

SECTION 9  
ELEVATOR TRIM CONTROL SYSTEM

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9-1. ELEVATOR TRIM CONTROL SYSTEM. (Refer to figure 9-1.)

9-2. DESCRIPTION. The elevator trim tab, located on the right elevator, is controlled by a trim wheel mounted in the lower instrument panel. Pow-

er to operate the tab is transmitted from the trim control wheel by means of chains, cables and an actuator. A mechanical pointer, adjacent to the trim wheel indicates tab position. A "nose-up" setting results in a tab-down position.

9-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to re-rig system. Refer to paragraph 9-16.

TROUBLE	PROBABLE CAUSE	REMEDY
TRIM CONTROL WHEEL MOVES WITH EXCESSIVE RESISTANCE.	Cable tension too high.	Adjust tension.
	Pulleys binding or rubbing.	Repair or replace as necessary.
	Cables not in place on pulleys.	Install cables correctly.
	Trim tab hinge binding.	Lubricate or replace hinge as necessary.
	Defective trim tab actuator.	Replace actuator.
	Rusty chain.	Replace rusty chain.
	Damaged sprocket.	Replace damaged sprockets.
	Bent sprocket shaft.	Replace bent sprocket shafts.

8-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
LOST MOTION BETWEEN CONTROL WHEEL AND TRIM TAB.	Cable tension too low.	Adjust tension.
	Broken pulley.	Replace defective pulley.
	Cables not in place on pulleys.	Install cables correctly.
	Worn trim tab actuator.	Remove and replace worn actuator.
	Actuator attachment loose.	Tighten.
TRIM INDICATOR FAILS TO INDICATE CORRECT TRIM POSITION.	Indicator incorrectly engaged on wheel track.	Reset indicator.
INCORRECT TRIM TAB TRAVEL.	Stop blocks loose or incorrectly adjusted.	Adjust stop blocks on cables.

9-4. TRIM TAB. (Refer to figure 8-2.)

9-5. REMOVAL AND INSTALLATION.

- a. Disconnect push-pull tube (2) from horn assembly (3).
- b. Drill out rivets attaching hinge to elevator.

**NOTE**

After tab has been removed and if hinge pin is to be removed, it is necessary to spread the crimped ends of the hinge before driving out pin. When a pin has been installed, crimp ends of hinge to prevent pin from working out.

- c. Reverse preceding steps for installation.

9-6. TRIM TAB ACTUATOR.

9-7. REMOVAL AND INSTALLATION. (Refer to figure 9-1.)

**CAUTION**

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- a. Remove baggage compartment aft wall for access.
- b. Remove safety wire and relieve cable tension at turnbuckle (15).

- c. Disconnect push-pull tube (12) from actuator (9).
- d. Remove access plate from under side of right hand stabilizer beneath actuator.
- e. Remove chain guard (8) and disengage chain (8A) from actuator sprocket.
- f. Remove screws (8B) and spacers (10) attaching actuator clamps to stabilizer structure (11) and carefully work actuator out through access opening.
- g. Reverse the preceding steps for reinstallation. Rig trim system in accordance with paragraph 9-12, safety turnbuckle (15) and reinstall all items removed for access.

9-8. DISASSEMBLY. (Refer to figure 9-2.)

- a. Remove actuator in accordance with paragraph 9-7.
- b. Disassemble actuator assembly (1) as illustrated in Detail A as follows:
  1. Remove chain guard (3) if not previously removed in step "e" of paragraph 9-7.
  2. Using suitable punch and hammer, remove groov-pins (8) securing sprocket (5) to screw (9) and remove sprocket from screw.
  3. Unscrew threaded rod end (15) and remove rod end from actuator.
  4. Remove groov-pins (10) securing bearings (6 and 14) at the housing ends.
  5. Lightly tap screw (9) toward the sprocket end of housing, remove bearing (6) and collar (7).
  6. Lightly tap screw (9) in the opposite direction from sprocket end, remove bearing (14), O-ring (13) and collar (7).

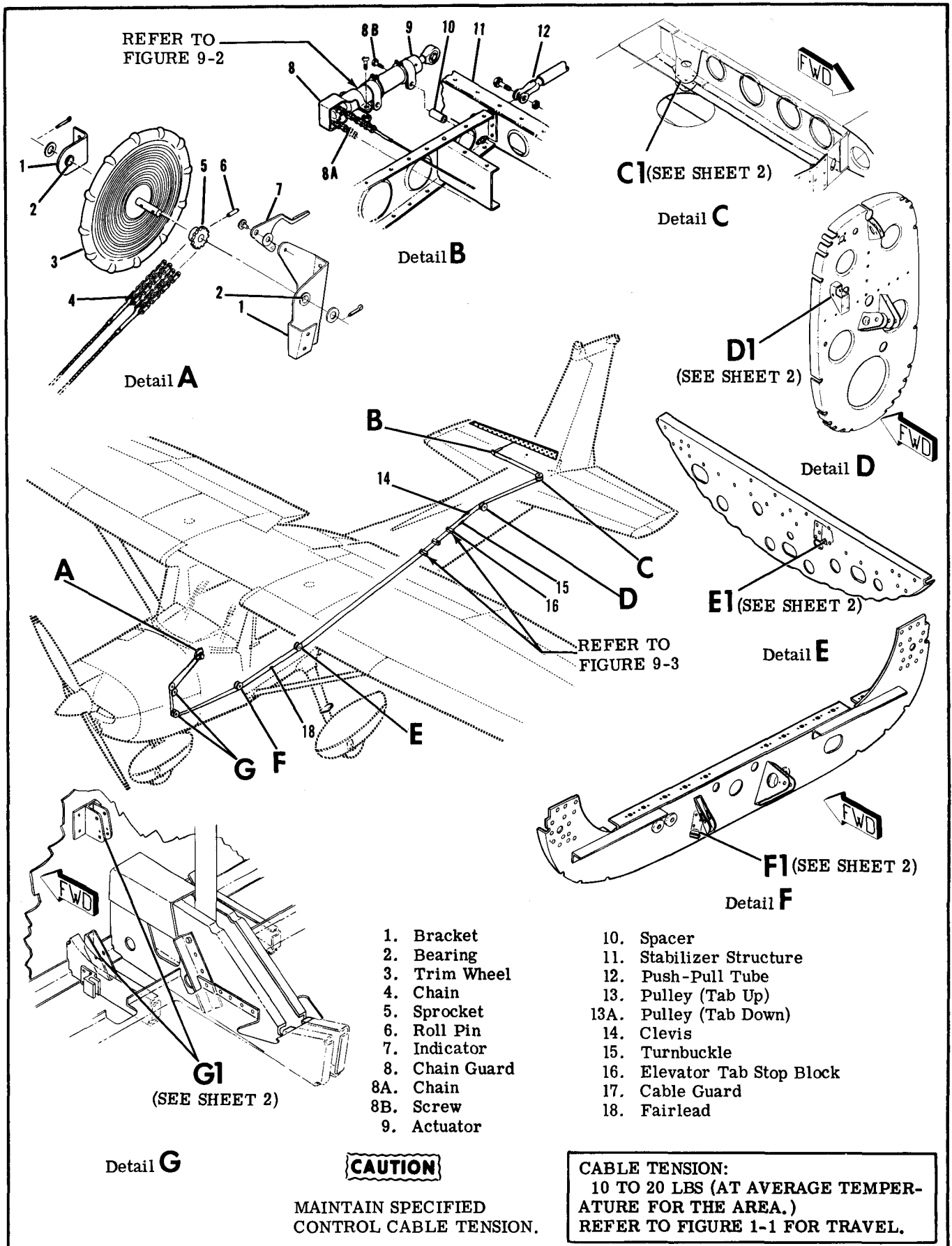


Figure 9-1. Elevator Trim Control System (Sheet 1 of 2)

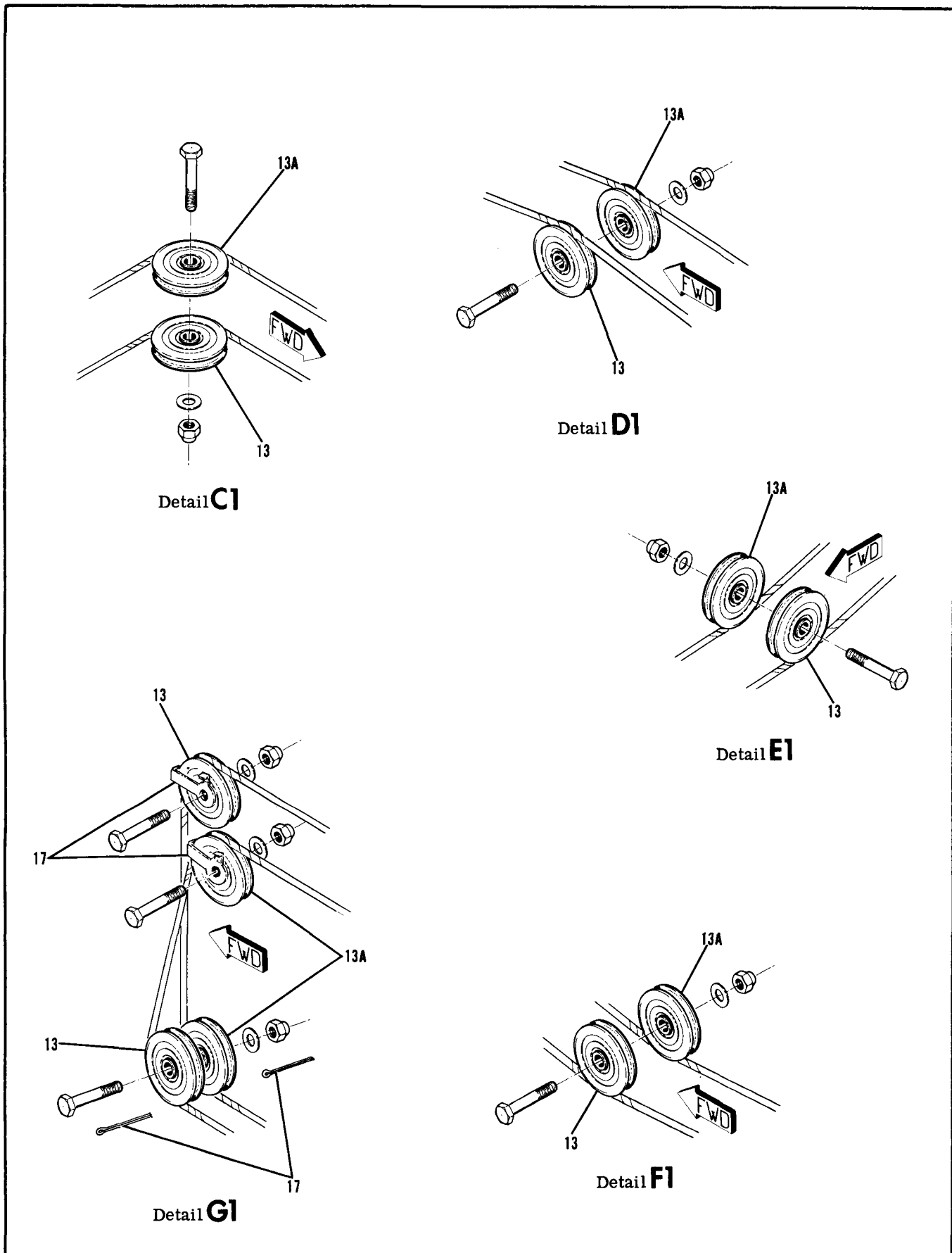


Figure 9-1. Elevator Trim Control System (Sheet 2 of 2)

7. It is not necessary to remove retaining rings (11).

9-9. CLEANING, INSPECTION AND REPAIR.  
(Refer to figure 9-2.)

- a. DO NOT remove bearing (16) from threaded rod end (15) unless replacement of bearing is necessary.
- b. Clean all component parts, except bearing (16), by washing in Stoddard solvent or equivalent. Do not clean sealed bearing (16).
- c. Inspect all component parts for obvious indications of damage such as stripped threads, cracks, deep nicks and dents.
- d. Check bearings (6 and 14), screw (9) and threaded rod end (15) for excessive wear and scoring. Dimensions of the parts are as follows:

BEARING (6)	
INSIDE DIAMETER	0.373" MIN.
INSIDE DIAMETER	0.380" MAX.
BEARING (14)	
INSIDE DIAMETER	
SMALL HOLE	0.248" MIN.
SMALL HOLE	0.253" MAX.
LARGE HOLE	0.373" MIN.
LARGE HOLE	0.380" MAX.
THREADED ROD END	
OUTSIDE DIAMETER	
(SHANK)	0.242" MIN.
	0.246" MAX.
SCREW (9)	
OUTSIDE DIAMETER	0.367" MIN.
	0.370" MAX.

NOTE

Relative linear movement between internal threaded screw (9) and bearing (14) should be 0.004 to 0.010 inch at room temperature.

- e. Examine threaded rod end (15) and screw (9) for damaged threads or dirt particles that may impair smooth operation.
- f. Check sprocket (5) for broken, chipped and/or worn teeth.
- g. Check bearing (16) for smoothness of operation.
- h. DO NOT attempt to repair damaged or worn parts of the actuator assembly. Discard all defective items and install new parts during reassembly.

9-10. REASSEMBLY. (Refer to figure 9-2.)

- a. Always discard the following items and install new parts during reassembly:
  - 1. Bearings (6 and 14).
  - 2. Groov-Pins (8 and 10).
  - 3. O-Ring (13).
  - 4. Nuts (2).
- b. During reassembly, lubricate collars (7), screw (9) and threaded rod end (15) in accordance with Section 2.
- c. Press sprocket (5) into the end of screw (9), align groov-pin holes and install new groov-pins (8).
- d. Slip bearing (6) and collar (7) on screw (9) and slide them down against sprocket (5).

e. Insert screw (9), with assembled parts, into housing (12) until bearing (6) is flush with the end of housing.

NOTE

When inserting screw (9) into housing (12), locate the sprocket (5) at the end of housing which is farther away from the groove for retaining ring (11).

• The bearings (6 and 14) are not pre-drilled and must be drilled on assembly. The groov-pins (10) are 1/16 inch in diameter, therefore, requiring a 1/16 (0.0625) inch drill.

- f. With bearing (6) flush with end of housing (12), carefully drill bearing so the drill will emerge from the hole on the opposite side of housing (12). DO NOT ENLARGE HOLES IN HOUSING.
- g. Press new groov-pins (10) into pin holes.
- h. Insert collar (7), new O-ring (13) and bearing (14) into opposite end of housing (12).
- i. Complete steps "f" and "g" for bearing (14).
- j. If a new bearing (16) is required, a new bearing may be pressed into the boss. Be sure force bears against the outer race of bearing.
- k. Screw the threaded rod end (15) into screw (9).
- l. Install retaining rings (11), if they were removed.
- m. Test actuator assembly by rotating sprocket (5) with fingers while holding threaded rod end (15). The threaded rod end should travel in and out smoothly with no indication of binding.
- n. Reinstall actuator assembly in accordance with paragraph 9-7.

9-11. TRIM TAB FREE-PLAY INSPECTION.

- a. Place elevators and trim tab in the neutral position.
- b. Using moderate pressure, move the trim tab trailing edge up and down by hand to check free-play.
- c. A maximum of .112" (total motion up and down) measured at the trim tab trailing edge is permissible.
- d. If the trim tab free-play is less than .112", the system is within prescribed limits.
- e. If the trim tab free-play is more than .112", check the following items for looseness while moving the trim tab up and down.
  - 1. Check push-pull tube to trim tab horn assembly attachment for looseness.
  - 2. Check push-pull tube to actuator assembly threaded rod end attachment for looseness.
  - 3. Check actuator assembly threaded rod end for looseness in the actuator assembly.
- f. If looseness is apparent while checking steps e-1 and e-2, repair by installing new parts.
- g. If looseness is apparent while checking step e-3, refer to paragraphs 9-6 through 9-10.

9-12. TRIM TAB CONTROL WHEEL. (Refer to figure 9-1.)

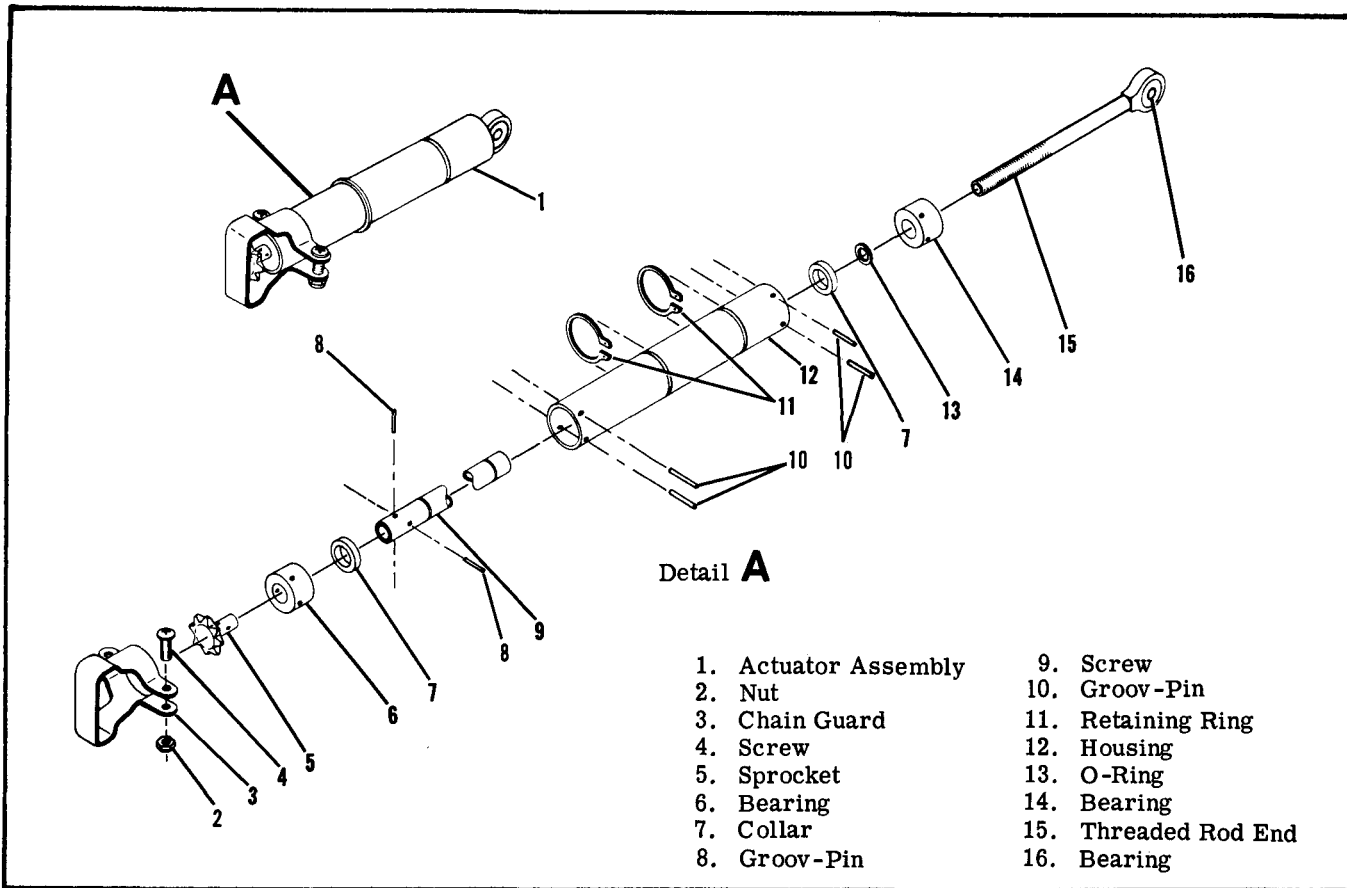


Figure 9-2. Elevator Trim Tab Actuator Assembly

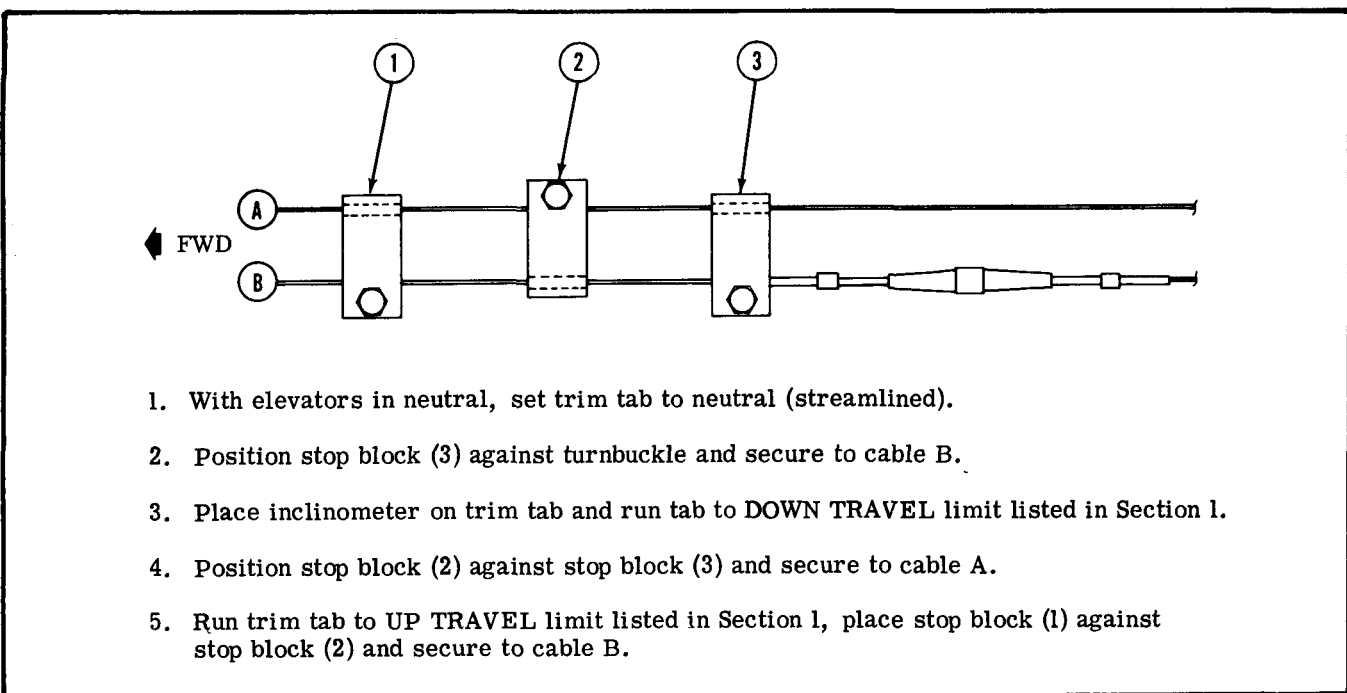


Figure 9-3. Elevator Trim Tab Travel Adjustment

9-13. REMOVAL AND INSTALLATION.

- a. Relieve cable tension at turnbuckle (15).

**CAUTION**

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- b. Disengage chain from sprocket (5).
- c. Remove cotter pin at each end of trim wheel shaft.
- d. Slide shaft assembly into either bearing (2) as far as possible.
- e. Carefully deform brackets (1) and slide shaft assembly free of bearings (2).
- f. Reverse preceding steps for installation. Rig system in accordance with applicable paragraph in this section, safety turnbuckle and reinstall all items removed for access.

9-14. CABLES AND PULLEYS. (Refer to figure 9-1.)

9-15. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Disconnect cables at turnbuckle (15) and clevis (14).
- c. Remove fairlead, cable guards and pulleys as necessary to work cables free of aircraft.

**NOTE**

To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure, attach cable being installed and pull cable into position.

- d. After cable is routed in position, install pulleys and cable guards. Make sure cable is positioned in pulley groove before installing guards.
- e. Rig system in accordance with applicable paragraph in this section, safety turnbuckle and reinstall all items removed in step "a."

9-16. RIGGING. (Refer to figure 9-1.)

**CAUTION**

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- a. Remove rear baggage compartment panel and access plates as necessary.
- b. Loosen travel stop blocks (16) on cables.

- c. Disconnect actuator (9) from push-pull tube (12).
- d. Check cable tension and readjust turnbuckle (15) if necessary.

**NOTE**

If chains and/or cables are being installed, permit actuator screw to rotate freely as chains and cables are connected. Set cable tension.

- e. Rotate trim wheel (3) full forward (nose down). Ensure that indicator (7) does not restrict wheel movement. If necessary, reposition indicator using a thin screwdriver to pry trailing leg of indicator out of groove.

**NOTE**

Full forward (nose down) position of trim wheel is where further movement is prevented by chain or cable ends contacting sprockets or pulleys.

- f. With elevator and trim tab both in neutral (streamlined), place inclinometer on tab and set to zero.

**NOTE**

An inclinometer for measuring control surface travel is available from Cessna Service Parts Center. Refer to figure 6-4.

- g. Rotate actuator screw in or out as required to place tab up with a maximum of 2° overtravel, with actuator screw connected to push-pull tube (12).

- h. Rotate trim wheel to position tab up and down, readjusting actuator screw as required to obtain overtravel in both directions.

- i. Position stop blocks (16) and adjust as illustrated in figure 9-3 to limit travel to the degree specified in Section 1.

- j. Check that trim wheel indicator travels same distance from ends of slot in cover. Reposition trailing leg of indicator if necessary (refer to step "e").

- k. Safety turnbuckle and reinstall all items removed in step "a".

**WARNING**

Be sure trim tab moves in correct direction when operated by trim wheel. Nose down trim corresponds to tab up position.