Attachment Eleven
Maintenance Manual Procedure: 27-30-02

ELEVATOR CONTROL RIGGING - MAINTENANCE PRACTICES

ELEVATOR CONTROL SYSTEM RIGGING

CAUTION: IF A FA2100 FLIGHT DATA RECORDER SYSTEM IS INSTALLED ON THIS AIRCRAFT, PERFORM THE LINK REMOVAL PORTION OF THE ELEVATOR SURFACE POSITION SYNCHRO TRANSMITTER (SENSOR) REMOVAL PROCEDURE. REFER TO **CHAPTER 31-31-12 IN THE BEECH 1900D AIRLINER FLIGHT DATA RECORDER (FA2100) MAINTENANCE MANUAL SUPPLEMENT, P/N 129-590000-109.**

CAUTION: WHERE THE CABLES PASS THROUGH STRUCTURE, THE AREAS OF POSSIBLE CONTACT BETWEEN THE CONTROL CABLES AND ADJACENT STRUCTURE MUST BE PROTECTED WITH GROMMETS, RUB STRIPS, BLOCK OR GUIDE FAIRINGS. WHERE CONTACT OF CONTROL CABLES DOES OCCUR WITH THE PROTECTIVE ELEMENTS, A FORCE NO GREATER THAN EIGHT (8) OUNCES SHALL BE REQUIRED TO MOVE THE CABLE TO A POSITION OF NO CONTACT. AT NO TIME SHOULD FLIGHT CONTROL CABLES CONTACT METAL STRUCTURE.

a. Disconnect the autopilot servo cables. Refer to Chapter 22.

b. Locate and remove all access panels from the vertical and horizontal stabilizers to gain access to the aft elevator bellcrank and the elevator cables. Refer to Chapter 6.

c. Locate and remove the flight compartment seats, carpet, and floorboards to gain access to the forward elevator bellcrank. Refer to Chapters 6 and 25.

d. Locate and remove the passenger seats, carpet, and floorboards on the right side of the passenger compartment to gain access to the elevator cable turnbuckles. Refer to Chapters 6 and 25.

e. Install an elevator travel board (5, Chart 1, 27-00-00) on each elevator at station 50.00.

f. Adjust the center-to-center length of the push-pull tube assembly between the control column and the forward elevator bellcrank to a dimension of 15.12 ± 0.06 inch.

g. Adjust the surface stop bolts on the elevator control horn support for up-travel of 20° + 1° - 0° and down-travel of 14° + 1° - 0° . Refer to Figure 201.

h. Verify the bob weight stop bolt clearance is 0.5 ± 0.06 inch. Adjust if necessary. Refer to Chapter 27-30-01, Figure 201.

i. Adjust the forward bellcrank stops for 0.37 ± 0.06 inch clearance from the stop bolts. Refer to Figure 202.

j. Verify the forward bellcrank stop bolts make contact before the bob weight stop bolts make contact with the weight.

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k. Install a rig pin in the aft elevator bellcrank. Refer to Chapter 27-30-01, Figure 201.

NOTE: Verify threads are visible through the inspection holes at the ends of the pushrods after adjustments are made.

l. Adjust the pushrods between the aft elevator bellcrank and the elevator to position the elevator at neutral (0° deflection).

m. Remove the rig pin from the aft elevator bellcrank.

n. Remove the safety clips from the turnbuckles and release cable tension.

o. Move the control yoke to install the rig pin in the forward elevator bellcrank.

p. Tighten the elevator-up cable until the elevator rises to neutral (0° on the travel board).

q. Tighten the elevator-down cable until the average tension of the up- and down-cables is 66 ± 8 pounds (the sum of up-cable and down-cable tensions, divided by two). Refer to Figure 203.

r. Continue to balance the adjustment of the two cables until the average tension is 66 ± 8 pounds while maintaining 0° deflection of the elevator.

s. Perform the CONTROL COLUMN SUPPORT ROLLER INSPECTION procedure of this Chapter.

t. Install safety clips on the turnbuckles.

u. On aircraft equipped with the F1000 Flight Data Recorder, calibrate the Pitch Position Potentiometer. Perform the FLIGHT DATA RECORDER (FDR) - PITCH ADJUSTMENT procedure. Refer to Chapter 31-30-00.

v. Remove the travel boards from the horizontal stabilizers.

w. Connect the autopilot servo cables to the elevator primary control cables. Refer to Chapter 22.

x. Install the seats, carpet and floorboards. Refer to Chapters 6 and 25.

y. Replace all access panels.

ELEVATOR CONTROL SYSTEM FRICTION TEST

NOTE: Take all force readings with the elevator control system completely installed: downsprings attached, cables rigged with tension applied, bob weight mounted on control yoke, and autopilot servo cables attached.

a. Use a hand-held force gage attached and centered between inboard grips of the pilot's and copilot's control

wheels.

b. Take five force-measurements by pulling the control wheels straight in line with the column from the fully forward (elevator down) position, through neutral, to the fully aft (elevator up) position. Read the force gage as the control wheels pass through neutral.

c. Average the five readings and record this value as F up.

d. Take five force-measurements by pushing the control wheels straight in line with the column from the fully aft (elevator up) position, through neutral, to the fully forward (elevator down) position. Read the force gauge as the control wheels pass through neutral.

e. Average the five readings and record this value as F down.

f. To determine the maximum allowable system friction, Fs(max), measure the tension of both elevator cables, take the higher of the two readings, and multiply it by a factor of 0.106. For example:

Fs(max) = 0.106 X Highest Cable Tension

Example:

Highest Cable Tension = 98 lbs.

Fs(max) = 0.106 X 98 lbs.

Fs(max) = 10.4 lbs.

g. With the maximum allowable system friction established, use the force measurements to calculate the actual system friction. System friction value is obtained by dividing the difference of the up and down force values by 2, or:

Fs = (F up - F down) ÷ 2

Example:

F up = 48 lbs., F down = 32 lbs.

Fs = (F up - F down) ÷ 2

Fs = (48 - 32) ÷ 2 = 16 ÷ 2 = 8 = acceptable.

h. Combined downspring and bob-weight-force range (Fc) is 40.0 ± 1.5 lbs.

i. Combined downspring and bob weight force is obtained by adding the up and down values then dividing by 2,

or:

Fc = (up + down) ÷ 2

Example:

F up = 48 lbs., F down = 32 lbs.

Fc = (F up + F down) ÷ 2

Fc = (48 + 32) ÷ 2 = 80 ÷ 2 = 40 = acceptable

j. If Fc is above the range of 40.0 ± 1.5 lbs., decrease the downspring tension by moving it further out on the adjustment link. If Fc is below the proper range, increase tension by moving it further in on the adjustment link.

NOTE: If system friction-force cannot be brought under the limit, check cable installation, pulley bearings, bellcrank bearings, push-pull rod ends, the control yoke, control column support rollers and all linkages associated with the elevator control.

k. Verify that the elevator installation is within the following limitations:

1. With the elevator deflected fully up or down, the distance at the closest point between the trailing edge of the horizontal stabilizer and the elevator skin shall be 0.187 +0.1/ -0.05 inch.

2. The minimum gap between the inboard edge of the elevator and the vertical stabilizer shall be 0.12 inch.

NOTE: It is permissible to trim the edge of the elevator by up to 0.06 inch in order to achieve the required distance.

NOTE: If trimming is required, the elevator should be checked for balance. If a FA2100 Flight Data Recorder System is installed on this aircraft, perform the LINK installation portion of the ELEVATOR SURFACE POSITION SYNCHRO TRANSMITTTER (SENSOR) INSTALLATION procedure in Chapter 31-31-12 of the BEECH 1900D AIRLINER FLIGHT DATA RECORDER (FA2100) MAINTENANCE MANUAL SUPPLEMENT, P/N 129-590000-109.

CONTROL COLUMN SUPPORT ROLLER INSPECTION

a. Remove the four screws (9) in each cover (10) that secure the covers over the control column support rollers where the control column passes through the instrument subpanel. Refer to Figure 204.

b. Inspect rollers (3 and 8), eccentric bolts (1) and nuts (5) for condition. Replace rollers with flat spots and replace damaged parts as required. If a nut is removed, it must be replaced with a new self-locking nut.

WARNING: BE SURE THE SELF-LOCKING NUTS (5) AT THE LOWER END OF THE ECCENTRIC BOLTS ARE PROPERLY TORQUED. WHEN THE ADJUSTMENT IS COMPLETE, THE ECCENTRIC BOLTS MUST NOT TURN OR CHANGE POSITION.

c. The upper two rollers are mounted on eccentric shaped bolts (1) that allow adjustment. The lower roller (8) is mounted on a screw and is not adjustable. Adjust the two eccentric bolts on each crew station around the control column as necessary to provide a minimum of .010 inch of play between the columns and the rollers. Torque the self-locking nuts to 15 -19 inch pounds.

d. If applicable, remove the rig pin from the forward elevator bellcrank.

e. Move the control columns all the way in and out to verify they are not too tight and that they do not bind in the rollers at any position.

f. Install the covers over the control column support rollers.

Elevator Control Rigging - Maintenance Practices

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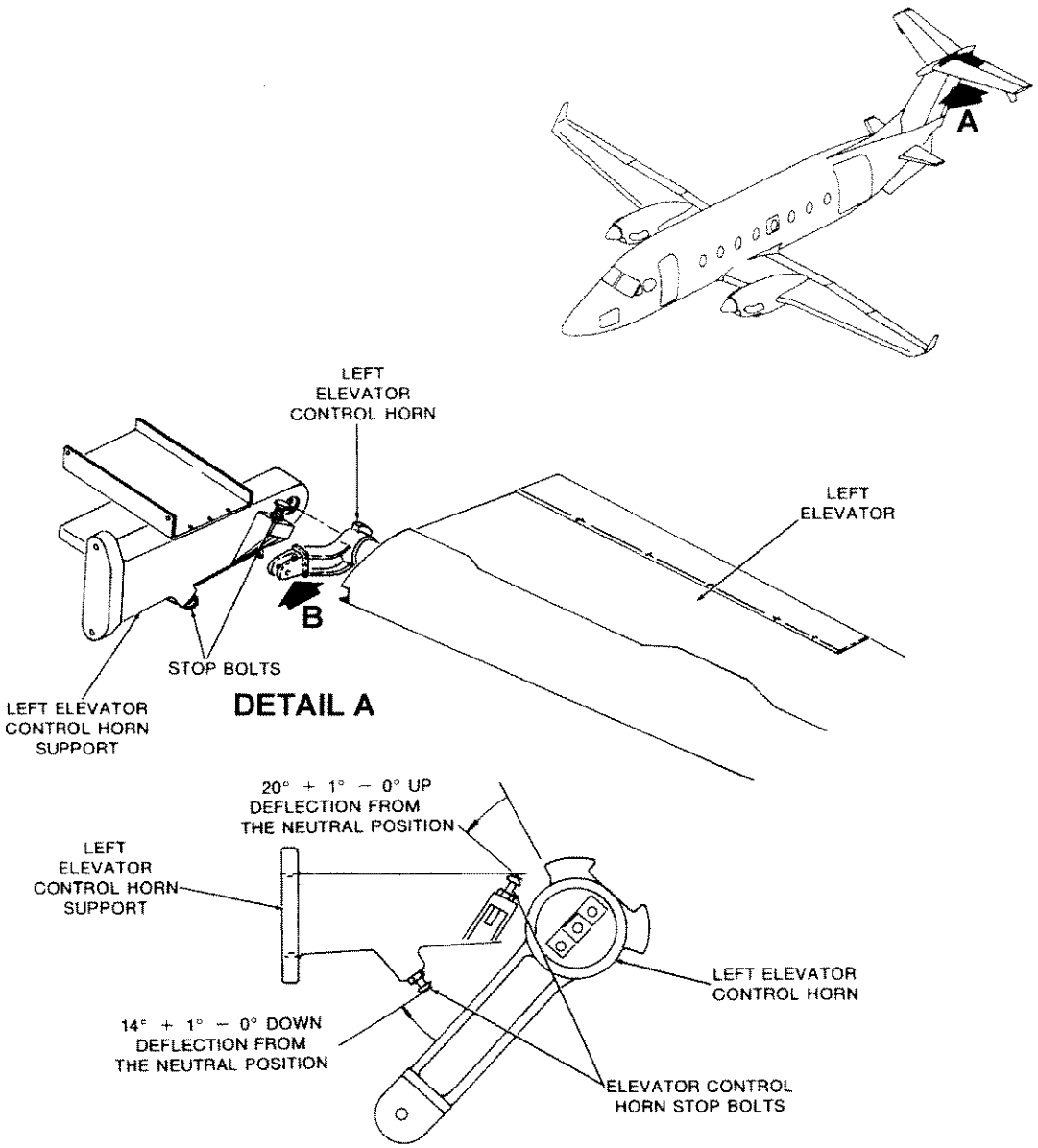
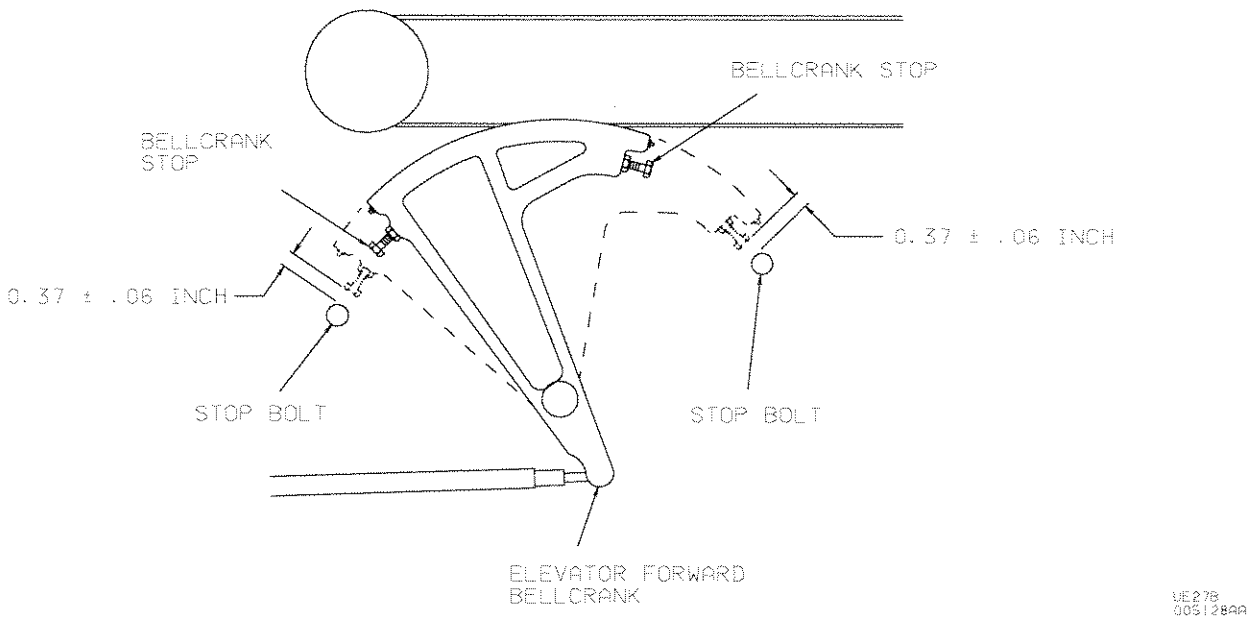


Elevator Control Horn Stop Bolts

Printed from REPS Airliner Revision 7 - December 2002
(P/N 129-590000-15 Revision A30 October 26 2002)



Elevator Forward Bellcrank Stops

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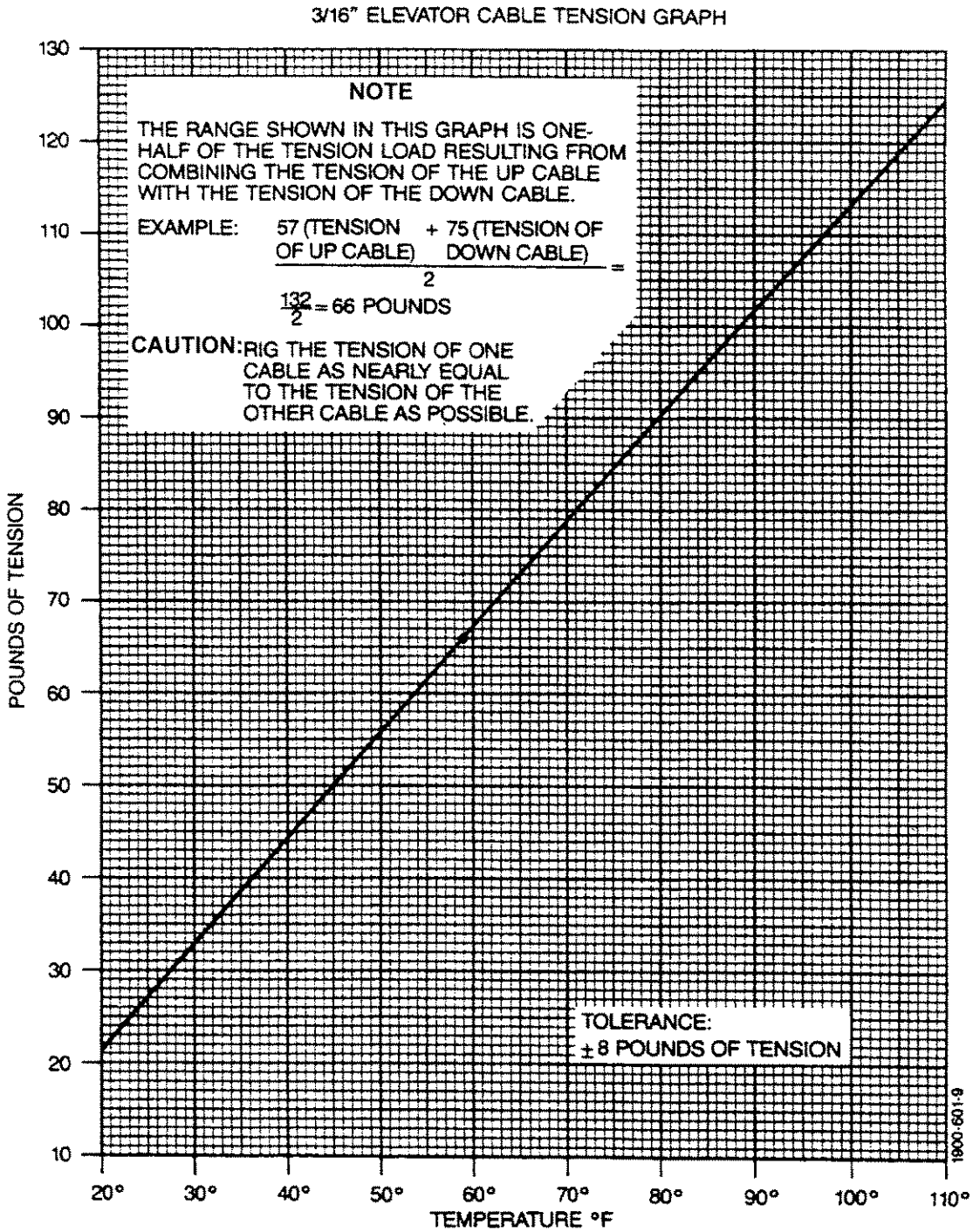
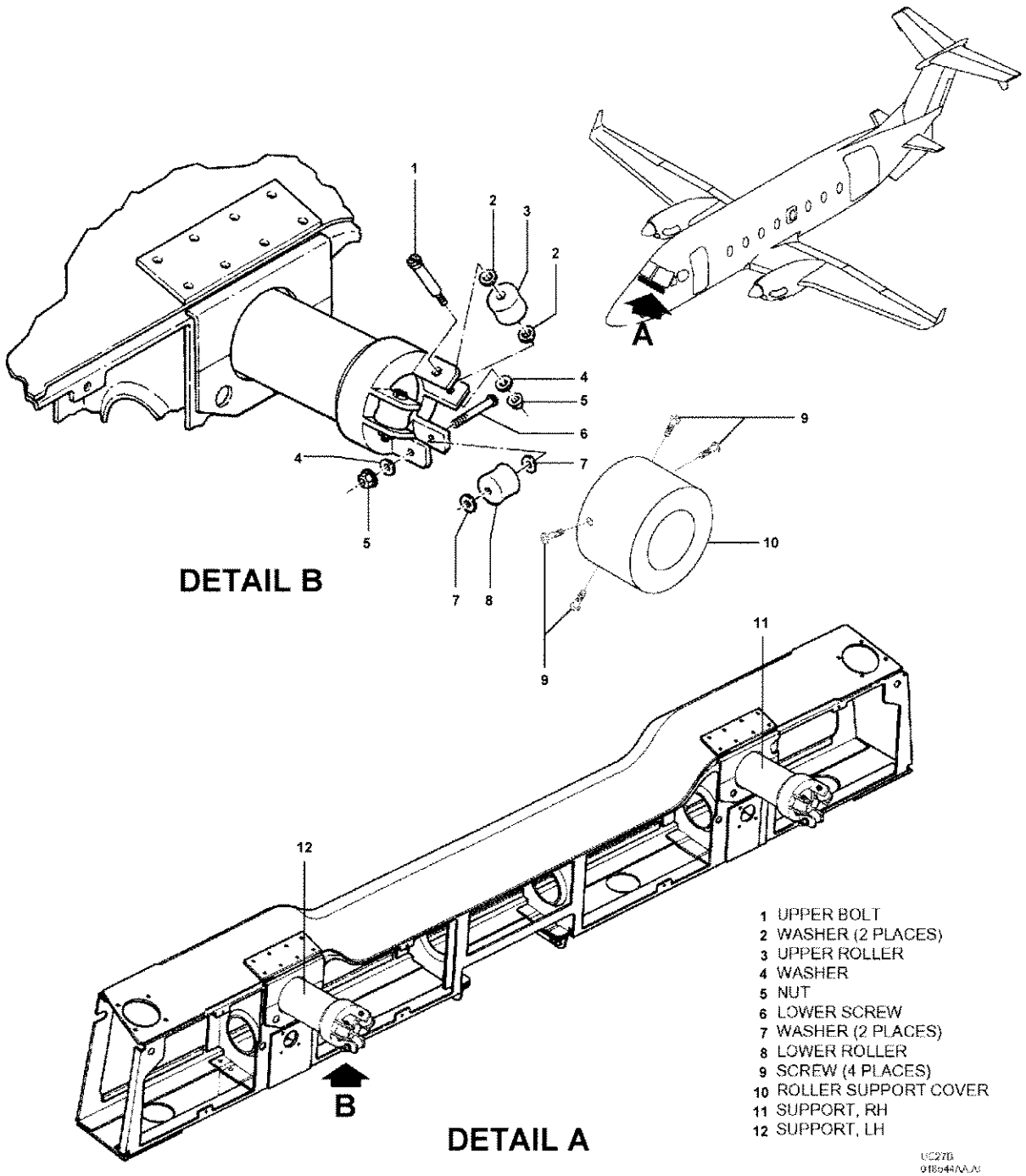


Elevator Cable Tension Graph



Control Column Rollers