

MODEL R182 AND TR182 SERVICE MANUAL

SECTION 8

ELEVATOR CONTROL SYSTEM

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- 8-1. ELEVATOR CONTROL SYSTEM. (Refer to figure 8-1.)
- 8-2. DESCRIPTION. The elevators are operated by power transmitted through fore-and-aft movement of the pilot or copilot control wheels. The system is comprised of control columns, an elevator torque tube, cables and pulleys. The elevator control cables, at their aft ends, are attached to a bellcrank mounted on a bulkhead in the tailcone. A push-pull tube connects this bellcrank to the elevator arm assembly, installed between the elevators. An elevator trim tab is installed in the trailing edge of the right elevator and is described in Section 9.
- 8-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to re-rig system, refer to paragraph 8-14.

TROUBLE	PROBABLE CAUSE	REMEDY
NO RESPONSE TO CONTROL WHEEL FORE-AND-AFT MOVEMENT.	Forward or aft end of push-pull tube disconnected.	Attach push-pull tube correctly.
	Cables disconnected.	Attach cables and rig system in accordance with paragraph 8-14.

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8-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BINDING OR JUMPY MOTION FELT IN MOVEMENT OF ELEVATOR SYSTEM.	Defective bellcrank or arm assembly pivot bearings or push-pull tube attach bearings.	Replace defective parts.
	Cables slack.	Adjust to tension specified in figure 8-1.
	Cables not riding correctly on pulleys.	Route cables correctly over pulleys.
	Nylon grommet on instrument panel binding.	Replace grommet.
	Defective control column bearing rollers.	Replace defective rollers.
	Defective control column torque tube bearings.	Replace defective bearings.
	Control guide on aft end of control square tube adjusted too tightly.	Loosen screw and tapered plug in end of control tube enough to eliminate binding.
	Defective elevator hinges.	Replace defective hinges.
ELEVATORS FAIL TO ATTAIN PRESCRIBED TRAVEL.	Defective pulleys or cable guards.	Replace defective parts and install guards properly.
	Stops incorrectly set.	Rig in accordance with paragraph 8-14.
	Cables tightened unevenly.	Rig in accordance with paragraph 8-14.
	Interference at instrument panel.	Rig in accordance with paragraph 8-14.

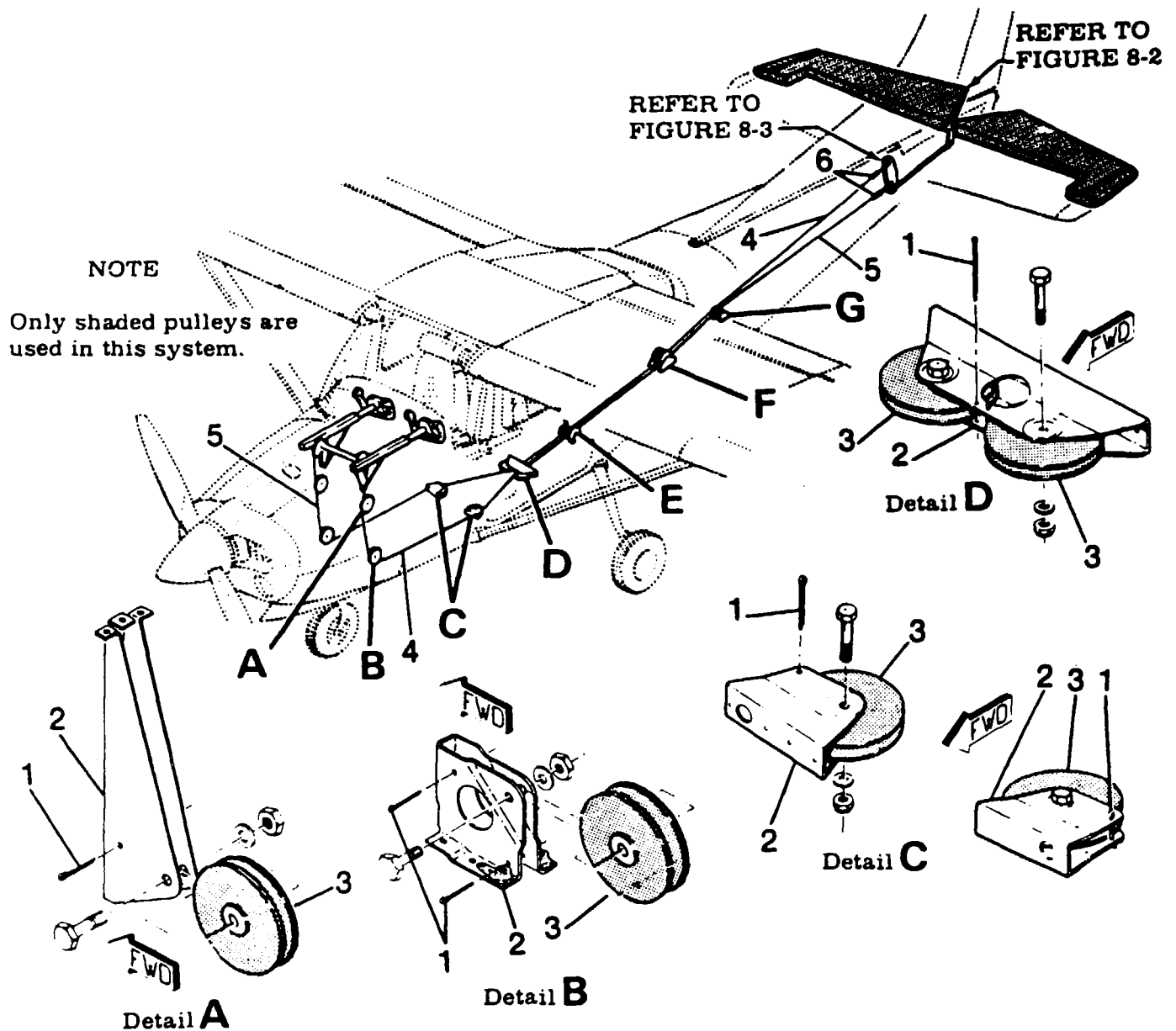
8-4. CONTROL COLUMN. (Refer to Section 6.) Section 6 outlines removal, installation and repair of control column.

8-5. ELEVATORS. (Refer to figure 8-2.)

8-6. REMOVAL AND INSTALLATION.

- a. Remove stinger.
- b. Disconnect trim tab push-pull tube (6) at tab actuator.

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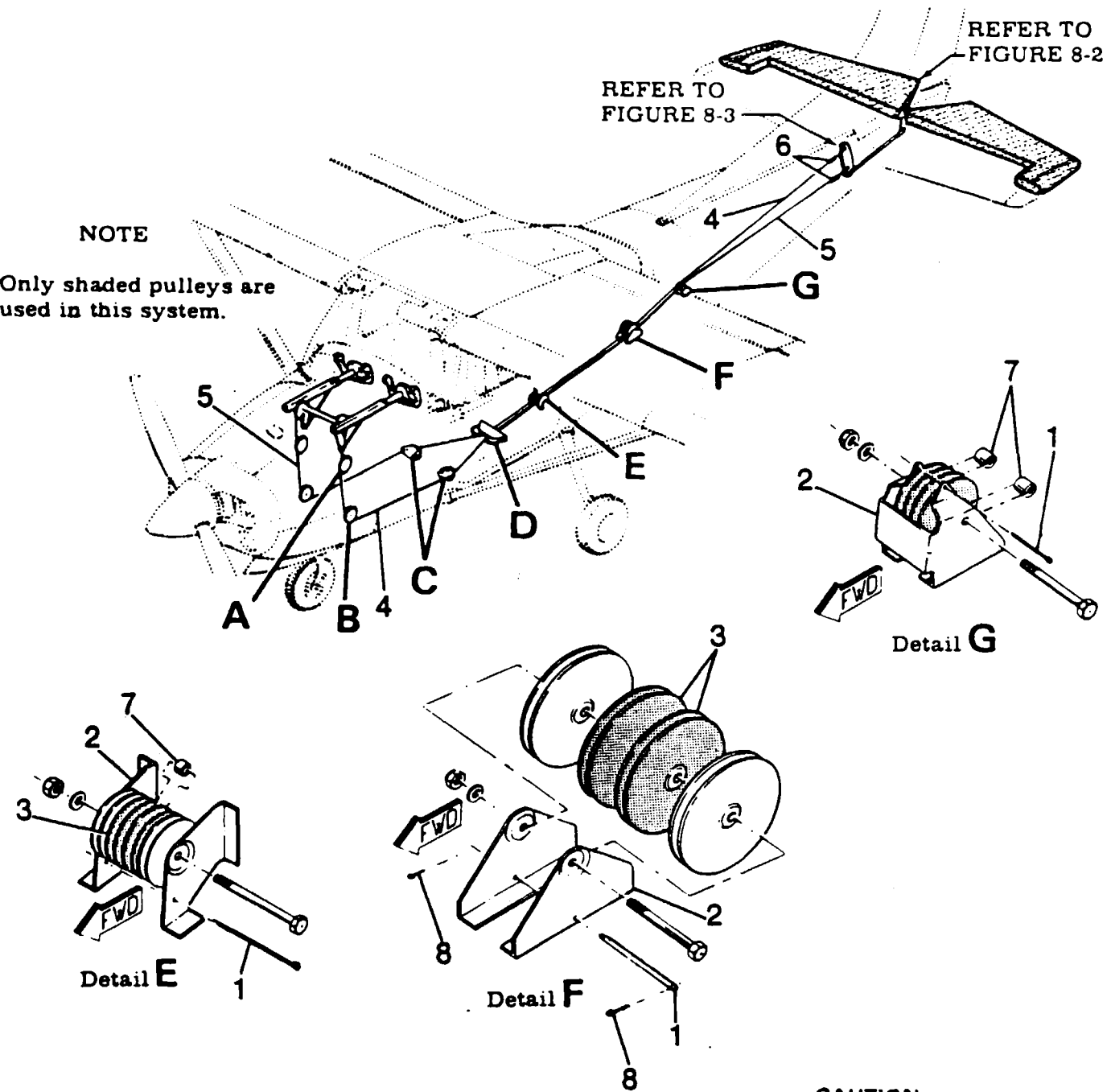
1. Cable Guard
2. Pulley Bracket
3. Pulley
4. Elevator UP Cable
5. Elevator DOWN Cable
6. Turnbuckle
7. Spacer
8. Pin

CAUTION

MAINTAIN SPECIFIED CONTROL CABLE TENSION.

CABLE TENSION:
30 LBS \pm 10 LBS (AT AVERAGE TEMPERATURE FOR THE AREA.)
REFER TO FIGURE 1-1 FOR TRAVEL.

Figure 8-1. Elevator Control System (Sheet 1 of 2)



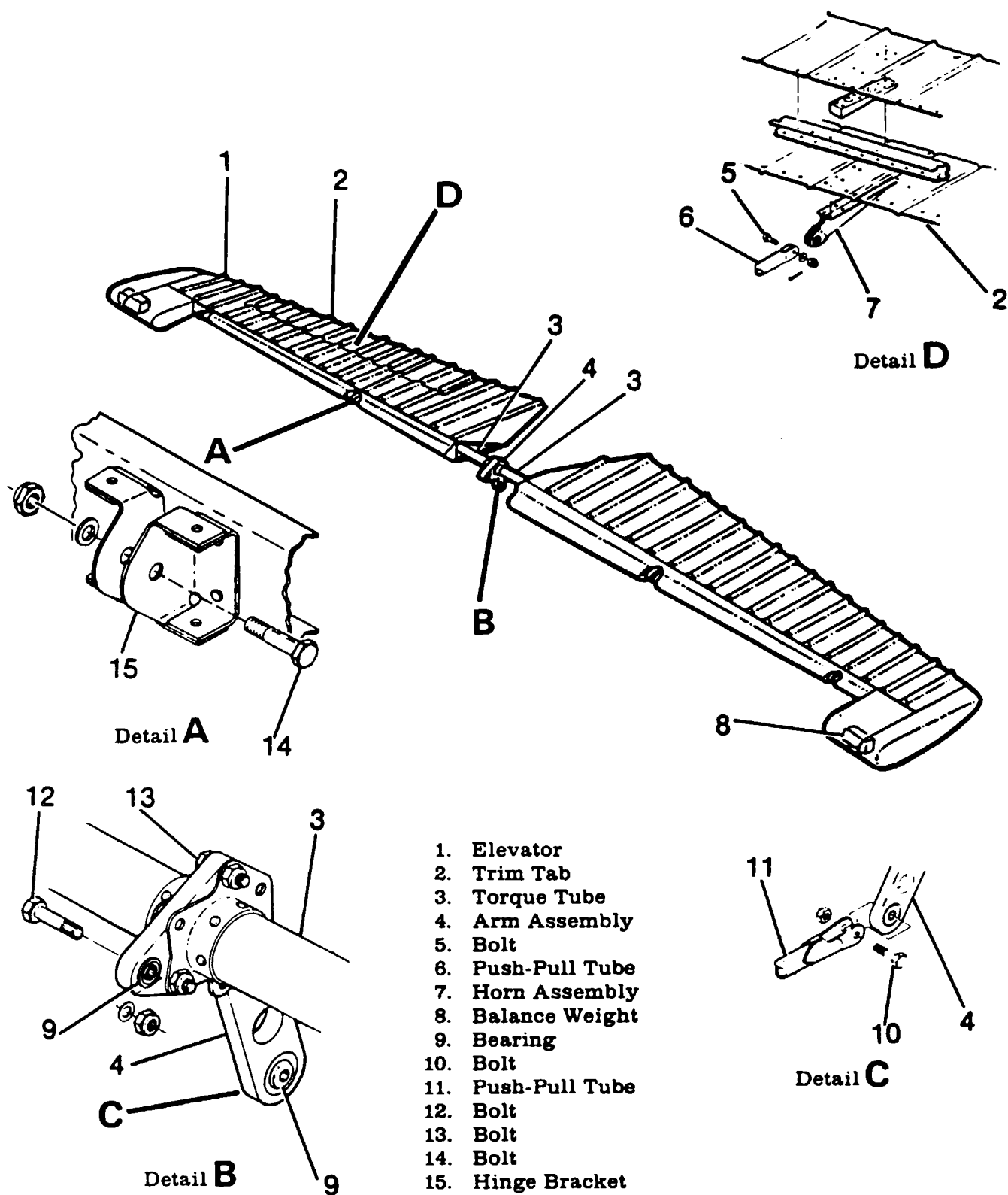
CAUTION

MAINTAIN SPECIFIED CONTROL
CABLE TENSION.

CABLE TENSION:
30 LBS \pm 10 LBS (AT AVERAGE TEMPER-
ATURE FOR THE AREA.)
REFER TO FIGURE 1-1 FOR TRAVEL.

Figure 8-1. Elevator Control System (Sheet 2 of 2)

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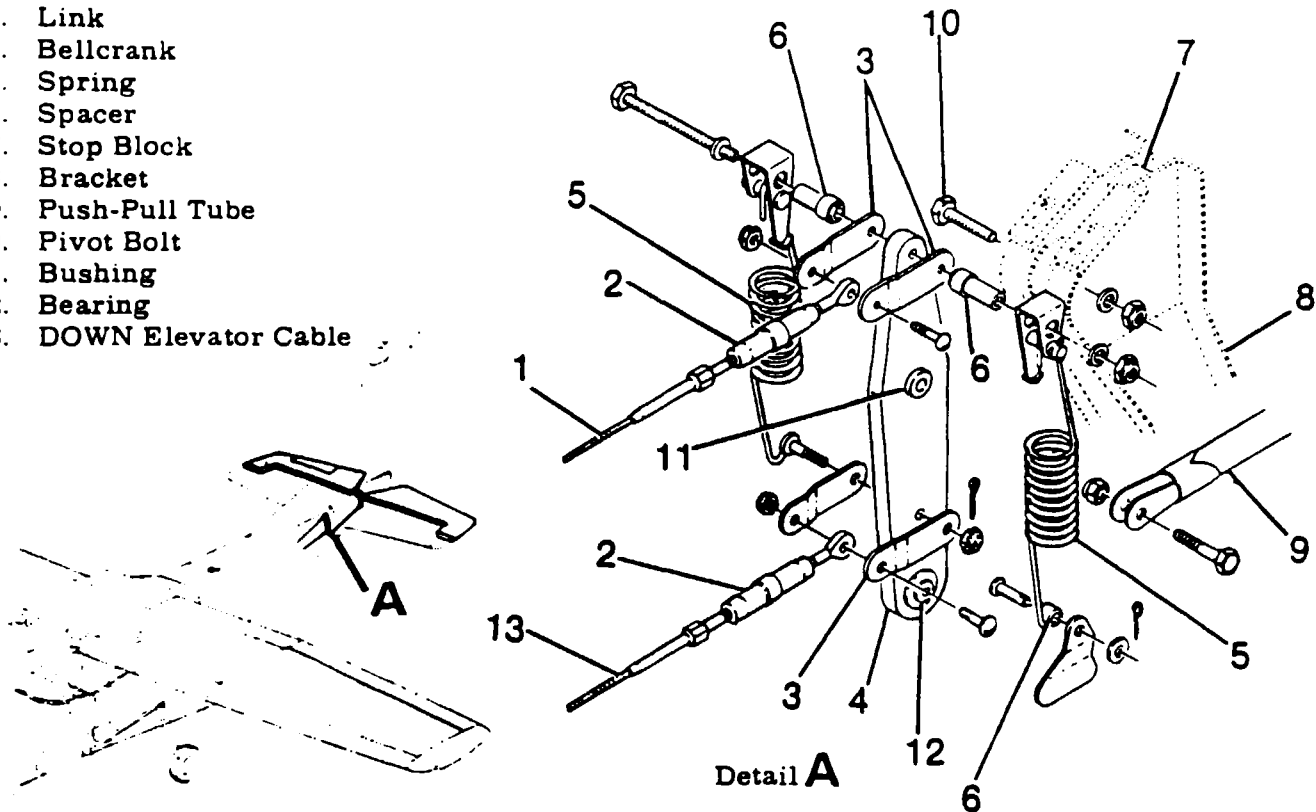
NOTE

Refer to Section 9 for trim tab control system.

Figure 8-2. Elevator Installation

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1. UP Elevator Cable
2. Turnbuckle
3. Link
4. Bellcrank
5. Spring
6. Spacer
7. Stop Block
8. Bracket
9. Push-Pull Tube
10. Pivot Bolt
11. Bushing
12. Bearing
13. DOWN Elevator Cable



8-3. Elevator Bellcrank Installation

NOTE

If trim system is not moved and actuator screw is not turned, re-rigging of trim system should not be necessary after reinstallation of elevator.

- c. Remove bolts (13) securing elevator torque tubes (3) to arm assembly (4).
- d. Remove bolts (14) from elevator hinges.
- e. Using care, remove elevator.
- f. To remove left elevator use same procedure, omitting step "b".
- g. Reverse the preceding steps for reinstallation.

- 8-7. REPAIR. Refer to Section 17. Hinge bearings may be replaced as necessary.
- 8-8. BELLCRANK. (Refer to figure 8-3.)
- 8-9. REMOVAL AND INSTALLATION.
 - a. Remove access plate below bellcrank on tailcone.

CAUTION

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

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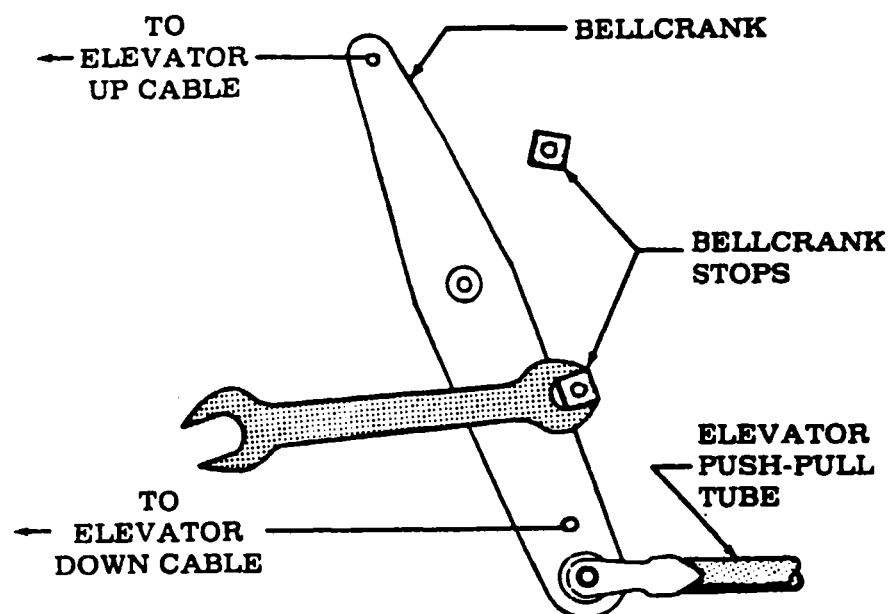


Figure 8-4. Elevator Bellcrank Travel Stop Adjustment

- b. Remove safety wire, relieve cable tension at turnbuckles (2) and disconnect turnbuckle eyes at bellcrank links (3).
- c. Disconnect elevator down-springs (5) at bellcrank (4).
- d. Disconnect push-pull tube (9) at bellcrank (4).
- e. Remove pivot bolt (10) attaching bellcrank (4) to brackets (8). Remove bellcrank.
- f. Reverse the preceding steps for reinstallation. Rig system in accordance with paragraph 8-14, safety turnbuckles and reinstall all items removed for access.

8-10. ARM ASSEMBLY. (Refer to figure 8-2.)

8-11. REMOVAL AND INSTALLATION.

- a. Remove stinger.
- b. Remove bolt (10) securing push-pull tube (11) to arm assembly (4).
- c. Remove bolts (13) attaching elevator torque tubes (3) to arm assembly (4).
- d. Remove pivot bolt (12) securing arm assembly (4) and slide assembly from between elevator torque tubes.
- e. Reverse the preceding steps for reinstallation and reinstall all items removed for access.

8-12. CABLES AND PULLEYS. (Refer to figure 8-1.)

8-13. REMOVAL AND INSTALLATION.

CAUTION

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

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CAUTION

Maintain specified control cable tension, which is 30 Lbs \pm 10 Lbs (at average temperature for the area).

- a. Remove seats, upholstery and access plates as necessary.
- b. Remove safety wire and relieve cable tension at turnbuckles (6).
- c. Disconnect cables at control column arm assemblies (index 18, figure 6-2).
- d. Disconnect cables at bellcrank links (index 3, figure 8-3).
- e. Remove 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 the end of cable being withdrawn from aircraft. Leave wire in place, routed through structure; then attach the cable being installed and pull cable into position.

- f. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guards.
- g. Re-rig system in accordance with paragraph 8-14, safety turnbuckles and reinstall all items removed in step "a".

8-14. RIGGING. (Refer to figure 8-3.)

CAUTION

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

CAUTION

Maintain specified control cable tension, which is 30 Lbs \pm 10 Lbs (at average temperature for the area).

- a. Install control column neutral position rigging tool. (Refer to figure 8-5.)
- b. Holding elevator in neutral position (streamlined with horizontal stabilizer), adjust turnbuckles (Index 2, figure 8-3) equally to obtain cable tension.
- c. Remove neutral position rigging tool from control column.
- d. Streamline elevators, mount an inclinometer on one elevator and set to 0°.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Supply Division. Refer to Section 6.

- e. (Refer to figure 8-3.) Adjust bellcrank stop blocks (7) at brackets (8) to degree of travel specified in figure 1-1.

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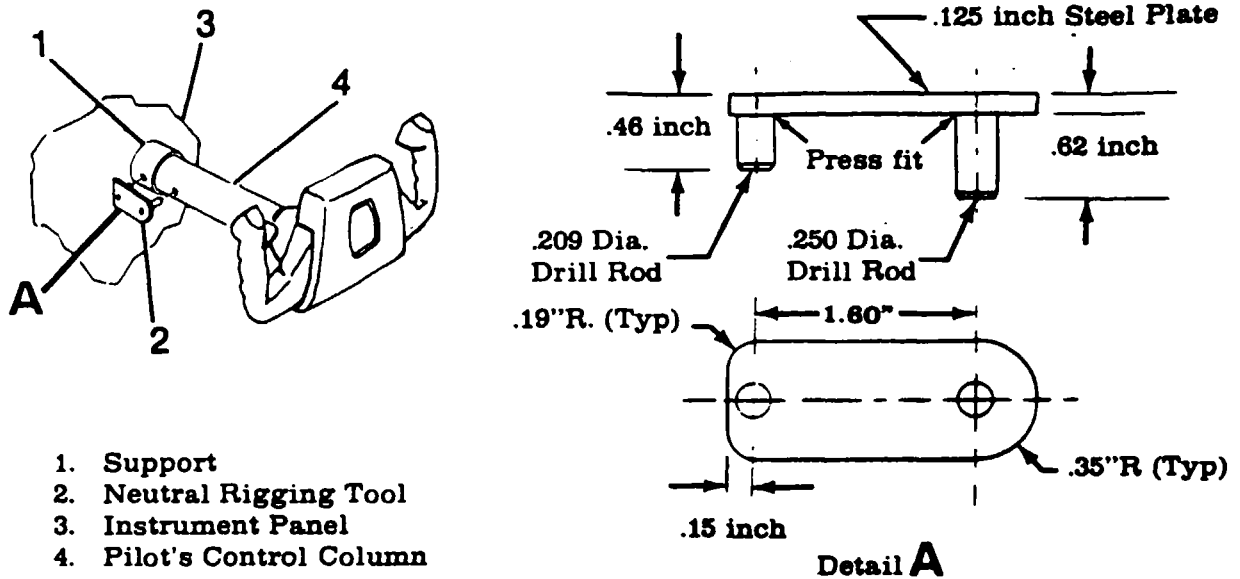


Figure 8-5. Control Column Neutral Position Rigging Tool

NOTE

The bellcrank stop blocks (7) are four-sided bushings drilled off-center so they may be rotated to any of four positions to attain correct elevator travel. Each 90 degree rotation of the stop changes elevator travel approximately one degree.

- f. Check sponge at control column in both UP and DOWN positions and if necessary, readjust turnbuckles (Index 2, figure 8-3) to prevent the control column from hitting the instrument panel or firewall. Check for freedom of movement.
- g. Safety turnbuckles and reinstall all items removed for access.

WARNING

Be sure elevators move in the correct direction when operated by the control wheel.