ELEVATOR TRIM CONTROL- MAINTENANCE PRACTICES

1. General

A. The elevator trim tab is on the right elevator. It is controlled by a trim wheel installed in the pedestal. The power to operate the elevator trim tab comes from the trim control wheel through chains, cables, and an actuator. A mechanical pointer adjacent to the trim wheel shows elevator trim tab position. A nose up setting causes an elevator trim tab down position.

2. Trim Tab Actuator Removal/Installation

A. Trim Tab Actuator Removal (Refer to Figure 201).

CAUTION: Put a support stand in position under the tail tiedown ring. The support stand will help to prevent the tailcone from falling while a person works inside.

(1) Remove the panel310AR to get access to the stop blocks. Refer to Chapter 6, Access/Inspection Plates - Description and Operation (Refer to Figure 201).
(2) Remove the safety clip and loosen the tension on the cable at the turnbuckle.
(3) Remove the lock nut, bolt, and washers from the push-pull tube and disconnect it from the actuator.
(4) Remove the access plate 310CB to get access to the actuator. Refer to Chapter 6, Access/Inspection Plates - Description and Operation.
(5) Remove the chain guard and the chain from the actuator sprocket.
(6) Remove the screws that attach the actuator clamps to the bracket.
(7) Carefully remove the actuator from the access opening.

B. Trim Tab Actuator Installation (Refer to Figure 201).
(1) Carefully install the actuator through the access opening.
(2) Use the screws to attach the actuator clamps to the bracket.
(3) Install the chain on the actuator sprocket.
(4) Install the chain guard.
(5) Install the access plate 310CB. Refer to Chapter 6, Access/Inspection Plates - Description and Operation.
(6) Use the washers, bolt, and lock nut to connect the push-pull tube to the actuator.
(7) Set the cable tension at the turnbuckle. Refer to the Trim Tab Control Adjustment/Test.
(8) Install the safety clip. Refer to Chapter 20, Safetying - Maintenance Practices.
(9) Install the panel 310AR . Refer to Chapter 6, Access/Inspection Plates - Description and Operation.
(10) Remove the support stand.

3. Trim Tab Actuator Disassembly/Assembly

A. Trim Tab Actuator Disassembly (Refer to Figure 202).
(1) Remove the trim tab actuator. Refer to Tim Tab Actuator Removal/Installation.
(2) Turn the screw assembly to loosen and remove it from the actuator.

B. Trim Tab Actuator Assembly (Refer to Figure 202).
(1) If a new bearing is necessary, press it into the boss on the screw assembly. Make sure that the force pushes against the outer race of the bearing.
(2) Install the screw assembly into the actuator as follows:
(a) Pack the internal housing with MIL-G-21164C grease.

NOTE: This supplies the lubrication for the screw assembly.

(b) Install the screw assembly in the housing.
(c) If necessary, clean the unwanted grease from the housing.
(3) Hold the screw assembly and turn the sprocket by hand to do a test of the actuator assembly.

NOTE: The screw assembly must move smoothly in the actuator.

4. Trim Tab Actuator Cleaning and Inspection

A. Complete a Trim Tab Actuator Cleaning and Inspection (Refer to Figure 202).
   (1) Remove the screw assembly from the housing. Refer to Trim Tab Actuator Disassembly/Assembly.
      (a) Do not remove the sealed bearing from the screw assembly unless the bearing replacement is necessary.
   (2) Wash the screw assembly, except the sealed bearing, in Stoddard solvent or equivalent. Do not clean the sealed bearing.
   (3) Do a check of the sealed bearing and screw assembly for wear and for parts that have scores. Refer to Table 201 for dimensions.

Table 201. Wear Dimensions

COMPONENT	MAXIMUM DIMENSION	MINIMUM DIMENSION
Aft End Bearing Inside Diameter	0.249 Inch	0.248 Inch
Threaded Rod End Outside Diameter	0.246 Inch (Shank)	0.245 Inch (Shank)

   (4) Examine the screw assembly and the screw for threads that have damage or dirt particles that can cause the assembly to operate incorrectly.
   (5) Examine the screw assembly sealed bearing for smoothness of operation.
   (6) Examine the housing components for stripped threads, cracks, deep nicks, dents, and other signs of damage.
   (7) Examine the sprocket for broken, chipped, and/or worn teeth.
   (8) Examine the linear free play at the sprocket end of the housing.

      NOTE: The linear free play at the sprocket end must not be more than 0.010 inch maximum.

      (a) If the free play is more than the permitted limits, replace the actuator.
   (9) Do not try to repair the actuator assembly parts that have damage or wear.
   (10) Install the screw assembly into the housing. Refer to Trim Tab Actuator Disassembly/Assembly.

5. Trim Tab Free Play Inspection

A. Trim Tab Free Play Inspection (Figure 203).
   (1) Put the elevator and the trim tab in the neutral position.
   (2) With the elevator gust lock, make sure that the elevator cannot move.
   (3) Find the maximum amount of permitted free play.
      (a) Measure the chord length at the extreme inboard end of the trim tab.
      (b) Multiply the chord length by 0.025 to get the maximum permitted free play.
      (c) Measure the free play at the same point on the trim tab where the chord length was measured.
      (d) The total free play must not be more than the maximum permitted free play.
   (4) With moderate hand pressure (up and down), measure the free play at the trailing edge of the trim tab.
   (5) If the trim tab free play is less than the maximum permitted free play, the system is in the approved limits.
   (6) If the trim tab free play is more than the maximum permitted free play, check the items that follow for looseness while you move the trim tab up and down.
      (a) The push-pull tube/trim tab horn assembly attachment.
      (b) The push-pull tube/actuator assembly threaded rod-end attachment.
      (c) The actuator assembly threaded rod end in the actuator assembly.
   (7) If looseness is apparent while you check the push-pull tube/tab horn assembly, install new parts to repair.
   (8) If looseness is apparent while you check the push-pull tube/actuator assembly threaded rod-end assembly, install new parts to repair.

(9) If looseness is apparent while you check the push-pull tube threaded rod end in the actuator assembly, the threaded rod end is out of tolerance and you must replace it.

6. Trim Tab Control Cables and Pulleys Removal/Installation

A. Cables and Pulleys Removal (Refer to Figure 201).

CAUTION: Position a support stand under the tail tiedown ring to prevent the tailcone from falling while a person works inside.

(1) Remove the crew seats and the rear seat. Refer to Chapter 25, Front Seats and Rails - Maintenance Practices and Rear Seat - Maintenance Practices.
(2) Remove the pedestal cover.
(3) Remove the access panel (310AR), access plates(230DB, 230LB, 231LB, 310BB, and 310CB), and fairings(340AL and 340AR) for access. Refer to Chapter 6, Access/Inspection Plates - Description and Operation.
(4) Remove the stop blocks from the control cables.
(5) Remove the cable guard from the actuator.
(6) Remove the safety clip from the turnbuckle and disconnect the cable.
(7) Disconnect the cables at the cable ends.

NOTE: To ease the routing of the cables, a length of wire can be attached to the end of the cable before you remove it from the airplane. You can leave the wire in place, routed through the structure. Then you can attach the new cable and pull it into position.

(8) Remove the cable guards and the pulleys.
(9) Disengage the chains from the sprockets and remove the cables from the airplane structure.

B. Cables and Pulleys Installation (Refer to Figure 201).
(1) Attach the cables to the wires that are routed through the airplane structure and pull the cables into position.
(2) Engage the chains on the sprockets and install the chain guard on the actuator.
(3) Install the pulleys and the pulley guards.
(4) Connect the cable ends and install the turnbuckle.
(5) Rig the system. Refer to Trim Tab Control Adjustment/Test.
(6) Install the access panel (310AR), access plates (230DB, 230LB, 231LB, 310BB, and 310CB), and fairings (340AL and 340AR) removed to get access. Refer to Chapter 6, Access/Inspection Plates - Description and Operation.
(7) Install the pedestal cover.
(8) Install the crew seats and the rear seat. Refer to Chapter 25, Front Seats - Maintenance Practices and Rear Seat - Maintenance Practices.
(9) Remove the support stand.

7. Trim Tab Control Wheel Removal/Installation

A. Trim Tab Control Wheel Removal (Refer to Figure 201).
(1) Relieve cable tension at the turnbuckle.
(2) Remove the pedestal cover.
(3) Remove the screws that attach the control wheel retainer.
(4) Remove the retainer and the pointer. Do not drop the trim control wheel.

B. Trim Tab Control Wheel Installation (Refer to Figure 201).
(1) Install the retainer and the pointer with the screws.
(2) Install the pedestal cover.
(3) Set the cable tension at the turnbuckle. Refer to Trim Tab Control Adjustment/Test.

8. Trim Tab Control Adjustment/Test

A. Set Trim Tab Control Cable Tension (Refer to Figure 204 and Figure 205).

CAUTION: Position a support stand under the tail tiedown ring to prevent the tailcone from falling while a person works inside.

(1) Remove the access panel (310AR) and the access plates as necessary. Refer to Access/Inspection Plates - Description and Operation.
(2) Loosen the travel stop blocks on the cables.
(3) Disconnect the actuator from the trim tab push-pull tube.
(4) Adjust the turnbuckle as necessary to get 10 to 15 pounds (44.48 to 66.72 N) of cable tension at 70 °F (21 °C). Refer to the Charts in Figure 205 for the correct tensions at other temperatures.
(5) If this trim tab adjustment/test is done as part of a chain and/or cable installation, let the actuator screw turn freely, because the chains and the cables are connected.
(6) Adjust the cable tension and safety the turnbuckle.
(7) Turn the trim wheel full forward (nose down). Make sure that the pointer does not decrease the trim wheel movement. If necessary, move the pointer to a new position. To move the pointer to a new position, you can pry the trailing leg of the pointer out of the groove with a thin screwdriver if necessary.

NOTE: At the full forward (nose down) position of the trim wheel, more forward movement is prevented because the chain or the cable ends contact the sprockets or the pulleys.

(8) With the elevator and the trim tab both in neutral (streamlined), mount an inclinometer on the tab and set it at 0 degrees. Ignore the counterweight areas of the elevators when you streamline. These areas are contoured so they will be approximately 3 degrees down at cruising speed.

NOTE: Neutral positions for the elevators are streamlined with the horizontal stabilizer. Ignore the counterweight areas of the elevators when you streamline. These areas are contoured so they will be approximately 3 degrees DOWN at cruising speed.

NOTE: An inclinometer for measuring control surface travel is available from the Cessna Parts Distribution.

(9) Turn the trim tab actuator screw in or out as required to place the trim tab up with a maximum of 2 degrees overtravel, with the actuator screw connected to the push-pull tube.
(10) Turn the trim wheel to position the trim tab up and down, and adjust the actuator screws as required to get correct travel in both directions.
(11) Put the stop blocks in position. Refer to Figure 204.
  (a) With the elevators in neutral, set the trim tab to neutral.
  (b) Position the stop block (2) approximately 0.25 inch (6.35 mm) forward of the turnbuckle.
  (c) Position the stop block (3) approximately 0.25 inch (6.35 mm) aft of the turnbuckle.
  (d) Attach the stop blocks (2) and (3) to cable A.
  (e) Put the inclinometer on the trim tab and lower it to 15 degrees, +1 or -1 degree.
  (f) Put the stop block (4) against the stop block (3) and attach it to cable B.
  (g) Run the trim tab up to 24 degrees, +2 or -2 degrees.
  (h) Place stop block (1) against stop block (2) and attach to cable B.
(12) Make sure that the trim wheel pointer travels the same distance from the ends of the slot in the cover. Move the trailing leg of the pointer to a new position if necessary.

WARNING: Make sure that the elevators travel in the correct direction when you operate the control column.

(13) Move the control column to make sure that the elevators travel in the correct direction.
(14) Make sure that the trim tab moves in the correct direction when it is operated by the trim wheel.

NOTE: Nose down trim corresponds to the tab UP position.

(15) Safety the turnbuckle (Refer to Chapter 20, Safetying - Maintenance Practices).
(16) Install all of the items that you removed to get access to the components.
(17) Remove the support stand.