CHAPTER

55

STABILIZERS

CHAPTER 55 - STABILIZERS
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STABILIZERS - DESCRIPTION AND OPERATION

1. General

This topic gives a general description of the structure, and method of construction, of the stabilizers. For detailed information about the types and thicknesses of materials used refer to the Structural Repair Manual.

The stabilizers comprise the horizontal stabilizer, elevators, vertical stabilizer, rudder and trim tab.

2. Description

A. Horizontal Stabilizer

The horizontal stabilizer is a graphite box construction comprising:

- a one-piece tub section which forms the bottom skin, leading edge and front and rear spars
- three mechanical fastened and bonded ribs (one at each elevator hinge position)
- a mechanically fastened and bonded top skin.

The top and bottom skins are stiffened using nomex-honeycomb between the spars, and the ribs give extra strength for the elevator attachment fittings.

The horizontal stabilizer moves to give pitch trim and is connected to the top of the vertical stabilizer by two hinges and an actuator ram attachment. For the operation of the horizontal stabilizer refer to 27-40-00.

B. Elevators

The elevators are constructed of metallic honeycomb with thin aluminum skins and a single spar. Each elevator is aerodynamically and mass balanced and is connected to the rear spar of the horizontal stabilizer by three hinges. For the operation of the elevators refer to 27-30-00.

C. Vertical Stabilizer

For description of vertical stabilizer refer to Chapter 53-00-00.

D. Rudder

The rudder structure comprises:

- a machined front spar in which the rotation hinges are made out;
- a sheet-made lateral skin with form ribs;
- a sheet-made rear spar for the attachment of the tab hinges;
- a sheet-made leading edge.

E. Trim Tab

The trim tab is metal-made.
For the operation of the trim tab refer to 27-20-00.

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HORIZONTAL STABILIZER - MAINTENANCE PRACTICES

1. General

A. This pageblock gives the Inspection/Check for the structural parts of the horizontal stabilizer.

B. For the Removal/Installation and Adjustment/Test of the horizontal stabilizer refer to 27-40-00.

2. Horizontal Stabilizer - Inspection (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access Platforms 10ft (3m)	Not Specified
Warning Notice	Not Specified

B. Referenced Information

Maintenance Manual Chapter 51-15-00

C. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platforms in position on each side of the vertical stabilizer.
(3) Remove the elevator hinge access panels.
(4) Examine the upper and lower skins of the horizontal stabilizer for the following:
- damage, cracks and delamination
- blistering and flaking of the paint finish.

(5) Examine the fillet panels for damage, cracks and security of attachment to the horizontal stabilizer.
(6) Examine the fasteners for working and looseness. Use a feeler gauge to check the flushness (Refer to 51-15-00).

NOTE: Cracking or flaking of the paint around fastener heads is an indication of loose fasteners.

(7) Examine the elevator hinge attachments for the following:
- security of attachment to the rear spar of the horizontal stabilizer
- damage, cracks and excessive wear
- make sure the fasteners are not loose (use a feeler gauge to check for flushness)
- move the elevator by hand to check for excessive wear of the elevator hinge bushings.

(8) Repair or replace any defective parts as necessary.
(9) Install the elevator hinge access panels.
(10) Remove the access platforms.
(11) Remove the Warning Notice from the flight compartment.

3. Horizontal Stabilizer Left Hinge - Clearance Check (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access platform 10 ft (3 m)	Not Specified
Strong Light Source	Not Specified
Warning Notice	Not Specified

B. Referenced Information

Maintenance Manual Chapter 27-40-00
Maintenance Manual Chapter 55-30-00

C. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platform in position on the left side of the vertical stabilizer.
(3) Remove the center LH fairing from the vertical stabilizer (Refer to 55-30-00).
(4) Use a feeler gauge to check the clearance at the left hinge (Refer to 27-40-00).
(5) If the clearance is not correct install a new shim washer (Refer to 27-40-00).
(6) Install the center LH fairing to the vertical stabilizer (Refer to 55-30-00).
(7) Remove the access platform.
(8) Remove the Warning Notice from the flight compartment.

4. Horizontal Stabilizer Fillet Panel - Removal (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access platform 10 ft (3 m)	Not Specified
Warning Notice	Not Specified

B. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platform in position on the left side of the vertical stabilizer.
(3) Remove the screws that secure the fillet at the vertical stabilizer.
(4) Slide the fillet from the horizontal stabilizer.

5. Horizontal Stabilizer Fillet Panel - Installation (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access platform 10 ft (3 m)	Not Specified

B. Materials

DOWN CORNING 33	Not Specified

C. Procedure

(1) Put in position the RH or LH fillet panel at the vertical stabilizer top.
(2) Secure the fillet to the structure with its own screws using grease DOWN CORNING 33.
(3) Remove the access platforms
(4) Remove the Warning notice from the flight compartment.

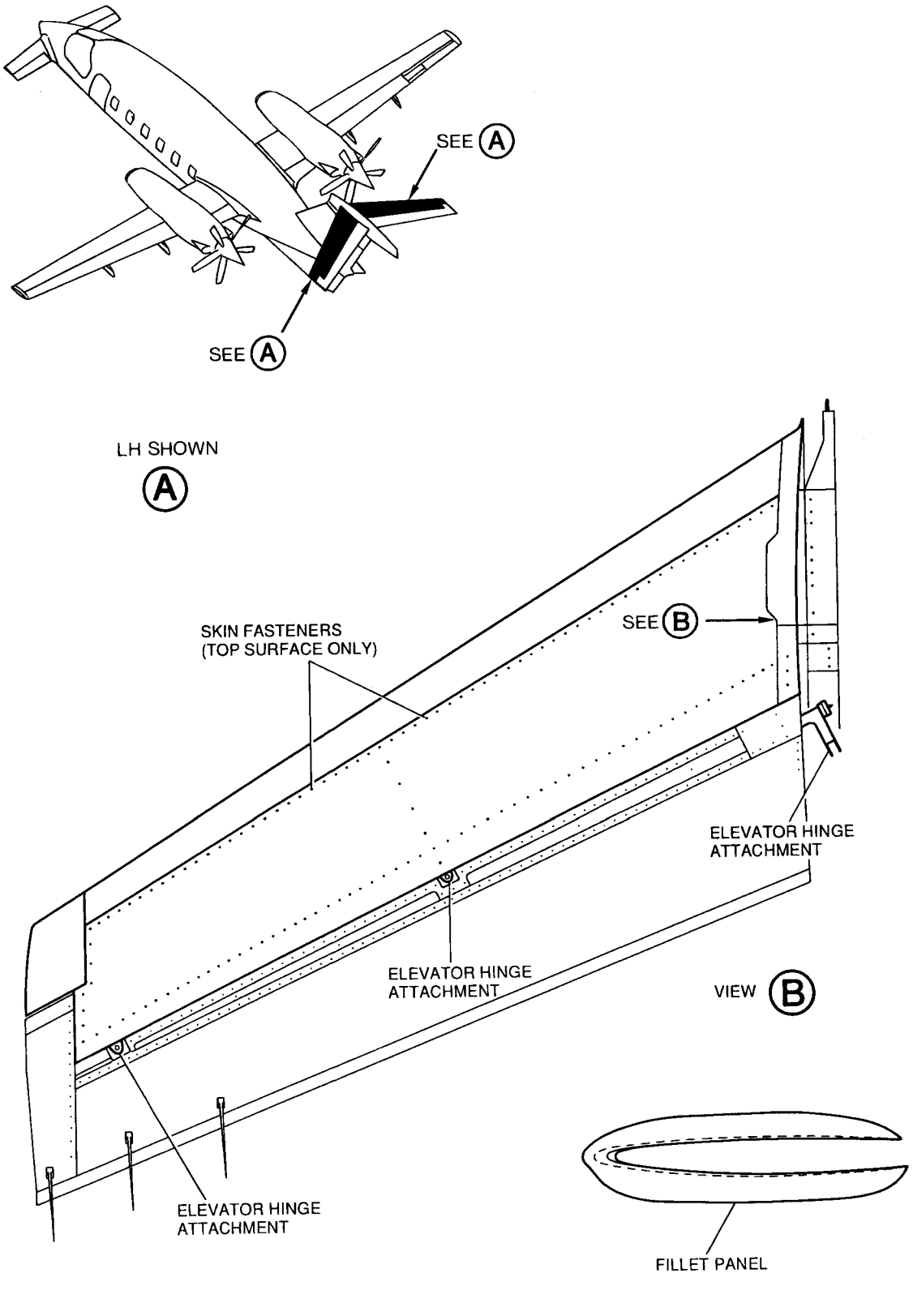

Fig. 201 - Horizontal Stabilizer - Inspection

ELEVATOR - MAINTENANCE PRACTICES

1. General

A. This pageblock gives the Inspection of the structural parts of the elevator.

B. For the Removal/Installation and Adjustment/Test of the elevator refer to 27-30-00.

2. Elevator - Inspection (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access Platforms 10 ft (3 m)	Not Specified
Warning Notice	Not Specified

B. Referenced Information

Maintenance Manual Chapter 27-30-00

C. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platforms in position on each side of the vertical stabilizer.
(3) Examine the upper and lower skins of the elevator for the following:
- damage, cracks and deformation
- corrosion
- blistering and flaking of the paint finish.

(4) Examine the fasteners which attach the leading edge for working and looseness.
(5) Examine the static dischargers (three each elevator) for security of attachment and serviceability.
(6) Remove the elevator hinge access panels and examine the linkages for:
- damage, cracks and corrosion
- excessive wear (Refer to 27-30-00).

(7) Examine the elevator balance horn cover for the following:
- damage and corrosion
- security of attachment to the elevator
- signs of contact with the horizontal stabilizer.

(8) Repair or replace any defective parts as necessary.
(9) Install the elevator hinge access panels.
(10) Remove the access platforms.
(11) Remove the Warning Notice from the flight compartment.

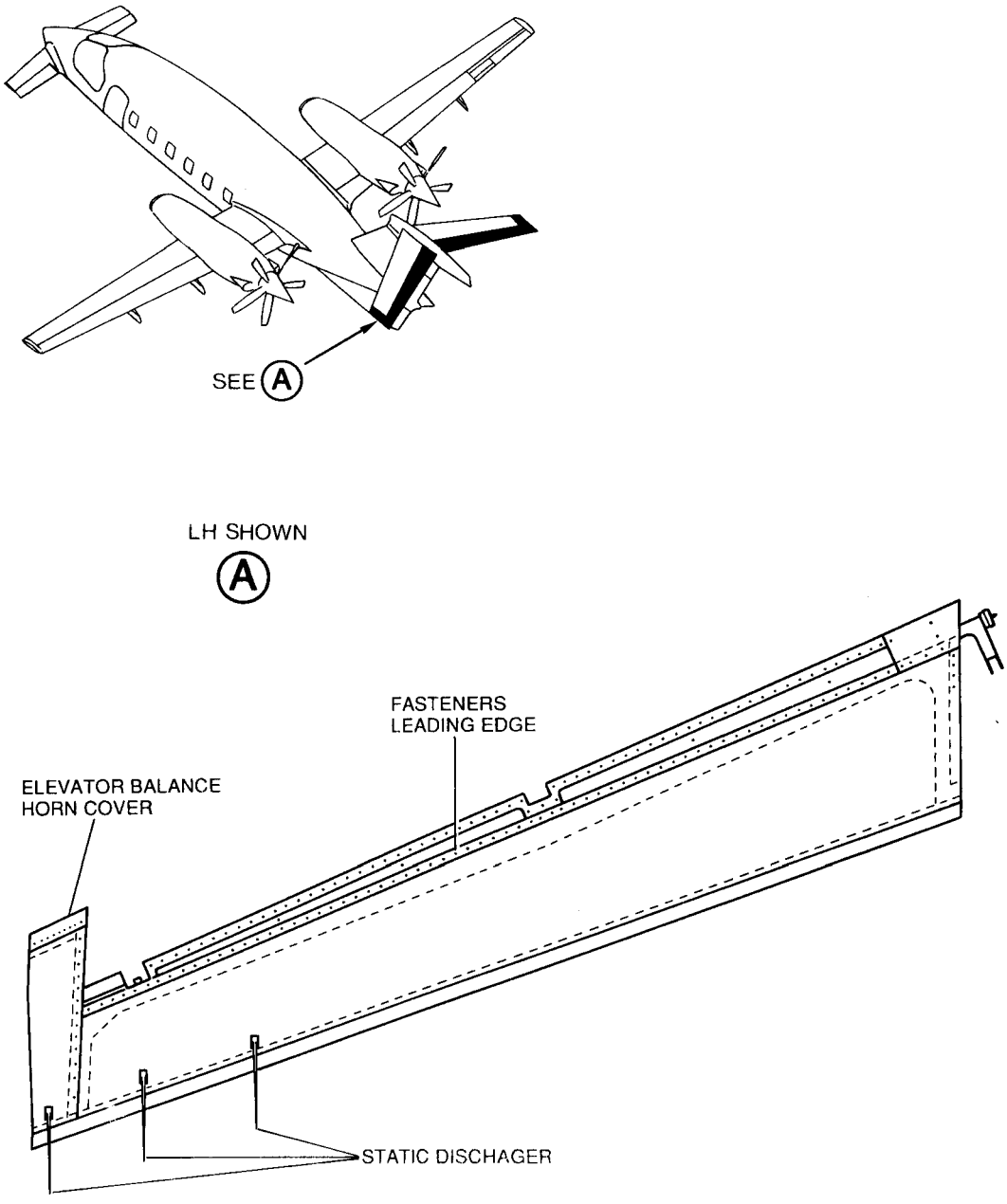

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Fig. 201 - Elevator - Inspection

VERTICAL STABILIZER - MAINTENANCE PRACTICES

1. General

A. This topic gives the Removal/Installation procedures for the vertical stabilizer fairings and the Inspection of the vertical stabilizer and fairings.

B. The vertical stabilizer is integral with the tailcone and is not removeable. If any damage is found refer to 51-10-00. If the damage exceeds the limits given, contact the manufacturer for a suitable Repair Scheme.

2. Vertical Stabilizer Fairings - Removal (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access Platforms 12 ft (4 m)	Not Specified
Warning Notice	Not Specified

B. Referenced Information

Maintenance Manual Chapter 33-42-00
Maintenance Manual Chapter 55-10-00

C. Procedure

NOTE: This procedure is divided into a separate sub-procedure for each of the five fairings.

(1) Remove the forward fairing (1)

(a) Open, tag and safety this circuit breaker:

Copilot CB panel:
RCNG LT

(b) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.

(c) Put the access platforms in position on each side of the vertical stabilizer.

(d) Unscrew the ten screws (2) that secure the RH Horizontal Stabilizer Fillet panel in its own position.

(e) Remove the RH Horizontal Stabilizer Fillet Panels (Refer to 55-10-00).

(f) Unscrew the ten screws that secure the LH Horizontal Stabilizer Fillet panel in its own position.

(g) Remove the LH Horizontal Stabilizer Fillet Panels (Refer to 55-10-00).

(h) Remove the bolts (12) which attach the fairing (1) to the vertical stabilizer.

(i) Remove the four screws (3) that secure the Anticollision Light Power Supply (4) to the Fairing.

(j) Remove the fairing (1).

(2) Remove the center top fairing (3)

(a) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(b) Put the access platforms in position on each side of the vertical stabilizer.
(c) Disconnect the electrical connector from the Anticollision Light Power Supply.
(d) Remove the anticollision light (Refer to 33-42-00).
(e) Remove the bolts (4) which attach the fairing (3) to the vertical stabilizer.
(f) Remove the fairing (3).

(3) Remove the center LH fairing (10)
(a) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(b) Put an access platform in position on the LH side of the vertical stabilizer.
(c) Remove the horizontal-stabilizer LH fillet-panel (Refer to 55-10-00).
(d) Remove the bolts (8) which attach the fairing (10) to the vertical stabilizer.
(e) Remove the fairing (10).

(4) Remove the center RH fairing (11)
(a) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(b) Put an access platform in position on the RH side of the vertical stabilizer.
(c) Remove the horizontal-stabilizer RH fillet-panel (Refer to 55-10-00).
(d) Remove the bolts (2) which attach the fairing (11) to the vertical stabilizer.
(e) Remove the fairing (11).

(5) Remove the rear fairing (5)
(a) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(b) Put the access platforms in position on each side of the vertical stabilizer.
(c) Remove the horizontal-stabilizer fillet-panels (Refer to 55-10-00).
(d) Support the rear fairing (5).
(e) Remove the bolts (6) and remove the fairing (5).

NOTE: Move the Horizontal Stabilizer to gain access to the Forward Firing front screws

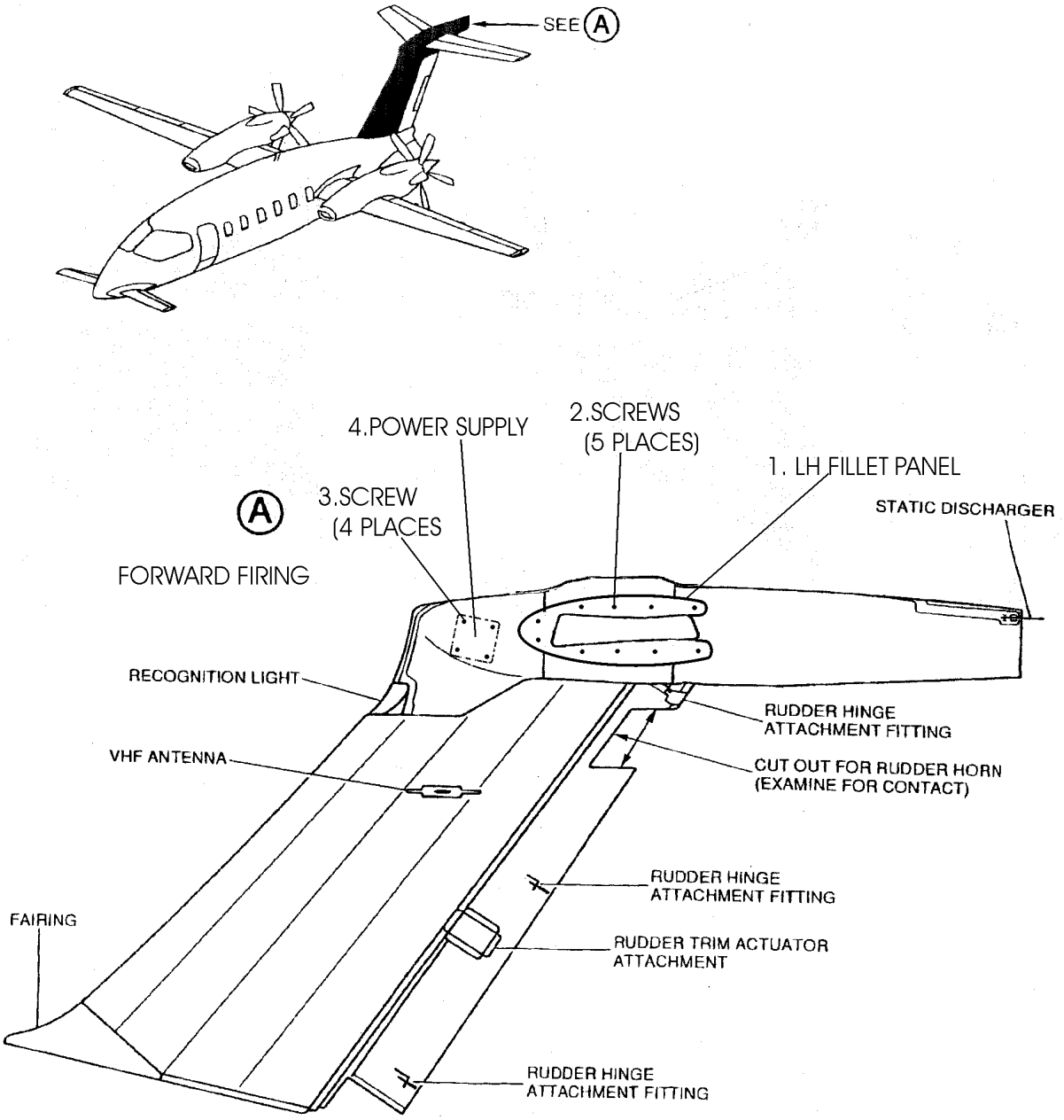

Fig. 201 - Vertical Stabilizer Fairings - Removal/Installation

3. Vertical Stabilizer Fairings - Installation (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access Platforms 12ft (4m)	Not Specified

B. Referenced Information

Maintenance Manual Chapter 20-20-01
Maintenance Manual Chapter 33-42-00
Maintenance Manual Chapter 55-10-00

C. Procedure

NOTE: This procedure is divided into a separate sub-procedure for each of the five fairings.

(1) Install the forward fairing (1)
  (a) Make sure as necessary that:
    – the appropriate circuit breaker is open, tagged and safetied
    – the Warning Notice is in position
    – access is available
  (b) Place the Anticollision Light Power Supply in its own position.
  (c) Secure the unit to the Forward Fairing with screws.
  (d) Hold the fairing (1) near the installed position and connect the wire (13) using an in-line connector (Refer to 20-20-01).
  (e) Put the fairing (1) in the installed position and install the bolts (12).
  (f) Remove the safety tag and close this circuit breaker:

    Copilot CB panel:
    RCNG LT

  (g) Do an operational test of the recognition light (Refer to 33-42-00).
  (h) Install the RH and LH Horizontal Stabilizer Fillet-Panels (Refer to 55-10-00).
  (i) Remove the access platforms.
  (j) Remove the Warning Notice.
(2) Install the center top fairing (3)
  (a) Make sure as necessary that:
    – the Warning Notice is in position
    – access is available
  (b) Put the fairing (3) in the installed position.
  (c) Install the anticollision light (Refer to 33-42-00).
  (d) Install the bolts (4).
  (e) Install the horizontal-stabilizer fillet-panels (Refer to 55-10-00).
  (f) Remove the access platforms.
  (g) Remove the Warning Notice.
(3) Install the center LH fairing (10)
  (a) Make sure as necessary that:

– the Warning Notice is in position
– access is available

(b) Install the fairing (10) using the bolts (8).
(c) Install the horizontal-stabilizer LH fillet-panel (Refer to 55-10-00).
(d) Remove the access platform.
(e) Remove the Warning Notice.

(4) Install the center RH fairing (11)
(a) Make sure as necessary that:
– the Warning Notice is in position
– access is available
(b) Install the fairing (11) using the bolts (2).
(c) Install the horizontal-stabilizer RH fillet-panel (Refer to 55-10-00).
(d) Remove the access platform.
(e) Remove the Warning Notice.

(5) Install the rear fairing (5)
(a) Make sure as necessary that:
– the Warning Notice is in position
– access is available
(b) Support the rear fairing (5) in the installed position and install the bolts (6).
(c) Install the horizontal-stabilizer fillet-panel (Refer to 55-10-00).
(d) Remove the access platforms.
(e) Remove the Warning Notice.

4. Vertical Stabilizer - Exterior Inspection (Ref. Fig. 202)

A. Fixtures, Test and Support Equipment

Access Platforms 3-10 ft (1-3 m)	Not Specified
Warning Notice	Not Specified

B. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platforms in position on each side of the vertical stabilizer.
(3) Examine the vertical stabilizer skins for the following:
– damage, cracks and delamination
– blistering and flaking of the paint finish.
(4) Examine the leading edge for dents, chips, and deterioration of the paint finish.
(5) Examine the fairing at the leading edge/fuselage interface for:
– damage, cracks, dents and delamination
– deterioration of the paint finish
– security of attachment.
(6) Examine the VHF navigation antennas for damage, corrosion and security of attachment.

(7) Examine the vertical stabilizer fairings for:
- damage, cracks and delamination
- blistering and flaking of the paint finish
- security of attachment. Make sure the securing screws are tight.

(8) Examine the recognition light transparent cover for cracks, chips and ingress of water. Make sure the securing screws are tight.

(9) Examine the static discharger for security of attachment and serviceability.

(10) Remove the rudder hinge access covers and examine the attachment fittings for:
- security of attachment to the rear spar of the vertical stabilizer
- cracks, deformation and corrosion
- loose fasteners (use a feeler gauge to check for flushness).

(11) Move the rudder by hand to check for excessive wear of the rudder hinge bushings.

(12) Examine the trailing edge of the vertical stabilizer, at the rudder balance horn position, for signs of contact with the rudder balance horn.

(13) Make sure the attachment screws for the rudder trim actuator are tight.

(14) Tighten, repair or replace any defective parts as necessary.

(15) Install the rudder hinge access covers.

(16) Remove the access platforms.

(17) Remove the Warning Notice from the flight compartment.

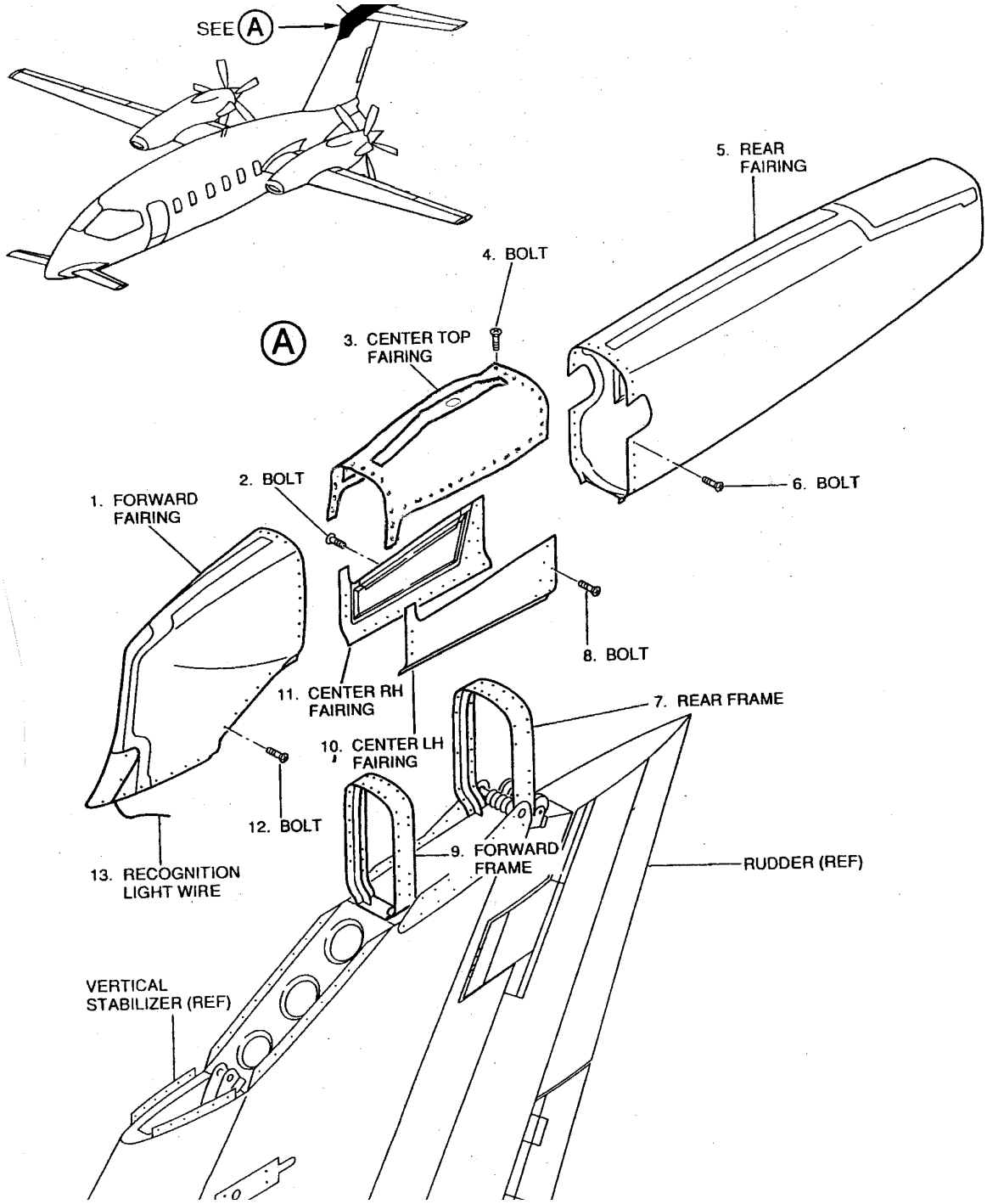

Fig. 202 - Vertical Stabilizer and Fairings - Inspection

5. Elevator Pulley Support Brackets - Inspection (Ref. Fig. 203)

A. Referenced Information

Maintenance Manual Chapter 22-10-00
Maintenance Manual Chapter 27-00-00
Maintenance Manual Chapter 27-30-00

B. Procedure

CAUTION: DURING THIS PROCEDURE MAKE SURE THAT THE CONTROL CABLES REMAIN LOCATED ON THEIR CORRECT PULLEYS. ATTACH IDENTITY TAGS TO CABLE ENDS IF IT IS NECESSARY TO DISCONNECT CABLES COMPLETELY. DAMAGE CAN OCCUR IF THE CABLES ARE NOT CORRECTLY CONNECTED/ROUTED.

(1) Loosen the turnbuckles of the elevator control system cables to the maximum extent possible without disconnection (refer to 27-30-00 for access and location details).
(2) Loosen the turnbuckles of the autopilot pitch control cables to the maxiumu extent possible without disconnection (refer to 22-10-00 for access and location details).
(3) Remove the center and rear fairings from the top of the vertical stabilizer.
(4) Apply hand force to the group of four pulleys which are supported by a bracket at each side of the vertical stabilizer. Apply the force in all directions (in turn) and make sure that there is no play, and that the items are secure.

NOTE: If there is a small amount of play in all directions or in one direction only, the brackets (and possibly the support shaft) will require replacement.

(5) Examine the pulleys and brackets for signs of wear, corrosion and for general condition. Replace any defective items.
(6) Tighten the turnbuckles of the autopilot pitch control cables (refer to 22-10-00).
(7) Tighten the turnbuckles of the elevator control system cables (refer to 27-30-00).
(8) Adjust the cables of the elevator control and autopilot pitch control systems (refer to 27-00-00).
(9) Check that the cables are correctly engaged in their pulleys grooves, then install the center and rear fairings at the top of the vertical stabilizer.

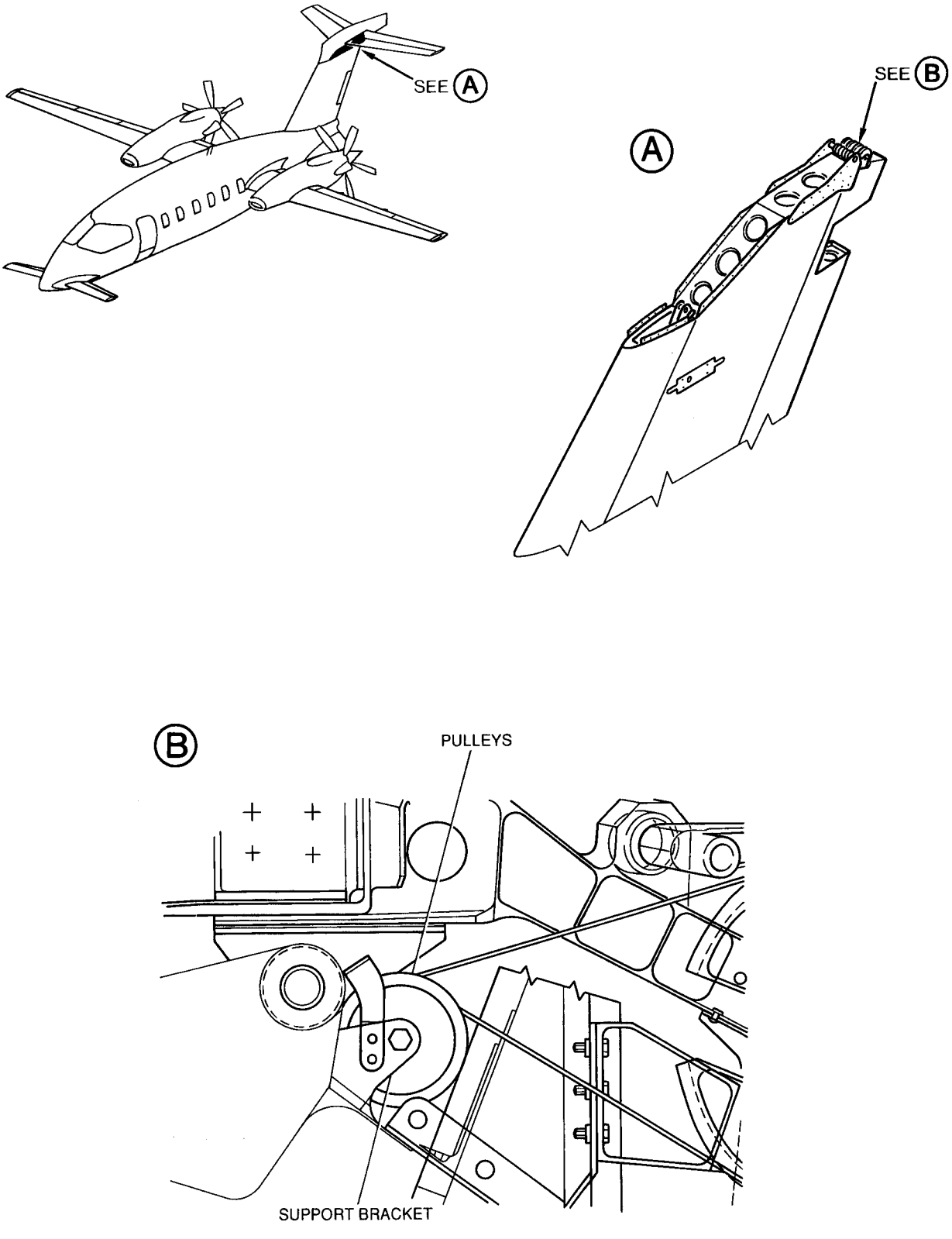

Fig. 203 - Elevator Pulley Support Bracket - Inspection

6. Vertical Stabilizer Hinge Fittings Bushings - Dimensional Check(Ref. Fig. 204)

A. Materials

Methyl-Ethyl-Ketone (MEK) solvent	TT-M-261
Lint-Free Cloth	Not Specified

B. Fixtures, Test and Support Equipment

Micrometer Comparator	Precision not lower than 0.001 mm

C. Referenced Information

Maintenance Manual Chapter 27-40-00
Maintenance Manual Chapter 20-00-00

D. Procedure

WARNING: BE CAREFUL WHEN YOU USE MEK. OBEY THE HEALTH AND SAFETY INSTRUCTIONS GIVEN IN CHAPTER 20-00-00.

(1) Remove the Horizontal Stabilizer (Refer to 27-40-00).
(2) Clean the bushings with a cloth, made moist with the MEK solvent (TT-M-261).
(3) By using a micrometer-comparator (precision not lower than 0.001 mm) verify, at the bushing diameter check points, as shown in figure 204, that the bushing diameter is from 25.413 to 25.425 mm and it doesn't show the presence of any ovalization.
(4) If the measuresare not within the required values , or an ovalization is detected, please call Piaggio Aero Industries Product Support.

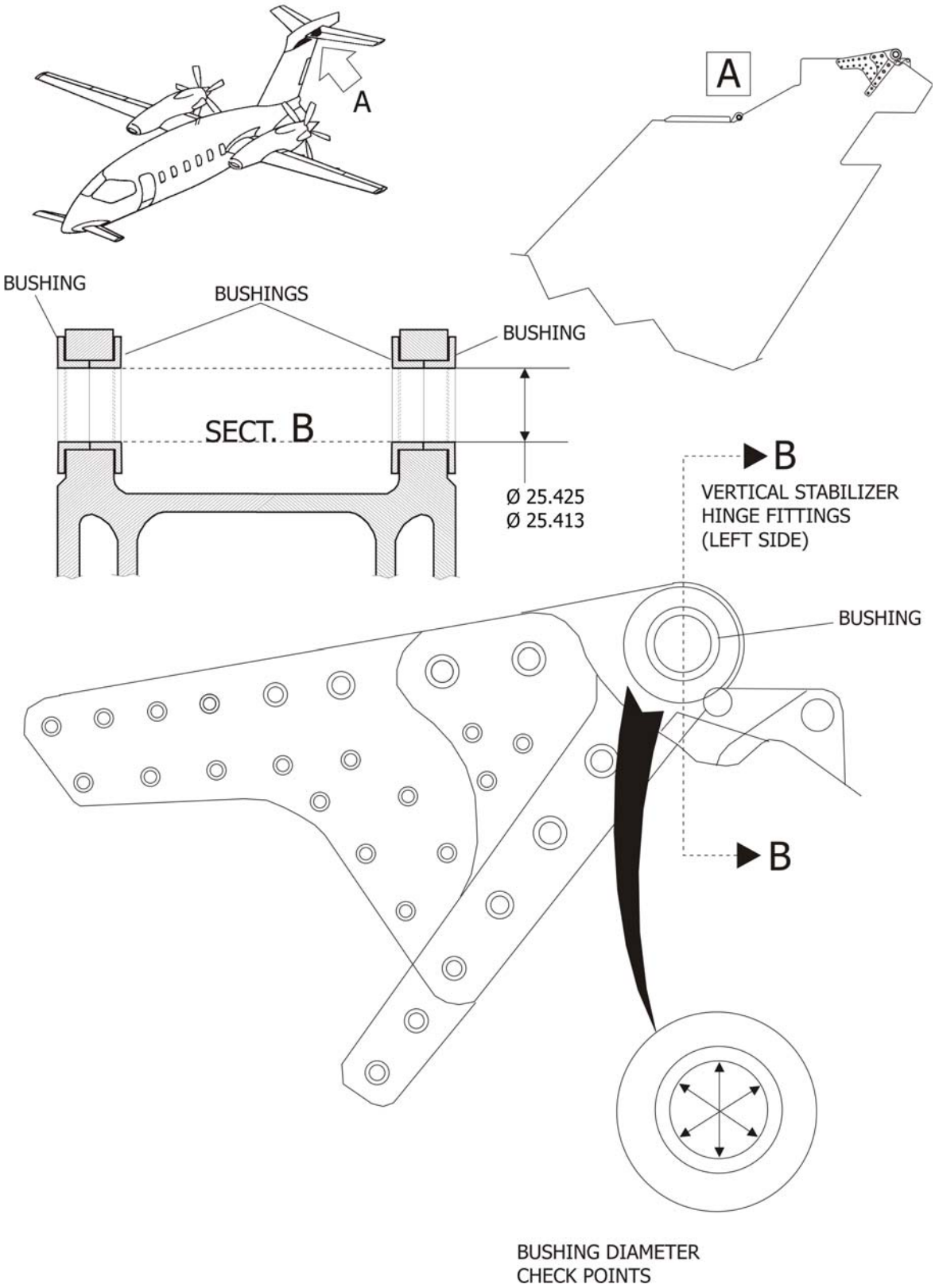

Fig. 204 - Vertical Stabilizer Hinge Fittings Bushings - Dimensional Check

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RUDDER - MAINTENANCE PRACTICES

1. General

A. This pageblock gives the Inspection/Check for the structural parts of the rudder and trim tab.

B. For the Removal/Installation and Adjustment/Test of the rudder and trim tab refer to 27-20-00.

2. Rudder - Inspection (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Access Platforms 3-10 ft (1-3 m)	Not Specified
Warning Notice	Not Specified

B. Procedure

(1) Put a Warning Notice in the flight compartment to tell persons not to move the flight controls.
(2) Put the access platforms in position on each side of the rudder.
(3) Remove the inspection panels 320AL and 320AR.
(4) Remove the rudder hinge access panels.
(5) Examine the rudder skin for the following:
- damage, cracks and delamination
- blistering and flaking of the paint finish.

(6) Examine the leading edge of the rudder for dents, chips and deterioration of the paint finish.
(7) Examine the rudder attachment fittings for the following:
- damage, cracks and deformation
- corrosion
- security of attachment.

(8) Examine, as far as possible, the rudder torque tube for the following:
- damage, cracks and corrosion
- working and looseness of the fasteners which attach the tube to the flange.

(9) Examine the trim tab for the following:
- damage, cracks, dents and delamination
- blistering and flaking of the paint finish
- security of attachment of the hinges
- working and looseness of the actuator attachment fasteners.

(10) Examine the trailing edge of the rudder and trim tab for delamination or peeling of the skin from the core.
(11) Examine the top rib of the rudder for signs of disbonding.

(12) Examine the balance horn for the following:
- security of attachment to the rudder
- damage and cracks
- make sure the drain hole is clear.

(13) Examine the balance horn cover for security of attachment and signs of contact with the vertical stabilizer.

(14) Examine the static discharger at the bottom rib position for security of attachment and serviceability.

(15) Examine the bottom rib of the rudder for signs of disbonding. Make sure the drain holes are clear.

(16) Repair, tighten or replace any defective parts as necessary.

(17) Install the rudder hinge access panels.

(18) Install the inspection panels 320AL and 320AR.

(19) Remove the access platforms.

(20) Remove the Warning Notice from the flight compartment.

3. Trim-Tab Actuator-Bushings - Check (Ref. Fig. 202)

A. Fixtures, Test and Support Equipment

Access Platform 6 ft (2 m)	Not Specified
Warning Notice	Not Specified

B. Referenced Information

Maintenance Manual Chapter 27-20-00

C. Procedure

(1) Put a Warning Notice in the flight compartment to tell other persons not to move the flight controls.

(2) Put the access platform in position on the right hand side of the vertical stabilizer.

(3) Remove rudder hinge panel 330BR.

WARNING: BE CAREFUL WHEN YOU OPERATE THE RUDDER. MAKE SURE THAT THE RUDDER IS CLEAR. DO NOT ALLOW THE RUDDER TO MOVE WHEN THE PERSON MAKING THE CHECK HAS HIS HAND IN THE ACCESS HOLE. INJURY TO PERSONS AND/OR DAMAGE TO EQUIPMENT CAN OCCUR.

(4) Move and hold the rudder to the fully left position.

(5) Apply hand force tothe trim-tab actuator connecting-rods and rocker arms in all directions (in turn). Make sure there is no play and that the items are secure.

(6) Make sure the person making the check is clear, then allow the rudder to return to the neutral position.

(7) If any play is found, replace the bushings as necessary (Refer to 27-20-00).

(8) Install hinge access panel 330BR.

(9) Remove the access platform.

(10) Remove the Warning Notice from the flight compartment.

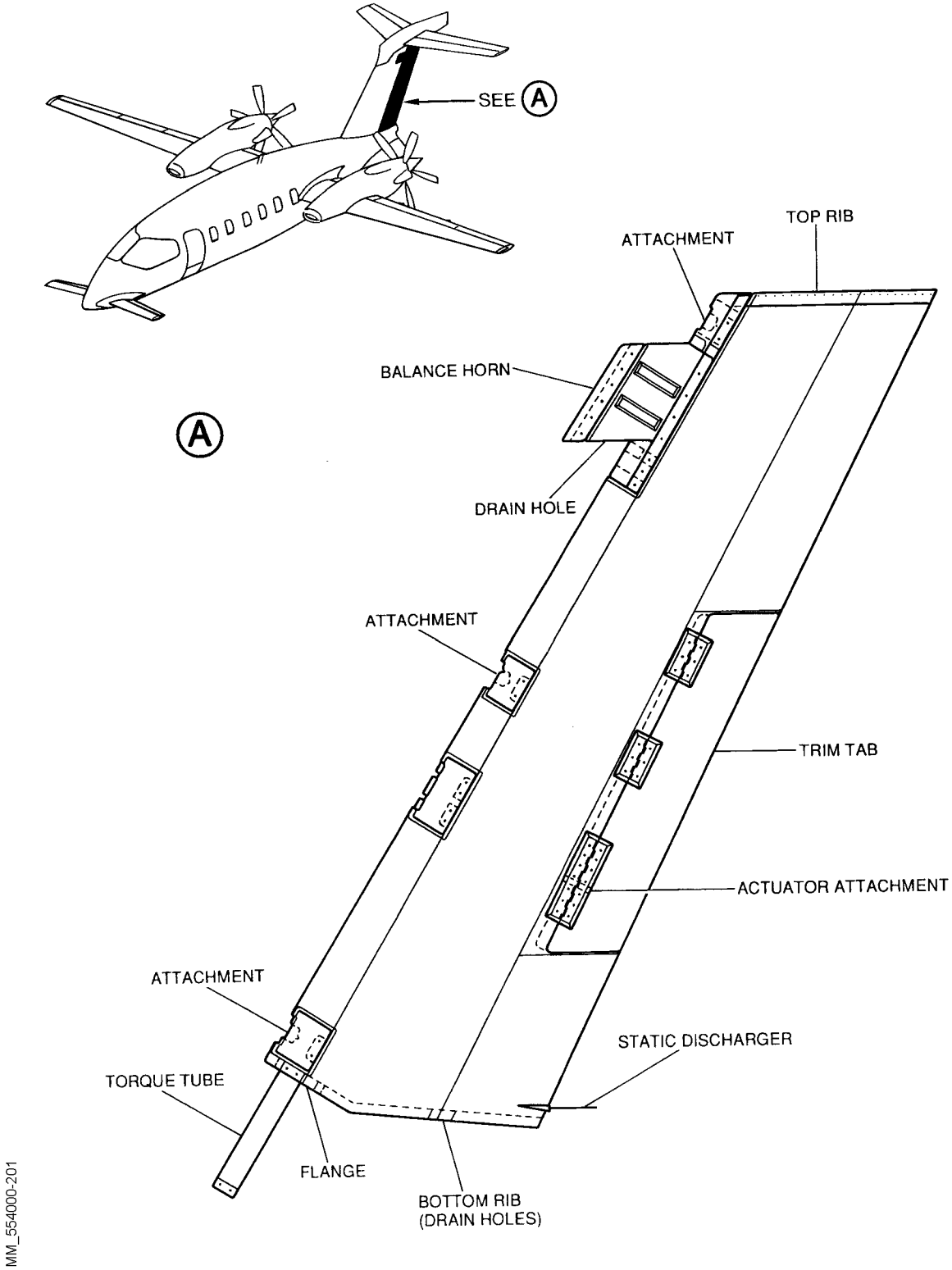

Fig. 201 - Rudder - Inspection

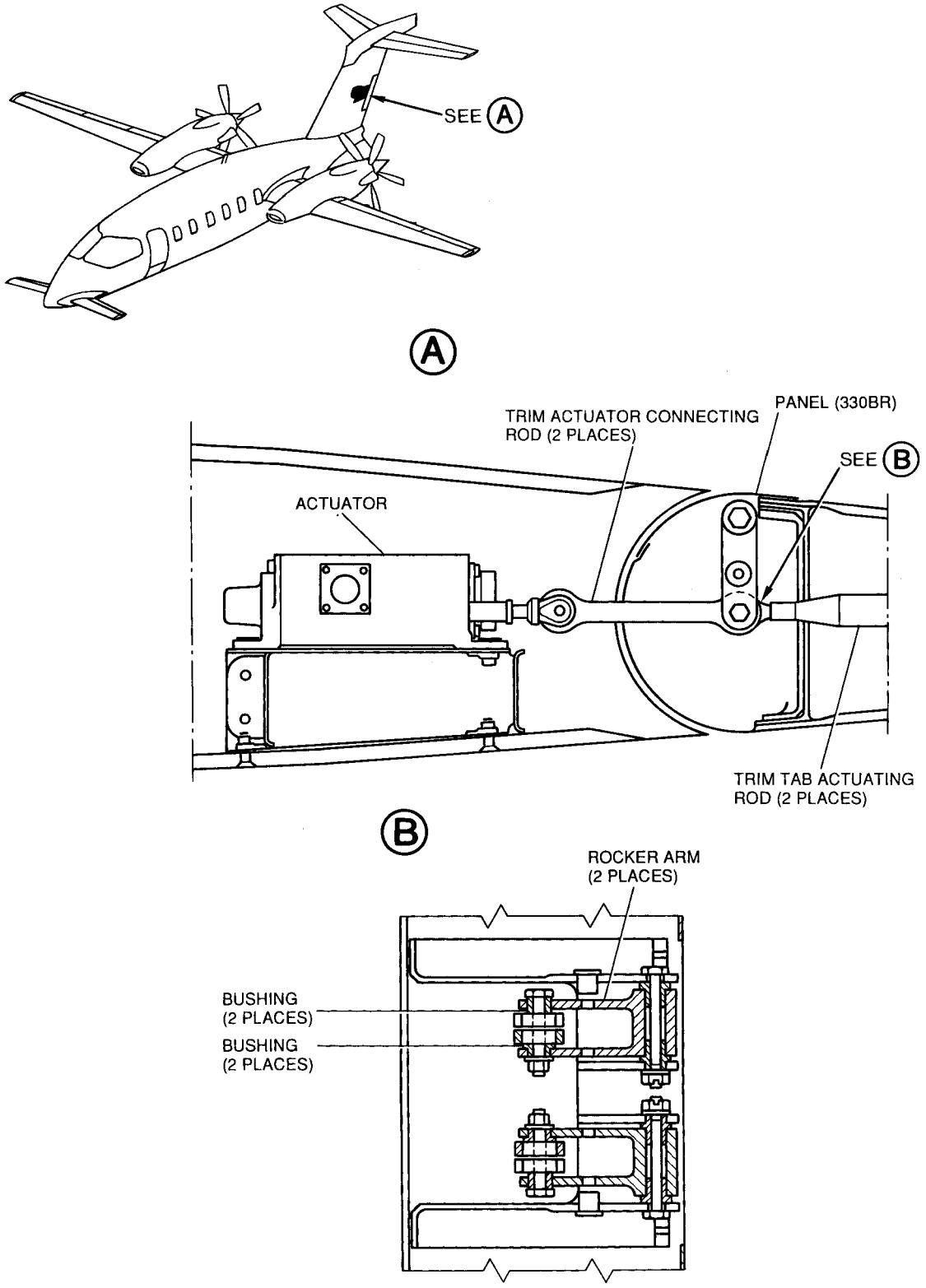

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Fig. 202 - Trim-Tab Actuator-Bushings - Check