

# MODEL R182 AND TR182 SERVICE MANUAL

## SECTION 9

### ELEVATOR TRIM TAB CONTROL SYSTEM

TABLE OF CONTENTS	Page No. Aerofiche/ Manual		
<b>ELEVATOR TRIM TAB</b>		<b>Cables and Pulleys</b> . . . . .	<b>2H18/9-11</b>
<b>CONTROL SYSTEM</b> . . . . .	<b>2H9/9-1</b>	Removal/Installation . . . . .	<b>2H18/9-11</b>
Description . . . . .	2H9/9-1	<b>Pedestal Cover</b> . . . . .	<b>2H20/9-12</b>
Trouble Shooting . . . . .	2H9/9-1	Removal/Installation . . . . .	<b>2H20/9-12</b>
Trim Tab . . . . .	2H11/9-3	<b>Rigging</b> . . . . .	<b>2H20/9-12</b>
Removal Installation . . . . .	2H11/9-3	<b>Electric Trim Assist</b>	
Tab Actuator . . . . .	2H11/9-3	Installation . . . . .	<b>2H21/9-13</b>
Removal Installation . . . . .	2H11/9-3	Description . . . . .	<b>2H21/9-13</b>
Disassembly . . . . .	2H11/9-3	Trouble Shooting . . . . .	<b>2H22/9-14</b>
Cleaning, Inspection and		Removal/Installation . . . . .	<b>2H22/9-14</b>
Repair . . . . .	2H16/9-8	Clutch Adjustment . . . . .	<b>2H22/9-14</b>
Reassembly . . . . .	2H17/9-9	<b>Rigging Electric Trim</b>	
Trim Tab Free-Play		Assist . . . . .	<b>2I2/9-18</b>
Inspection . . . . .	2H18/9-10	<b>Voltage Regulator</b>	
Tab Control Wheel . . . . .	2H18/9-11	Adjustment . . . . .	<b>2I2/9-20</b>
Removal Installation . . . . .	2H18/9-11		

9-1. ELEVATOR TRIM TAB CONTROL SYSTEM.

9-2. DESCRIPTION. The elevator trim tab, located on the trailing edge of the right elevator, is controlled by a trim wheel mounted in the pedestal. Power to operate the tab is transmitted from the trim control wheel by means of roller chains, cables, an actuator and a push-pull tube. A mechanical pointer, adjacent to the trim wheel, indicates tab position. A "nose-up" setting results in a tab-down position. An electric trim assist system may also be installed. This system is described in paragraph 9-19.

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 9-18.

# MODEL R182 AND TR182 SERVICE MANUAL

TROUBLE	PROBABLE CAUSE	REMEDY
TRIM CONTROL WHEEL MOVES WITH EXCESSIVE RESISTANCE.	Cable tension too high.	Check and adjust tension as specified in figure 9-1.
	Pulleys binding or rubbing.	Open access plates and check visually. Install cables correctly.
	Cables not in place on pulleys.	Open access plates and check visually. Install cables correctly.
	Trim tab hinge binding.	Disconnect actuator and move tab to check resistance. Lubricate or replace hinge as necessary.
	Defective trim tab actuator.	Remove chain from actuator sprocket and operate actuator manually. Replace actuator if defective.
	Rusty chain.	Check visually. Replace chain.
	Damaged sprocket.	Check visually. Replace sprockets.
	Bent sprocket shaft.	Observe motion of sprockets. Replace bent sprocket shafts.
LOST MOTION BETWEEN CONTROL WHEEL AND TRIM TAB.	Cable tension too low.	Check and adjust tension as specified in figure 9-1.
	Broken pulley.	Open access plates and check visually. Replace defective pulley.
	Cable not in place on pulleys.	Open access plates and check visually. Install cables correctly.
	Worn trim tab actuator.	Remove and replace worn actuator.
	Actuator attachment loose.	Check actuator for security. Tighten as necessary.
TRIM INDICATOR FAILS TO INDICATE CORRECT TRIM POSITION.	Indicator incorrectly engaged on wheel track.	Check visually and reset indicator as necessary.
INCORRECT TRIM TAB TRAVEL.	Stop blocks loose or incorrectly adjusted.	Adjust stop blocks on cables. Refer to figure 9-3.

## MODEL R182 AND TR182 SERVICE MANUAL

### 9-4. TRIM TAB.

### 9-5. REMOVAL AND INSTALLATION. (Refer to figure 9-2.)

- a. Disconnect push-pull tube (15) from horn assembly (16).

#### NOTE

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

- b. Drill out rivets securing trim tab hinge to elevator and remove trim tab.

#### 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 the preceding steps for reinstallation. Rig system if necessary in accordance with paragraph 9-18.

### 9-6. TRIM TAB ACTUATOR.

### 9-7. REMOVAL AND INSTALLATION. (Refer to figure 9-2.)

- a. Relieve cable tension at turnbuckle (index 5, figure 9-1.).

#### CAUTION

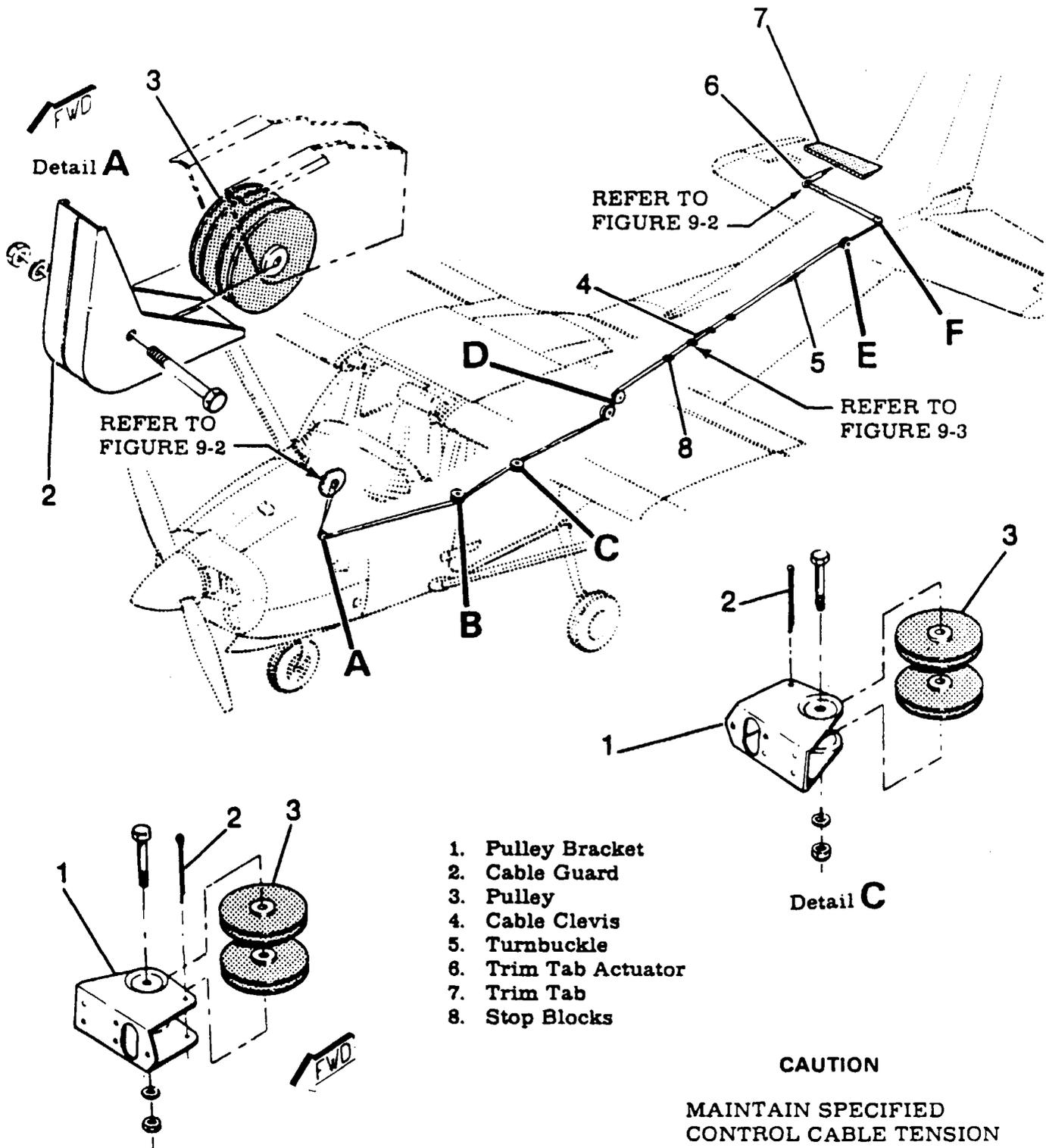
Position a support stand under the tail tiedown ring to prevent tailcone from dropping while working inside.

- b. Disconnect push-pull tube (15) at actuator (11).
- c. Remove access plate beneath actuator.
- d. Remove chain guard (10) and disengage chain from actuator sprocket (7).
- e. Remove screws attaching clamps (12) to bracket (9) and remove actuator (11) through access opening.
- f. Reverse the preceding steps for reinstallation. Rig system in accordance with paragraph 9-18, safety turnbuckle and reinstall all items removed for access.

### 9-8. DISASSEMBLY. (Refer to figure 9-4.)

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

MODEL R182 AND TR182 SERVICE MANUAL



Detail B

CAUTION

MAINTAIN SPECIFIED CONTROL CABLE TENSION

CABLE TENSION:  
 10 to 15 LBS (AT AVERAGE TEMPERATURE FOR THE AREA.)  
 REFER TO FIGURE 1-1 FOR TRAVEL.

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

# MODEL R182 AND TR182 SERVICE MANUAL

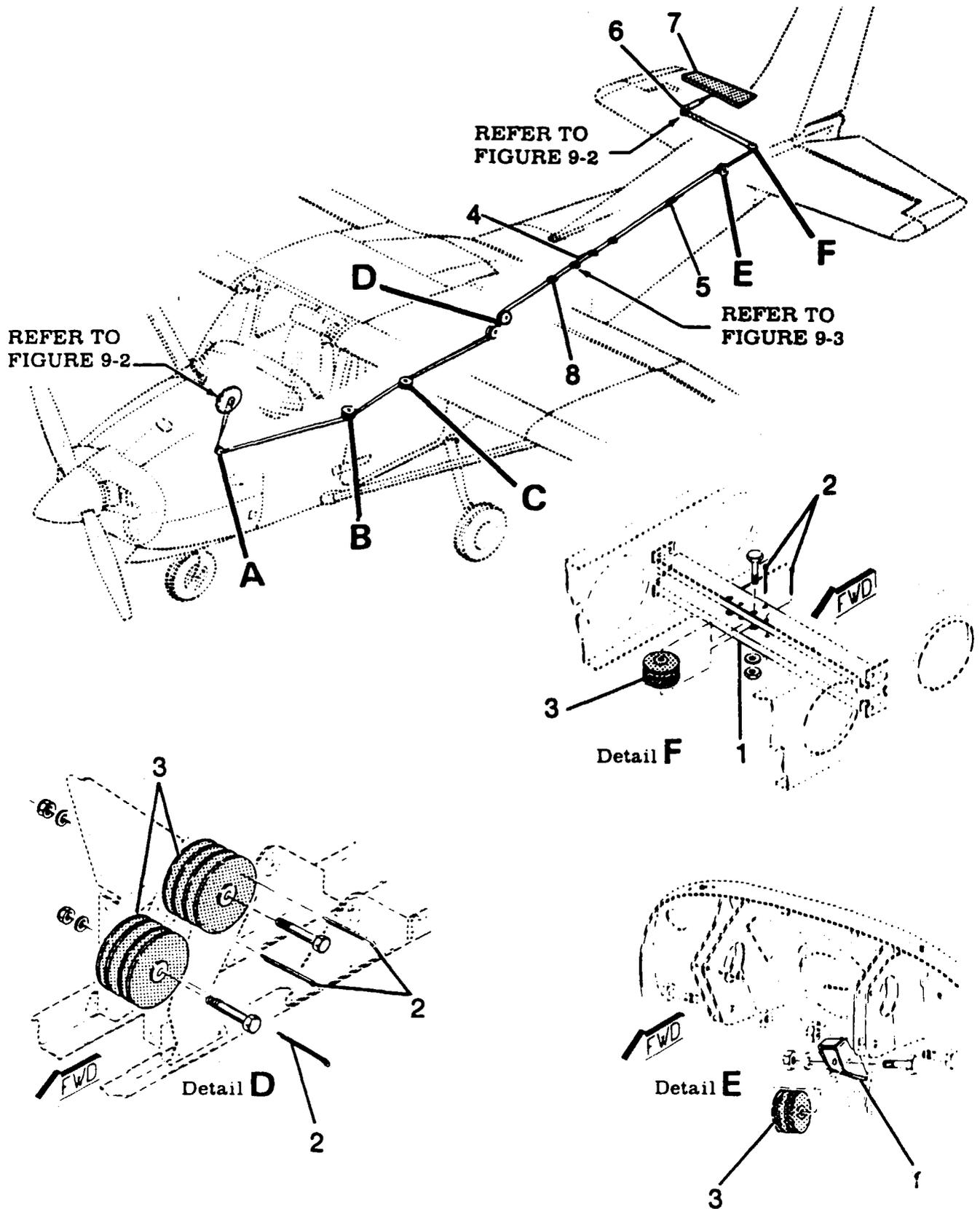


Figure 9-1. Elevator Trim Tab Control System (Sheet 2 of 2)

MODEL R182 AND TR182 SERVICE MANUAL

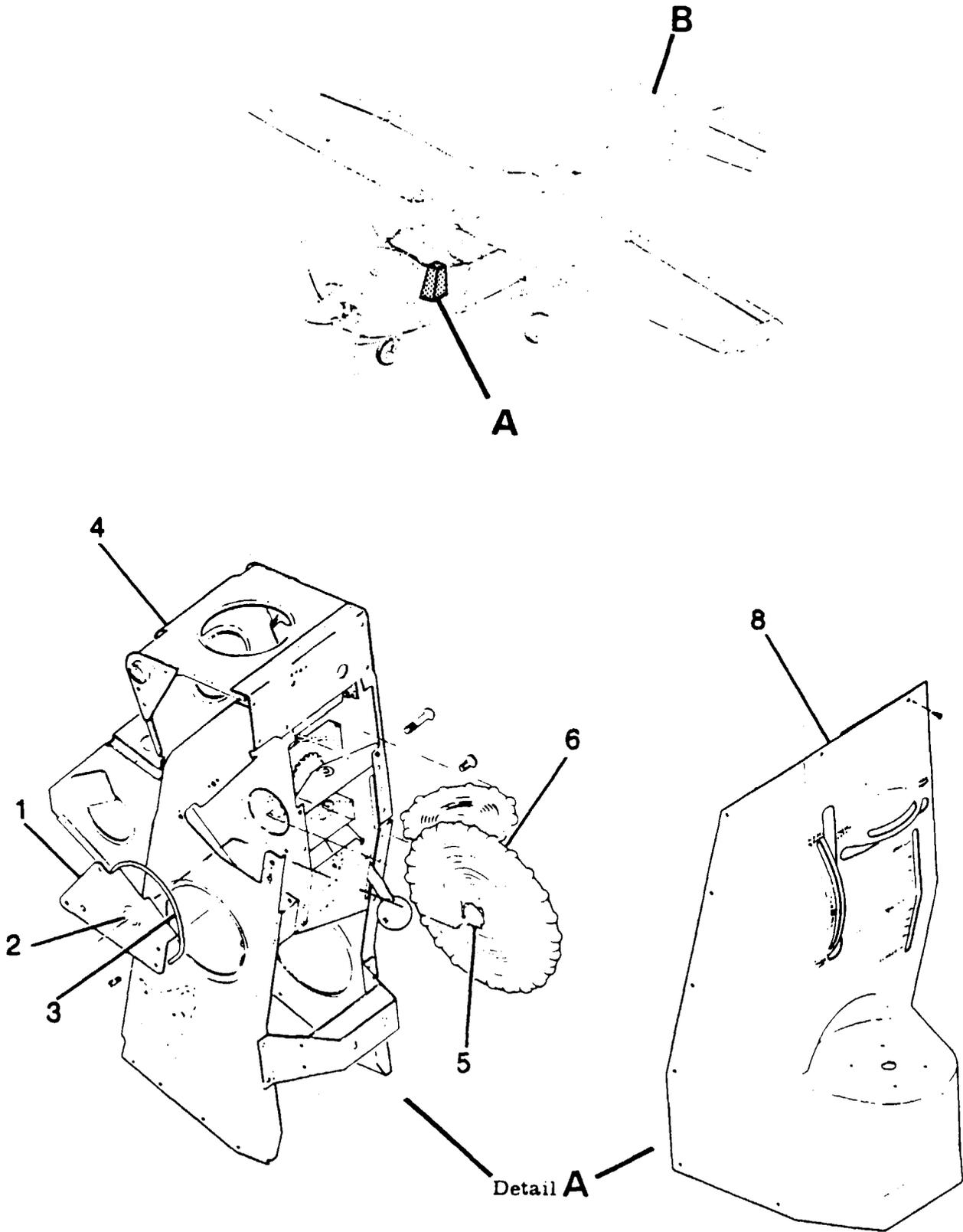
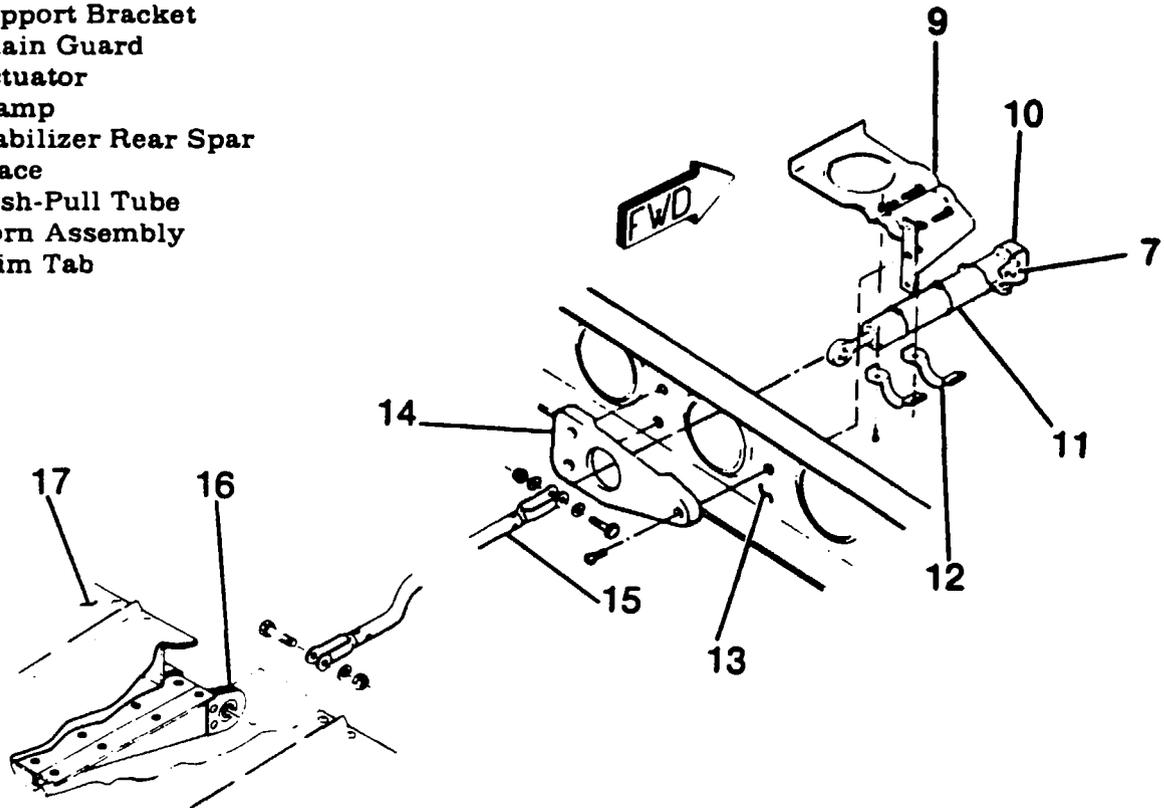


Figure 9-2. Elevator Trim Tab Control Wheel and Actuator (Sheet 1 of 2)

# MODEL R182 AND TR182 SERVICE MANUAL

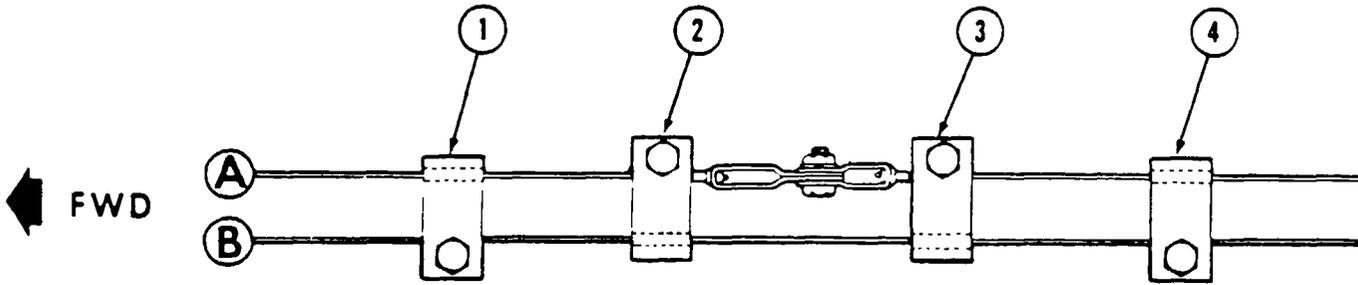
1. Retainer
2. Bearing
3. Trim Indicator
4. Pedestal Structure
5. Trim Wheel Sprocket
6. Trim Wheel
7. Sprocket
8. Pedestal Cover
9. Support Bracket
10. Chain Guard
11. Actuator
12. Clamp
13. Stabilizer Rear Spar
14. Brace
15. Push-Pull Tube
16. Horn Assembly
17. Trim Tab



Detail **B**

Figure 9-2. Elevator Trim Tab Control Wheel and Actuator (Sheet 2 of 2)

# MODEL R182 AND TR182 SERVICE MANUAL



1. With elevators in neutral, set trim tab to neutral (streamlined).
2. Position stop blocks (2 and 3) against cable ends and secure to cable A.
3. Place inclinometer on trim tab and lower to degree specified in figure 1-1.
4. Position stop block (4) against stop block (3) and secure to cable B.
5. Raise trim tab to specified degree, place stop block (1) against stop block (2) and secure to cable.

Figure 9-3. Elevator Trim Tab Travel Stop Adjustment

## 9-9. CLEANING, INSPECTION AND REPAIR. (Refer to figure 9-4.)

- 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	0.374" MAX.
BEARING (14)	
INSIDE DIAMETER	
SMALL HOLE	0.248" MIN.
SMALL HOLE	0.249" MAX.
LARGE HOLE	0.373" MIN.
LARGE HOLE	0.374" MAX.
THREADED ROD END (15)	
OUTSIDE DIAMETER	
(SHANK)	0.245" MIN.
	0.246" MAX.
SCREW (9)	
OUTSIDE DIAMETER	0.369" 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.

## MODEL R182 AND TR182 SERVICE MANUAL

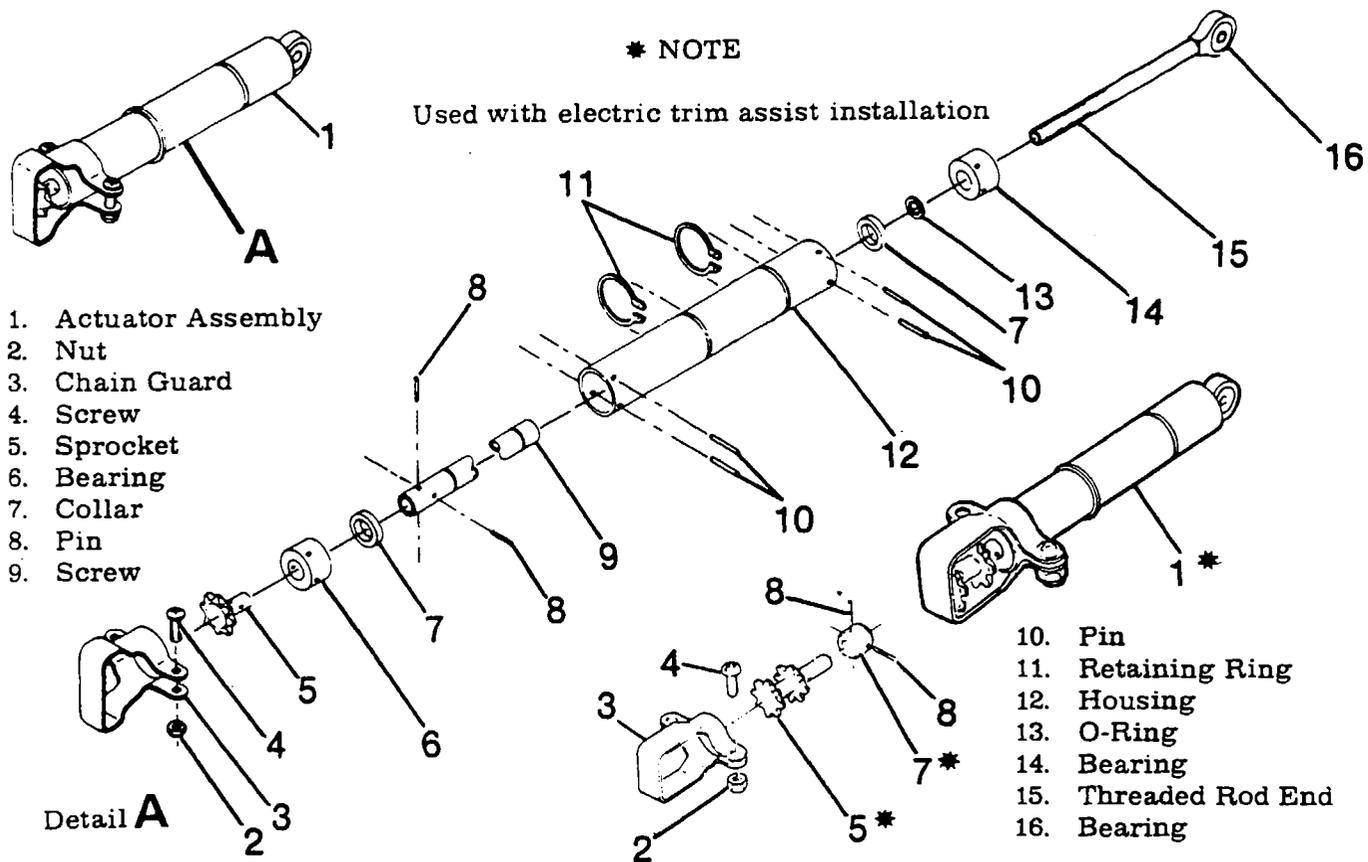


Figure 9-4. Elevator Trim Tab Actuator

- 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 9-4.)

- a. Always discard the following items and install new parts during reassembly.
  1. Bearings (6 and 14).
  2. Roll 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 roll pin holes and install new roll 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.

# MODEL R182 AND TR182 SERVICE MANUAL

## 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 roll pins (10) are 3/32 inch in diameter, therefore, requiring a 3/32 (0.094) 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 roll 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. (Refer to figure 9-5.)

- a. Place elevators and trim tab in the neutral position and secure from movement.
- b. Determine maximum allowable free-play using the following instructions.
  1. Measure chord length at extreme inboard end of trim tab as shown in detail A, figure 9-5.
  2. Multiply chord length by 0.025 to obtain maximum allowable free-play.
- c. Using moderate pressure, move the trim tab trailing edge up and down by hand to check free-play.

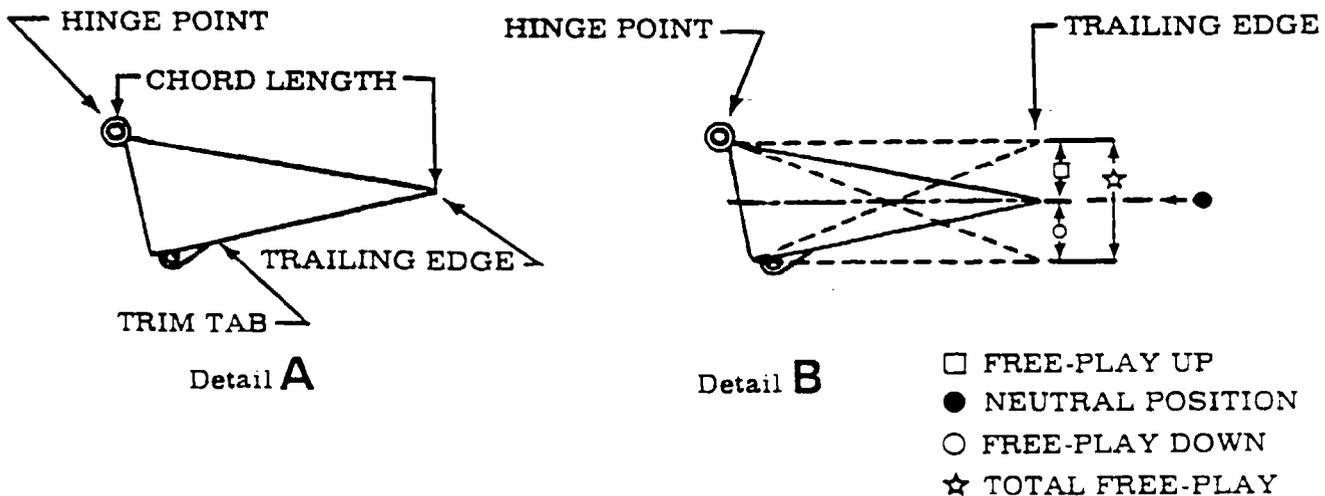


Figure 9-5. Elevator Trim Tab Free Play

## MODEL R182 AND TR182 SERVICE MANUAL

### NOTE

Measure free-play at same point on trim tab that chord length was measured. Total free-play must not exceed maximum allowable. Refer to detail B, figure 9-5.

- d. If the trim tab free-play is less than the maximum allowable, the system is within prescribed limits.
- e. If the trim tab free-play is more than the maximum allowable, 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 actuator assembly with push-pull tube disconnected.
- 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. Recheck trim tab free-play.

#### 9-12. TRIM TAB CONTROL WHEEL.

#### 9-13. REMOVAL AND INSTALLATION. (Refer to figure 9-2.)

- a. Relieve cable tension at turnbuckle (index 10, figure 9-1.)

### CAUTION

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

- b. Remove pedestal cover (8) in accordance with paragraph 9-17.
- c. Remove screws attaching control wheel retainer (1) to left side of pedestal structure (4).
- d. Remove retainer (1) and indicator (3), using care not to drop control wheel (6).
- e. Disengage roller chain from sprocket (7) and remove control wheel (6).

### NOTE

Removal of the sprocket (7) from control wheel shaft is not recommended except for replacement of parts.

- f. Reverse the preceding steps for reinstallation. Rig system in accordance with paragraph 9-18, safety turnbuckle and reinstall all items removed for access.

#### 9-14. CABLES AND PULLEYS.

#### 9-15. REMOVAL AND INSTALLATION. (Refer to figure 9-1.)

- a. Remove seats, upholstery, pedestal cover and access plates as necessary.

### CAUTION

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

## MODEL R182 AND TR182 SERVICE MANUAL

- b. Remove travel stop blocks (8) from control cables.
- c. Disconnect control cables at turnbuckles (10) and at cable ends (9).
- d. Remove cable guards and pulleys as necessary to work cables free of aircraft. Disengage roller chains from sprockets to ease cable removal.

### NOTE

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

- e. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guards. Ensure roller chains are positioned correctly over sprockets.
- f. Re-rig system in accordance with paragraph 9-18, safety turnbuckle and reinstall all items removed in step "a".

### 9-16. PEDESTAL COVER.

### 9-17. REMOVAL AND INSTALLATION. (Refer to figure 9-2.)

- a. Remove fuel selector valve handle and placard.
- b. Remove mike and remove mike mounting bracket.
- c. Remove cowl flap control knob.
- d. Disconnect electrical wiring to pedestal lights.
- e. Remove screws securing pedestal cover to structure and remove cover.
- f. Reverse the preceding steps for reinstallation.

### 9-18. RIGGING. (Refer to figure 9-1.)

### CAUTION

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

- a. Remove rear baggage compartment wall and access plates as necessary.
- b. Loosen travel stop blocks (8) on trim tab cables.
- c. Disconnect push-pull tube from actuator (6).
- d. Check cable tension and readjust turnbuckle (5) if necessary.

### NOTE

If chains and/or cables are being installed, permit actuator screw to rotate freely as chains and cables are connected. Adjust cable tension and safety turnbuckle (10).

- e. (Refer to figure 9-2.) Rotate trim control wheel (6) full forward (nose down). Ensure pointer (3) does not restrict wheel movement. If necessary, reposition pointer using thin screwdriver to pry trailing leg of pointer out of groove.

## MODEL R182 AND TR182 SERVICE MANUAL

### NOTE

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

- f. With elevator and trim tab both in neutral (streamlined), mount an inclinometer on tab and set to 0°. Disregard counterweight areas of elevators when streamlining. These areas are contoured so they will be approximately 3° down at cruising speed.

### NOTE

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

- g. Rotate actuator screw in or out as required to place trim tab up with a maximum of 2° overtravel, with actuator screw connected to push-pull tube (15).
- h. Rotate trim wheel to position trim tab up and down, readjusting actuator screw as required to obtain overtravel in both directions.
- i. Position stop blocks and adjust as illustrated in figure 9-3 to degree of trim tab travel specified in figure 1-1.
- j. Install pedestal cover and adjust trim tab pointer to the center of the "TAKEOFF" triangle with the trim tab set at 0°.
- k. Safety turnbuckle and reinstall all items removed in step "a".

### WARNING

Be sure trim tab moves in correct direction when operated by the trim control wheel. Nose down trim corresponds to tab up position. Check for freedom of movement.

9-19. ELECTRIC ELEVATOR TRIM INSTALLATION. (Refer to figure 9-6.)

9-20. DESCRIPTION. An electric elevator trim assist system may be installed consisting of 2 switches mounted on the pilot's control wheel, a circuit breaker mounted in the lower left hand side of the instrument panel, fuselage wiring running aft to the 24 Volt D.C. electric drive assembly and a chain connecting the drive assembly to an additional sprocket mounted on the standard elevator trim actuator. The electric drive assembly includes a motor, sprockets and a chain driven solenoid type adjustable clutch. The electric drive assembly chain connects to the FORWARD sprocket of the trim tab actuator while the manual trim chain connects to the AFT sprocket of the actuator. When the clutch or the drive assembly is not energized, the drive assembly "free wheels" and, therefore, has no effect on manual operation.

## MODEL R182 AND TR182 SERVICE MANUAL

### 9-21. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
SYSTEM INOPERATIVE.	Circuit breaker out.	Check visually. Reset breaker.
	Defective circuit breaker.	Check continuity. Replace defective breaker.
	Defective wiring.	Check continuity. Repair wiring.
	Defective trim switch.	Check continuity. Replace defective switch.
	Defective trim motor.	Remove and bench test. Replace defective motor.
TRIM MOTOR OPERATING-TRIM TAB FAILS TO MOVE.	Defective clutch solenoid.	Check continuity. Replace solenoid.
	Improperly adjusted clutch tension.	Check and adjust spanner nuts for proper tension.
	Disconnected or broken cable.	Operate manual trim wheel. Connect or replace cable.
	Defective actuator.	Check actuator operation. Replace actuator.

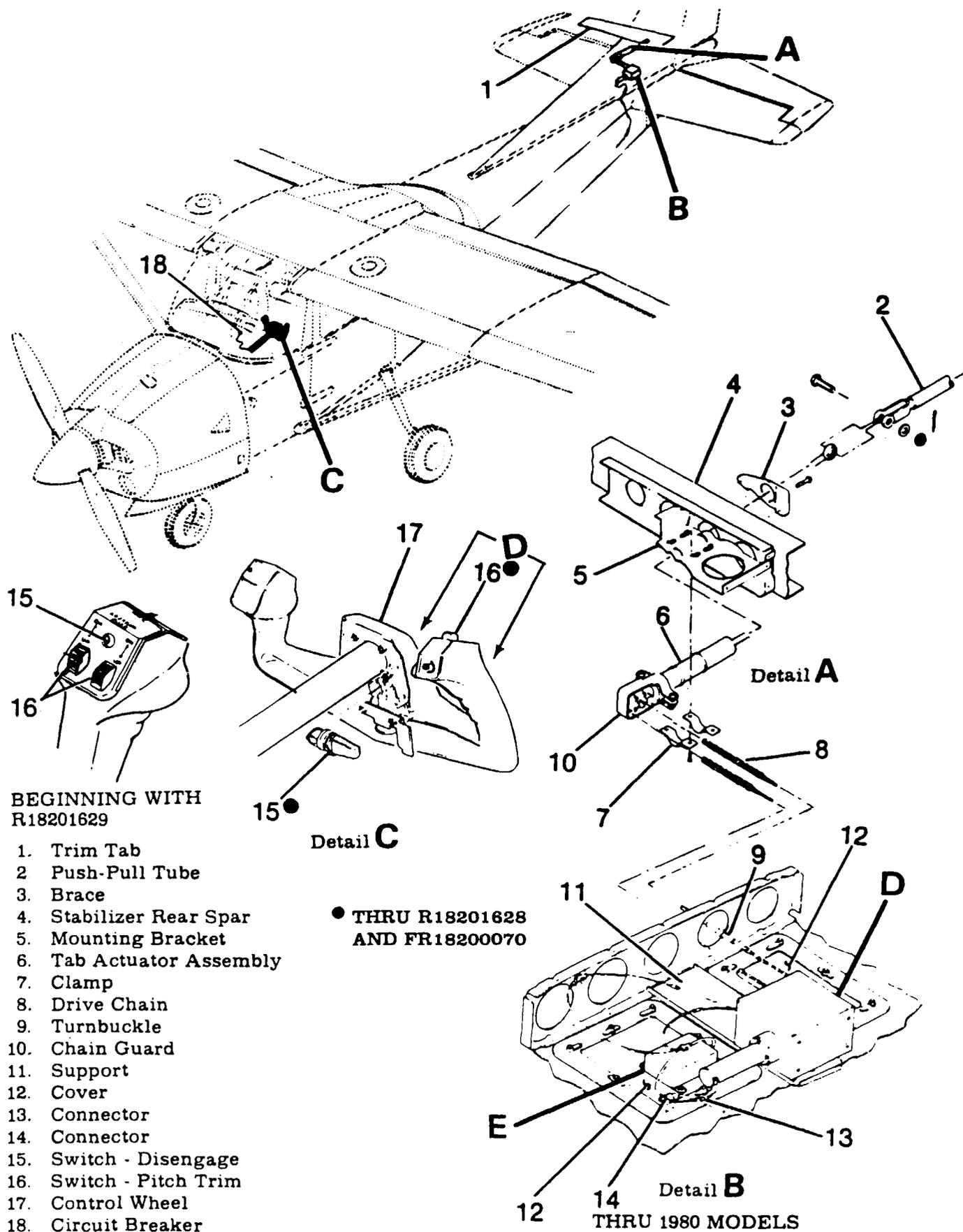
### 9-22. REMOVAL AND INSTALLATION. (Refer to figure 9-6.)

- a. Remove covers (12) beneath tab actuator assembly (6) and drive assembly.
- b. Disconnect electrical connectors (13 and 14) and relieve tension on drive chain (8) at turnbuckle (9).
- c. Remove chain guard (10) from tab actuator.
- d. Remove mounting bolts from drive assembly and tab actuator and remove units from the aircraft.
- e. Reverse preceding steps for reinstallation. Check system rigging in accordance with paragraph 9-24.
- f. Reinstall all items removed for access.

### 9-23. CLUTCH ADJUSTMENT. (Refer to figure 9-6.)

- a. Remove access covers (12) below drive assembly.
- b. Remove safety wire and relieve drive chain tension at turnbuckle (9).
- c. Disconnect electric motor by unplugging electrical connectors (13) leading to motor assembly.
- d. Remove mounting bolts from drive assembly. It is necessary to remove unit from aircraft to make necessary adjustments to clutch.

# MODEL R182 AND TR182 SERVICE MANUAL



BEGINNING WITH  
R18201629

1. Trim Tab
2. Push-Pull Tube
3. Brace
4. Stabilizer Rear Spar
5. Mounting Bracket
6. Tab Actuator Assembly
7. Clamp
8. Drive Chain
9. Turnbuckle
10. Chain Guard
11. Support
12. Cover
13. Connector
14. Connector
15. Switch - Disengage
16. Switch - Pitch Trim
17. Control Wheel
18. Circuit Breaker

● THRU R18201628  
AND FR18200070

Detail B  
THRU 1980 MODELS

Figure 9-6. Electric Trim Installation (Sheet 1 of 3)

# MODEL R182 AND TR182 SERVICE MANUAL

- 19. Screw
- 20. Rub Strip
- 21. Cover Assembly
- 22. Shaft Assembly
- 23. Nut
- 24. Washer
- 25. Spring Washer
- 26. Washer Assembly
- 27. Chain
- 28. Sprocket
- 29. Shaft
- 30. Washer

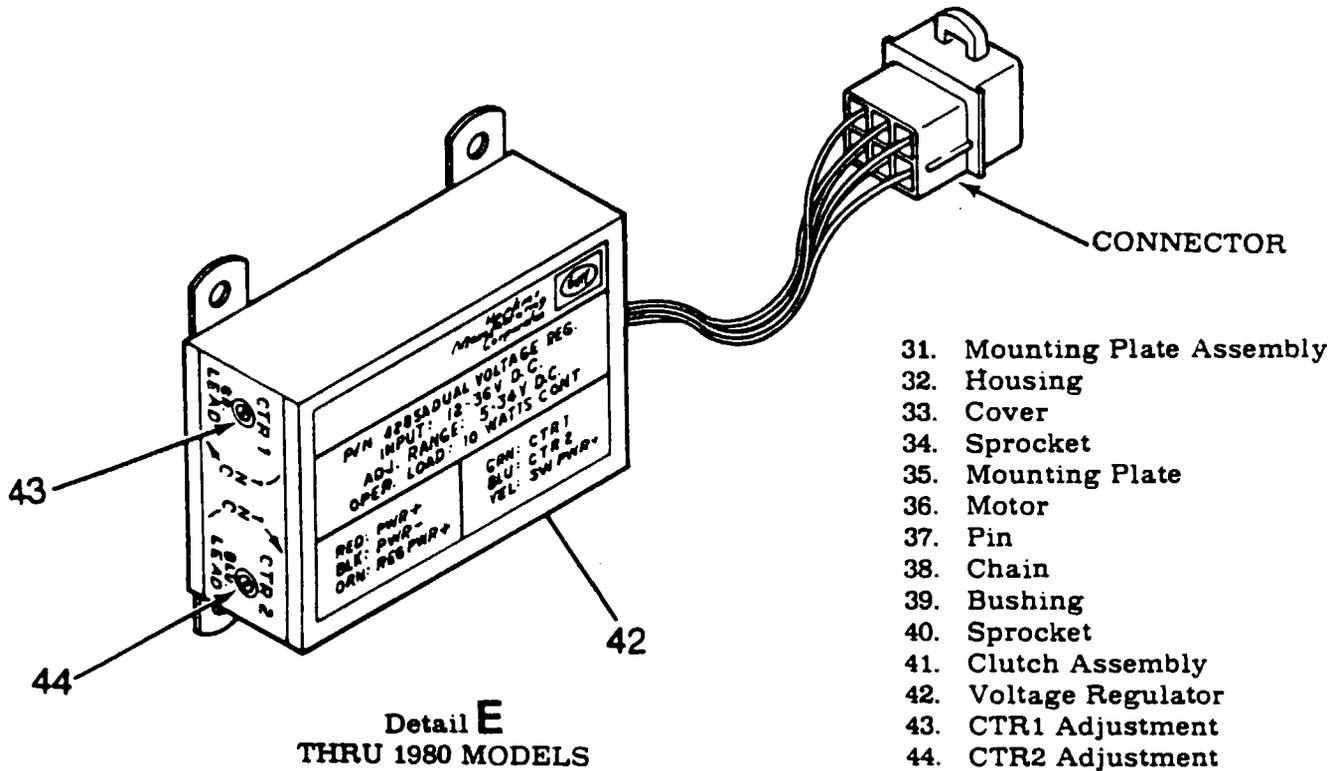
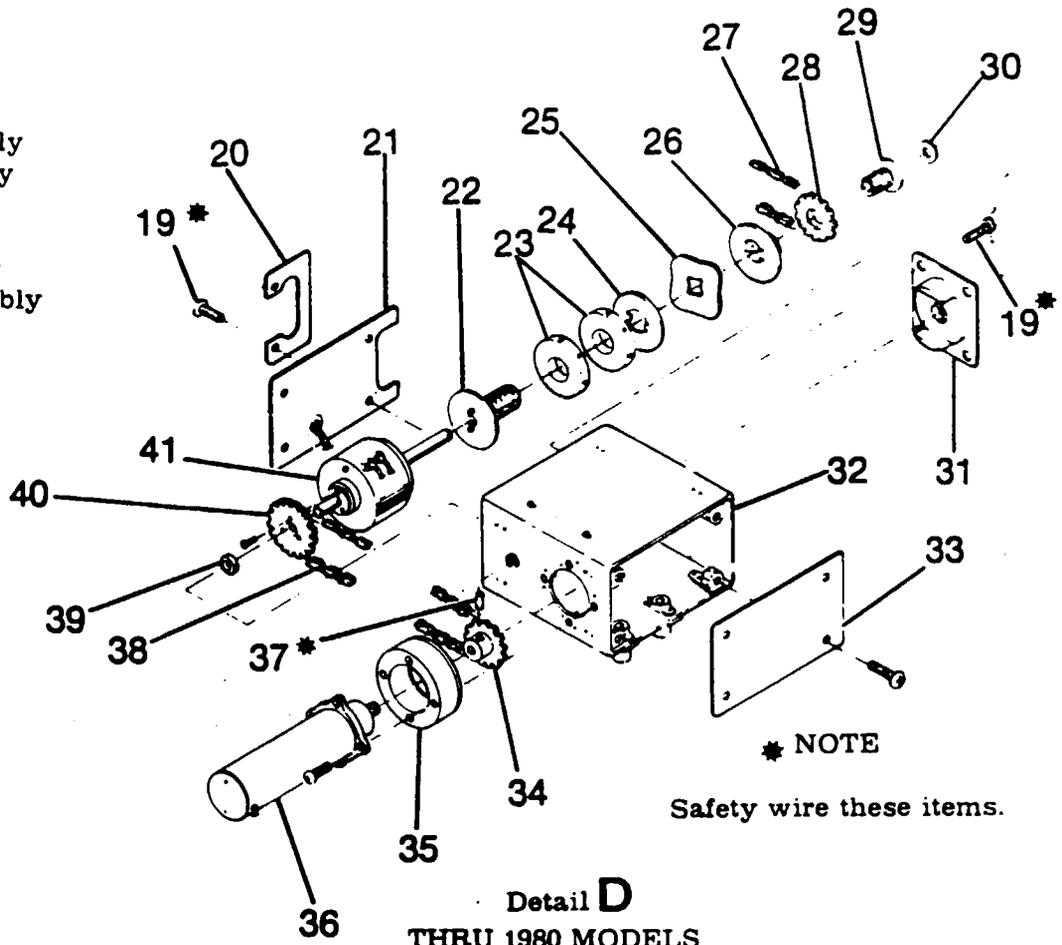


Figure 9-6. Electric Trim Installation (Sheet 2 of 3)

# MODEL R182 AND TR182 SERVICE MANUAL

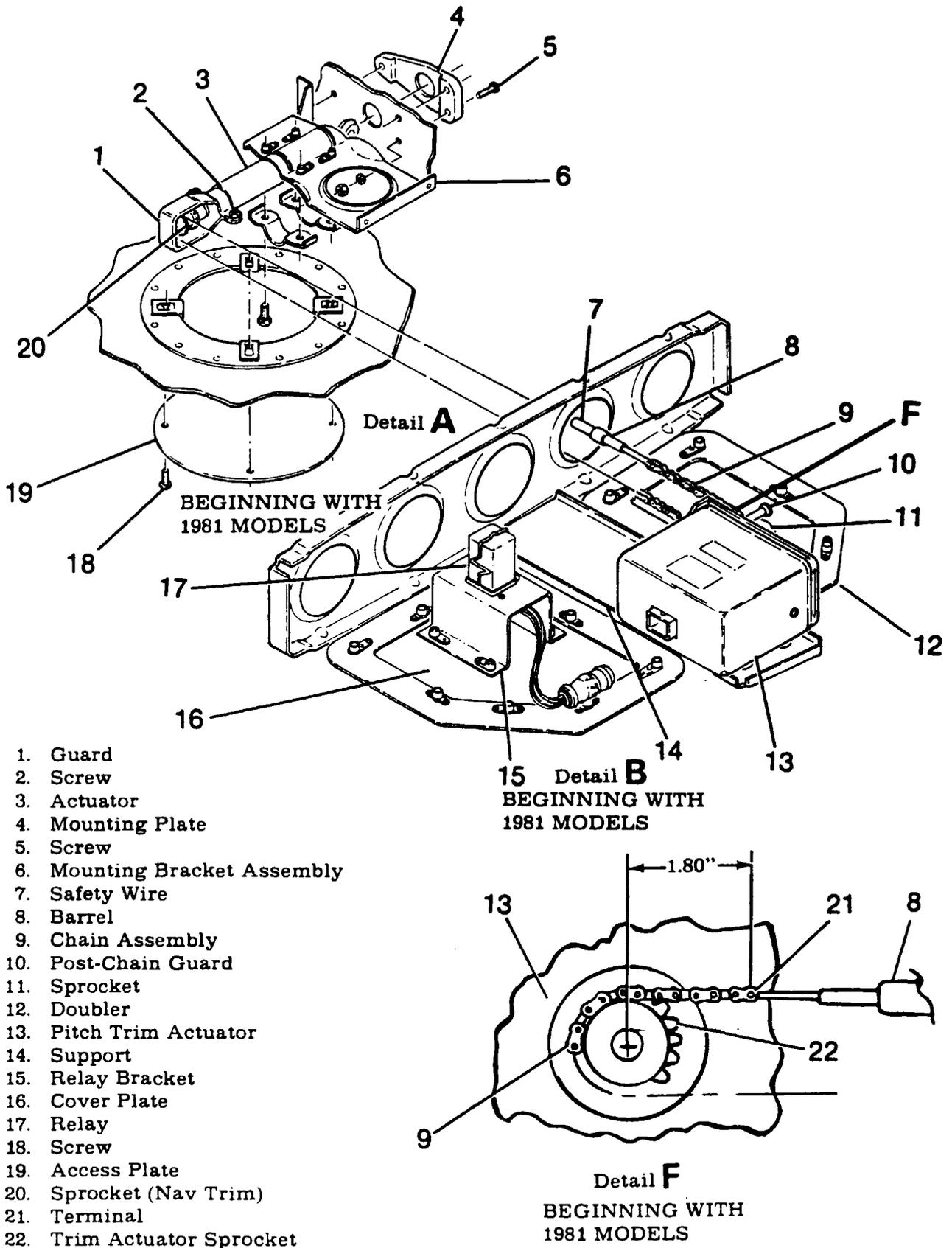


Figure 9-6. Electric Trim Installation (Sheet 3 of 3)

## MODEL R182 AND TR182 SERVICE MANUAL

### NOTE

Step 3 isolates the motor assembly from the remainder of the electric trim system so it cannot be engaged during clutch adjustment.

- e. Remove screws securing covers (20) and (21) to housing (32) and slide the cover down over electrical wiring far enough to expose the clutch assembly.
- f. Ensure the electric trim circuit breaker on the pedestal cover is pushed in and place master switch in ON position.
- g. Place disengage switch (15) in ON position.
- h. Operate pitch trim switch (16) UP or DOWN to energize the solenoid clutch (41).
- i. Attach a spring scale to drive chain and slowly pull scale till clutch slippage occurs.

### NOTE

During step "i", attach scale to drive chain so that sprocket rotates clockwise as viewed from the drive end to ensure proper clutch adjustment.

- j. Repeat steps "h" and "i" several times to break initial friction of clutch.
- k. Repeat step "i" very slowly while watching indicator on spring scale. Slippage should occur between 29.1 and 32.9 pounds.
- l. If tension is not within tolerance, loosen OUTSIDE spanner nut (23) which acts as a lock.
- m. Tighten INSIDE spanner nut to increase clutch tension and loosen nut to decrease clutch tension.
- n. When clutch tension is within tolerance, tighten outside spanner nut against inside nut.
- o. Connect electrical wiring removed in step 3, and reinstall drive assembly in aircraft.
- p. Rerig trim system in accordance with paragraph 9-24 and reinstall all items removed for access.

#### 9-24. RIGGING - ELECTRIC TRIM ASSIST. (See figure 9-1.)

- a. THRU 1980 MODELS.
  1. The standard manual elevator trim system MUST be rigged in accordance with paragraph 9-18 before rigging electric trim assist.
  2. Move elevator trim tab to full "NOSE UP" position.
  3. Locate NAS228 terminal of turnbuckle (9) at a point 0.75 inch from drive assembly housing.
  4. Adjust AN155 barrel until chain deflection between sprockets is approximately 0.25 inch.
  5. Resafety turnbuckle and reinstall all items removed for access.
- b. BEGINNING WITH 1981 MODELS.

### NOTE

Be sure the elevator control system has been rigged in accordance with Section 8 and standard manual elevator trim system is rigged in accordance with paragraph 9-18.

## MODEL R182 AND TR182 SERVICE MANUAL

1. Place control wheels in neutral position of elevator travel and secure with control neutral rigging tool shown in Section 8.
2. Remove the aft, inboard access plate on the underside of the right-hand stabilizer to gain access to the pitch trim actuator (13). Then remove the outboard access plate (19) on the right-hand stabilizer to gain access to the navomatic pitch trim sprocket assembly (20).
3. Remove the four plug buttons on the under side of the stabilizer and ensure the pitch trim actuator assembly (13) is securely bolted to the actuator support (14).
4. With the trim tab in the full UP position check to see that pitch trim actuator chain (9) is properly aligned and that barrel (8) is safely wired (7) also that the trim actuator chain (9) deflection is .25 inch between sprockets (20 & 11).
5. Locate terminal (21) shown in Detail F on upper side of chain assembly (9) and ensure that terminal (21) is 1.80 inches from the center of the sprocket (22) as shown in Detail F.

### NOTE

If the navomatic pitch trim chain assembly (9) is to be removed for readjustments, it is necessary to remove the two chain guard posts (10) on the trim actuator (13) and chain guard (1) from the actuator assembly (3).

### CAUTION

When the chain guard posts (10) are being unscrewed for removal, use caution to not lose the locking washers.

6. In order to properly adjust the electric trim system, it is first necessary to assure that you have a well regulated continuous 28.8 volts dc (aircraft should be equipped with a C611005-0102 and-0101 alternator control units applied to the electronics side of the aircraft's bus bar. This can be accomplished in one of the following methods:
  - (a) Using the standard aircraft starting procedures, run the engine at approximately 1000 RPM to maintain normal operating aircraft voltage (28.8 vdc).
  - (b) With the master switch and avionics power switch in the OFF position, connect a well regulated and filtered external power supply directly to the battery side of the battery contactor. Adjust the power supply for 28.8 volts dc and then turn ON the master switch and avionics power switch to supply power to the system.

### CAUTION

Failure to observe proper polarity when connecting an external power source directly to the battery side of the battery contactor will result in damage to the diodes in the alternator and other semiconductor devices in the aircraft.

## MODEL R182 AND TR182 SERVICE MANUAL

7. With 28.8 volts dc applied to the electronics bus, use trim switches on control and rotate the pitch command wheel to the full "NOSE-DOWN" position.
8. Place a piece of tape or a mark on the very top of the airplane's ELEVATOR TRIM command wheel so a full revolution of the ELEVATOR TRIM command wheel may be observed and timed with a stop watch.
9. Observe and time stop to stop of the aircraft ELEVATOR TRIM command wheel by placing the trim switches on the control wheel in the UP position and ensure you obtain a timing of  $33 \pm 3$  seconds for one complete rotation of the aircraft ELEVATOR TRIM command wheel. Reverse this procedure and ensure that you are getting a reading of  $33 \pm 3$  seconds for one full rotation of the ELEVATOR TRIM command wheel in the "NOSE-DOWN" position. If the rate of travel for one full rotation does not agree with the aforementioned travel time limits, then use the following procedures to obtain the desired rate of pitch trim tab travel.
10. Turn avionics power switch, and aircraft master switch to the OFF position.
11. Remove the neutral rigging tool installed in Step 1, replace the access plates removed in Step 2, replace the plug buttons removed in step 3, remove the external power source installed in step 6.

### NOTE

For Air Load Test and Mechanical Clutch Torque Adjustment, refer to the Avionics Service/Parts Manual.

- 9-25. VOLTAGE REGULATOR ADJUSTMENT. (Refer to figure 9-6.)
- a. Remove access cover (39).
  - b. Connect an external power source of 27.5 volts DC continuous to the aircraft electrical system, or if an external power supply is not available, run the aircraft engine at approximately 1000 RPM to maintain the normal operating aircraft voltage.
  - c. Disconnect the electrical power leads to the motor by unplugging the connectors installed in the RED and BLACK wire leading to the motor assembly.
  - d. Connect one lead of a DC voltmeter capable of measuring the aircraft voltage to either the RED or BLACK wire leading to the motor and the other voltmeter lead to a good aircraft ground.

## MODEL R182 AND TR182 SERVICE MANUAL

- e. Operate the electric trim switch to the Nose UP and Nose DOWN positions and check voltage present at the RED and BLACK wires.
- f. Adjust CTR 1 and CTR 2 adjustment screws on the voltage regulator counterclockwise (CCW), then slowly turn adjustment screws clockwise (CW) until a 13.5 volt output is obtained for both (RED and BLACK) leads.
- g. Remove voltmeter and reconnect the motor assembly power leads. Be sure to connect RED to RED and BLACK to BLACK when reconnecting leads.
- h. Check to see if full "NOSE UP" to full "NOSE DOWN" and full "NOSE DOWN" to full "NOSE UP" cycle time is  $50 \pm 3$  seconds.

### CAUTION

The trim motor should be allowed to cool between voltage regulator adjustments for approximately 5 minutes if several actuations of the motor become necessary during adjustment.

- i. Readjust voltage regulator as required to obtain  $50 \pm 3$  seconds cycle time.

### NOTE

If trim tab travel time exceeds 53 seconds, lubricate and "free up" elevator trim system as required per section 2.

- j. Check trim system for proper operation and reinstall all items removed for access.