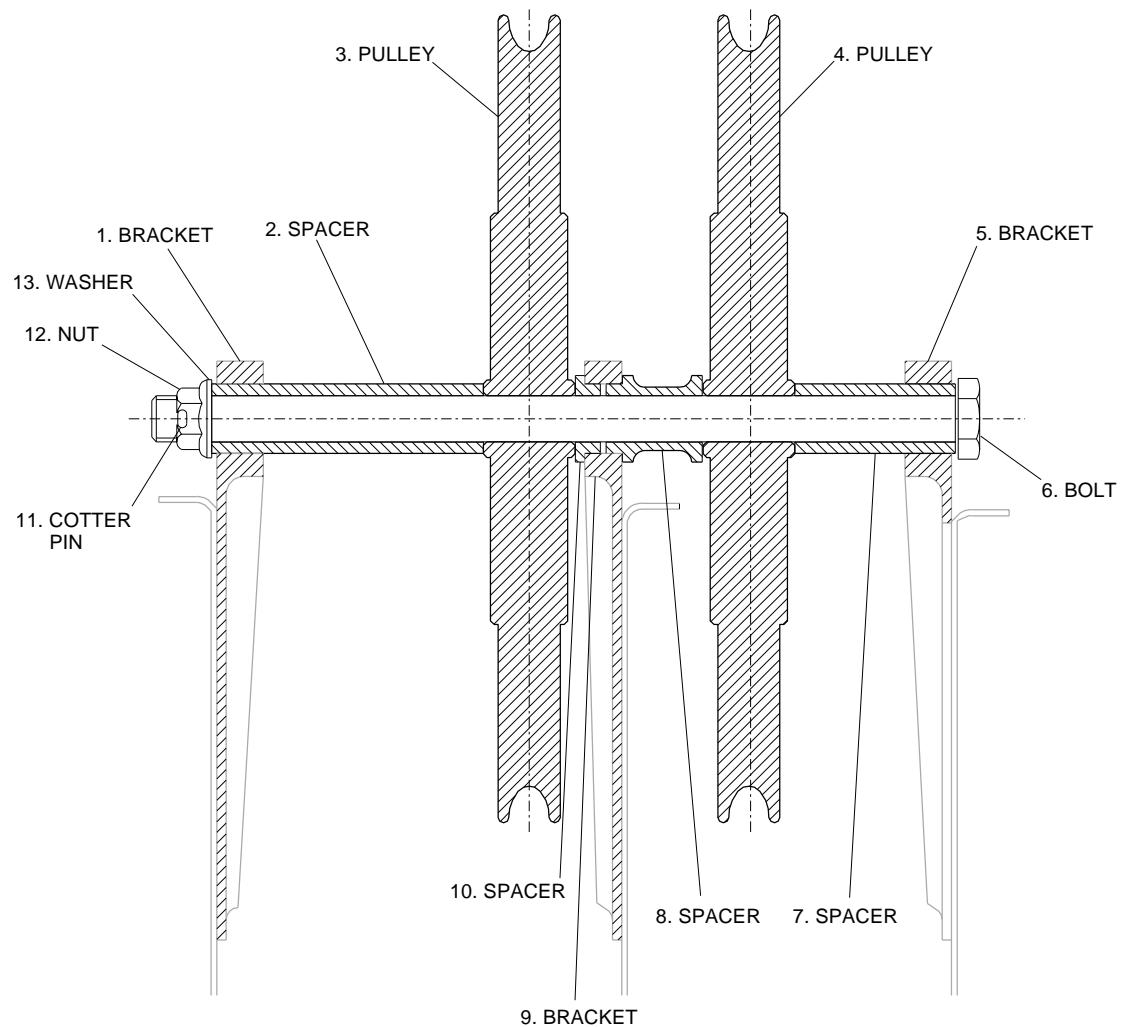


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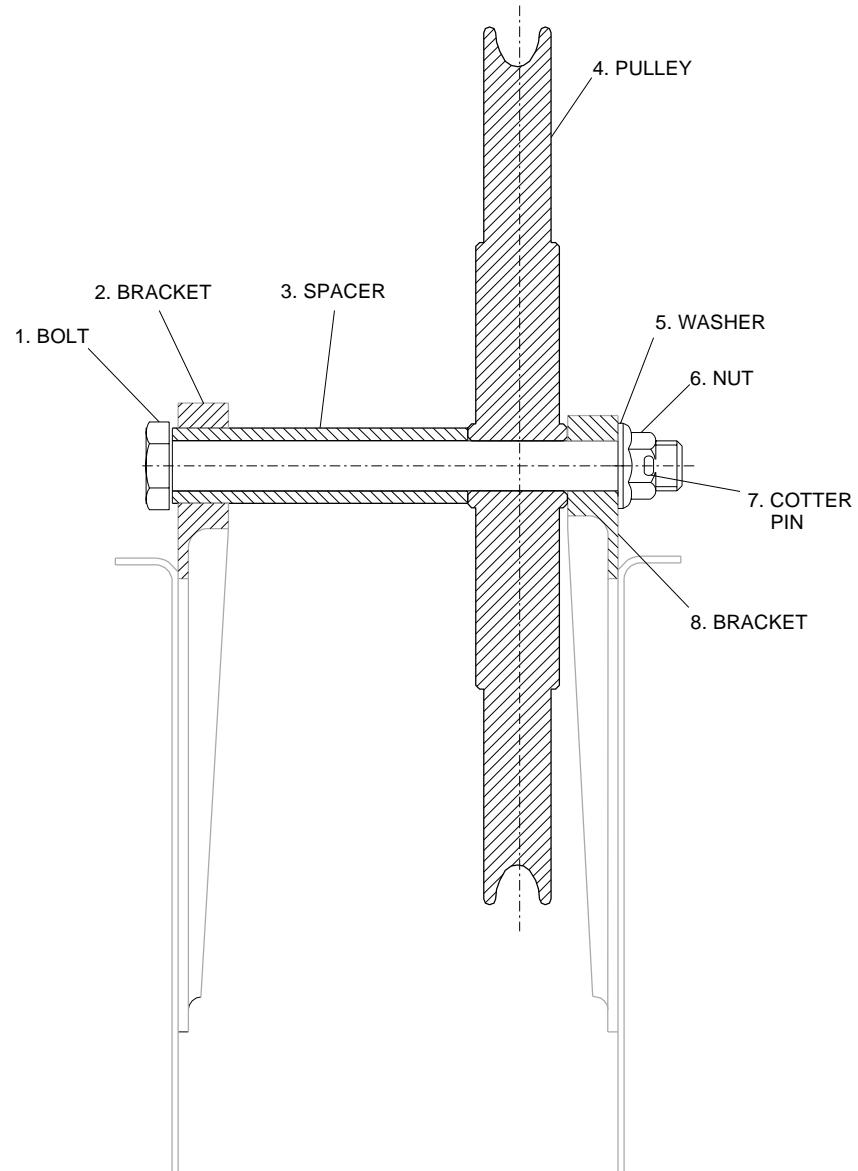
EFFECTIVITY: ALL
Pulleys Type 3 - Removal/Installation
Figure 404


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EFFECTIVITY: ALL

Pulleys Type 4 - Removal/Installation

Figure 405

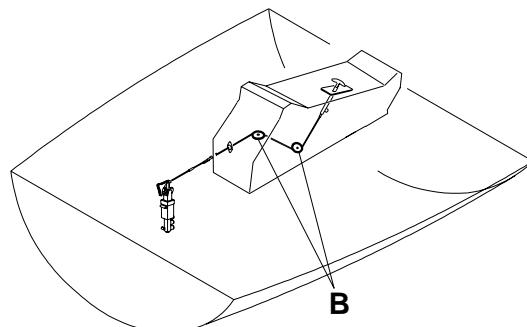
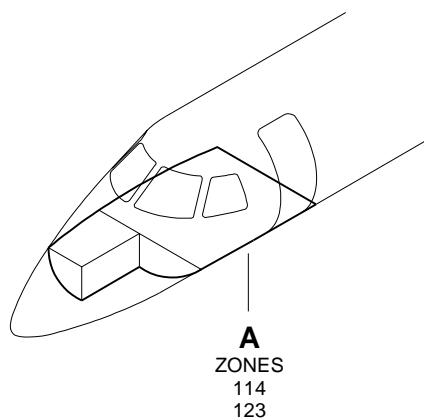


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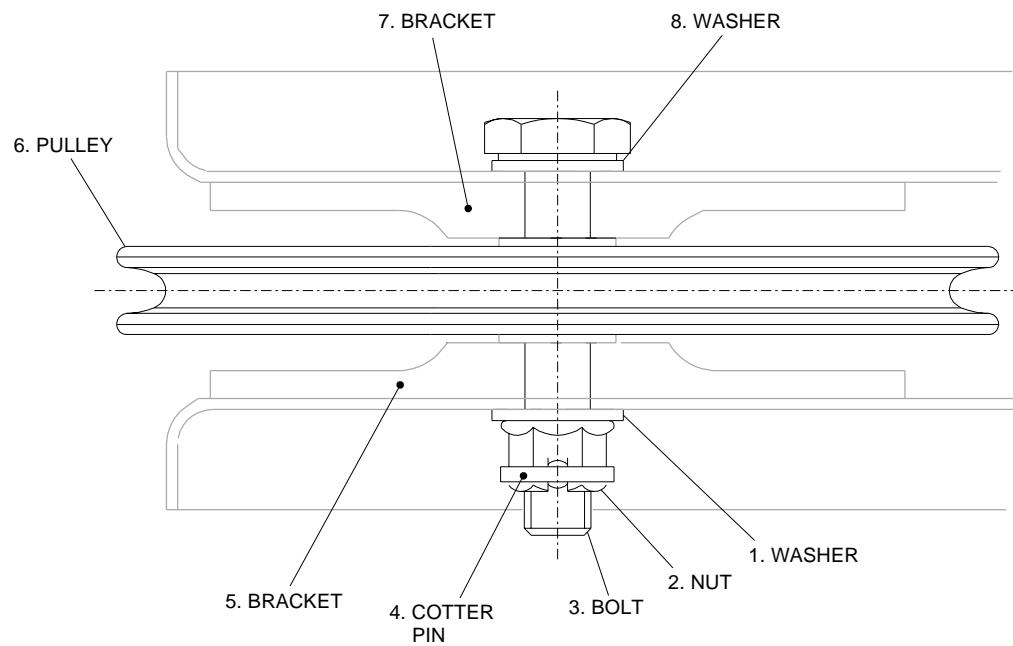
EFFECTIVITY: ALL

Pulleys of the Emergency Parking Brake System - Removal/Installation

Figure 406



DET. A



DET. B

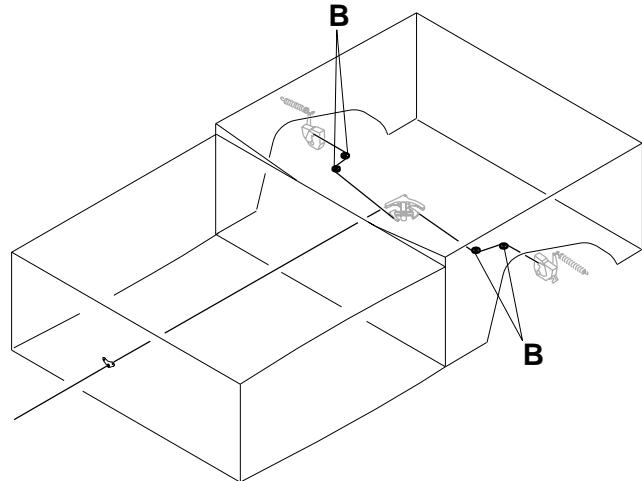
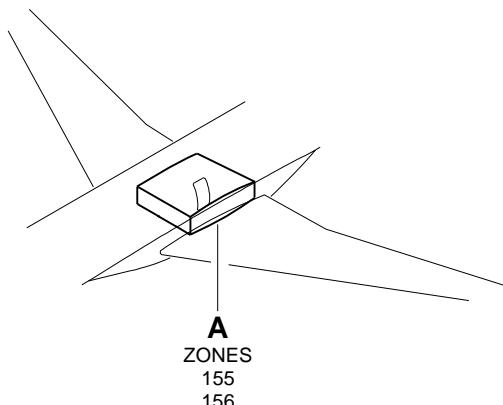
TYPICAL

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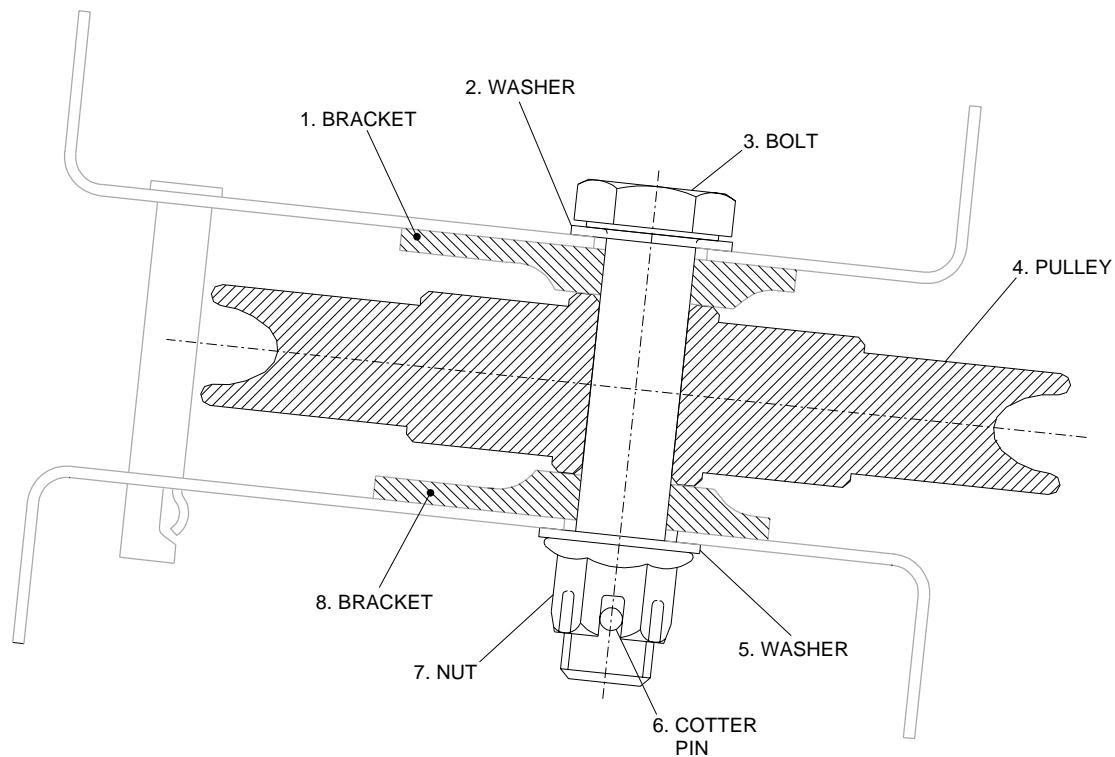
EFFECTIVITY: ALL

Pulleys of the Landing-Gear Free-Fall system - Removal/Installation

Figure 407



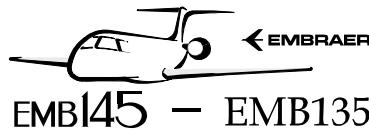
DET. A



DET. B

TYPICAL

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TASK 20-20-02-400-801-A

EFFECTIVITY: ALL

3. PULLEYS - INSTALLATION

A. General

- (1) This task gives the procedures to install the pulleys of aircraft.

B. Zones and Accesses

Not Applicable

C. Tools and Equipment

Not Applicable

D. Auxiliary Items

Not Applicable

E. Consumable Materials

Not Applicable

F. Expandable Parts

Not Applicable

G. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	N/A

H. Installation

SUBTASK 420-002-A

- (1) Install the pulleys as follows. Use the applicable procedure:

- (2) Typical Assembly Type 1 (Figure 402) (for pulleys installed in the fuselage and vertical stabilizer) (Figure 401).

- (a) Put the bolt (6) in the hole of the bracket (7).
- (b) Put the spacer (5), pulley (4), spacer (3), and pulley (2) in position and put the bolt (6) in the hole of the bracket (1).
- (c) Put the washer (8) and nut (9) on the bolt (6).
- (d) Tighten the nut (9) until it touches the structure surface.
- (e) Turn the nut (9) by a 1/4 turn more.

NOTE: Make sure that the hole of the bolt is aligned with the slots of the nut. If they are not, tighten the nut until they align.

- (f) Install the cotter pin (10).

- (3) Typical Assembly Type 2 (Figure 403) (for pulleys installed in the fuselage and vertical stabilizer) (Figure 401).



- (a) Put the bolt (1) in the hole of the bracket (2).
- (b) Put the pulley (3), spacer (9), and pulley (4) on bolt (1).
- (c) Put the bolt (1) in the hole of the bracket (8).
- (d) Put the washer (5) and nut (6) on the bolt (1).
- (e) Tighten the nut (6) until it touches the structure surface.
- (f) Turn the nut (6) by a 1/4 turn more.

NOTE: Make sure that the hole of the bolt is aligned with the slots of the nut. If they are not, tighten the nut until they align.

- (g) Install the cotter pin (7).
- (4) Typical Assembly Type 3 (Figure 404) (for pulleys installed in the fuselage and vertical stabilizer) (Figure 401).
- (a) Put the bolt (6) in the hole of the bracket (5).
 - (b) Put the spacer (7), pulley (4), and spacer (8) on the bolt (6).
 - (c) Put the bolt (6) in the hole of the bracket (9).
 - (d) Put the spacer (10), pulley (3), and spacer (2) on the bolt (6).
 - (e) Put the bolt (6) in the hole of the bracket (1).
 - (f) Put the washer (13) and nut (12) on the bolt (6).
 - (g) Tighten the nut (12) until it touches the structure surface.
 - (h) Tighten the nut (12) by a 1/4 turn more.
- NOTE: Make sure that the hole of the bolt is aligned with the slots of the nut. If they are not, tighten the nut until they align.
- (i) Install the cotter pin (11).
- (5) Typical Assembly Type 4 (Figure 405) (for pulleys installed in the fuselage and vertical stabilizer) (Figure 401).
- (a) Put the bolt (1) in the hole of the bracket (2).
 - (b) Put the spacer (3) and pulley (4) on the bolt (1).
 - (c) Put the bolt (1) in the hole of the bracket (8).
 - (d) Put the washer (5) and nut (6) on the bolt (1).
 - (e) Tighten the nut (6) until it touches the structure surface.
 - (f) Tighten the nut (6) by a 1/4 turn more.



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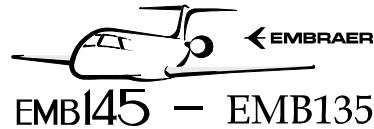
NOTE: Make sure that the hole of the bolt is aligned with the slots of the nut. If they are not, tighten the nut until they align.

- (g) Install the cotter pin (7).
- (6) Procedure Applicable to Pulleys of the Emergency/Parking Brake System (Figure 406).
 - (a) Put the washer (8) on the bolt (3).
 - (b) Put the bolt (3) in the hole of the bracket (7).
 - (c) Put the pulley (6) on bolt (3).
 - (d) Put the bolt (3) in the hole of the bracket (5).
 - (e) Put the washer (1) and nut (2) on the bolt (3).
 - (f) Tighten the nut (2) until it touches the structure surface.
 - (g) Tighten the nut (2) by a 1/4 turn more.
- NOTE: Make sure that the hole of the bolt is aligned with the slots of the nut. If they are not, tighten the nut until they align.

 - (h) Install the cotter pin (4).
- (7) Procedure Applicable to Pulleys of the Landing-Gear Free-Fall System (Figure 407).
 - (a) Put the washer (2) on the bolt (3).
 - (b) Put the bolt (3) in the hole of the bracket (1).
 - (c) Put the pulley (4) on the bolt (3).
 - (d) Put the bolt (3) in the hole of the bracket (8).
 - (e) Put the washer (5) on the bolt (3).
 - (f) Tighten the nuts (7) as follows:
 - 1 Make sure that the threads of the nut and the bolt fully engage.

NOTE: The base of the nut must not touch the structure surface.
 - 2 Turn the nut and measure the locking torque with a torque wrench.
 - 3 Make sure that the locking torque is in the range of 0.734 - 6.78 N.m (6.5 - 60 lb.in).

NOTE: Replace the nut that is not in the correct range. If you replace a nut, do steps (1), (2), and (3) again.
 - 4 Add the locking torque value measured in step (2) to the standard torque (11.3 - 15.8 N.m (100 - 140 lb.in)) to get the final torque.
 - 5 Use a torque wrench to apply the final torque to the nut.



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NOTE: Tighten the nut to the bolt to remove the clearance. Then, torque the nut as necessary to align slots with the cotter pin hole in the bolt. If necessary, continue to torque the nut until you get the alignment. Be careful not to apply more than the maximum permitted torque value.

6 Install the cotter pin (6).

I. Follow-on

SUBTASK 842-002-A

- (1) Put the aircraft back to the original condition.

