

BOEING 
COMMERCIAL JET
OVERHAUL MANUAL

ELEVATOR CONTROLS FEEL AND CENTERING ROD ASSEMBLY

27-37-06

BOEING P/N 65-60584

AIRLINE P/N

THIS SUBJECT APPLIES TO THE FOLLOWING BOEING AIRPLANE MODELS:

707 STRATOLINER	707 INTERCONTINENTAL	720	727	737
NONE	NONE	NONE	NONE	ALL

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT

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LIST OF EFFECTIVE PAGES					
* Indicates pages revised, added or deleted in latest revision					
F Indicates foldout pages - print one side only					
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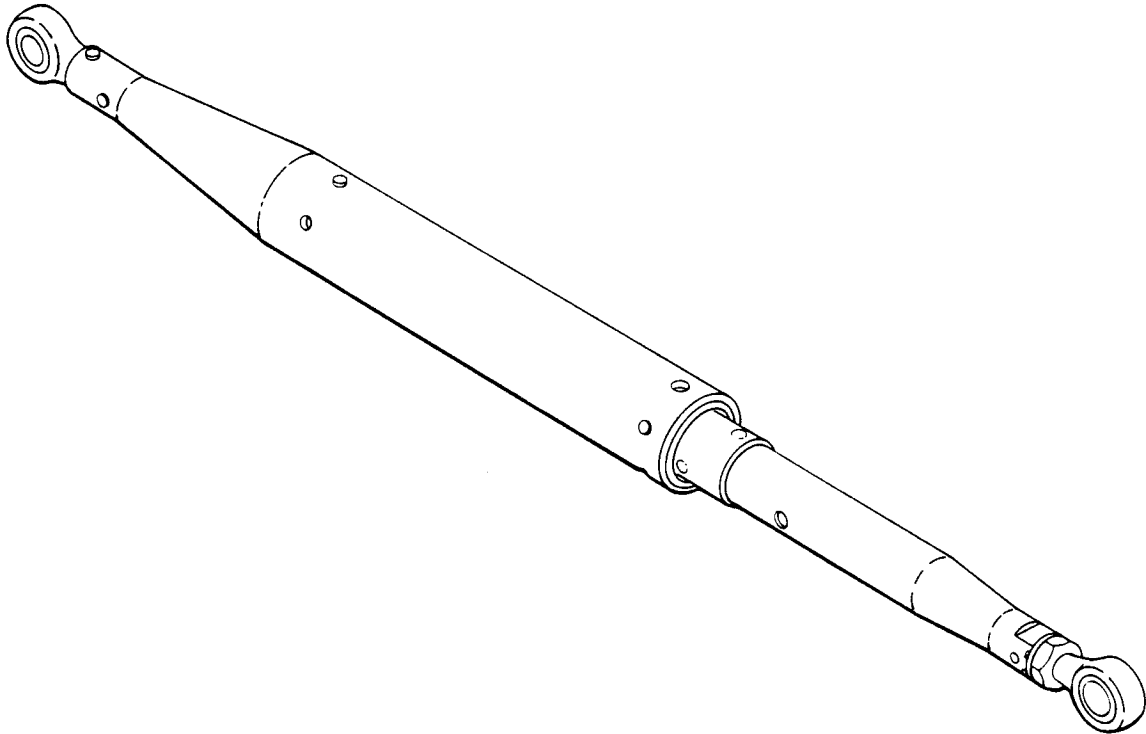
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ELEVATOR CONTROLS FEEL AND CENTERING ROD ASSEMBLY
Boeing Part Number 65-60584-1



Elevator Controls Feel and Centering Rod Assembly
Figure 1

1. DESCRIPTION AND OPERATION

A. Description

- (1) The elevator controls feel and centering rod assembly consists basically of an inner rod end assembly, an outer rod end assembly, and a loaded spring.

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B. Operation

- (1) The elevator controls feel and centering rod assembly provides artificial feel to the pilot and centering for the elevator control system. Actuation of the control columns, forward or aft, will result in extension or compression of the elevator controls feel and centering rod assembly, placing a load on the control system and artificially providing feel at the control columns.

C. Leading Particulars

Length -- 23.00 inches (approximately)
 Diameter -- 1.50 inches (approximately)
 Weight -- 2.25 pounds (approximately)

2. DISASSEMBLY

A. General

- (1) Disassemble unit only as necessary for cleaning, inspection, repair, and replacement of components.

B. Disassemble Unit (See figure 4.)

- (1) Remove rivets (1).
 (2) Remove rod end assembly (2).

NOTE: Do not remove rod end bearing (5) and stop (4) unless repair or replacement is necessary.

- (3) Remove stop (8).
 (4) Remove nut (9), washer (10), and rod end bearing (11).
 (5) Remove rivets (19) that hold stop (15).

WARNING: SPRING (16) IS LOADED TO APPROXIMATELY 90.0 POUNDS. TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO PARTS, DO NOT ALLOW SPRING TO DECOMPRESS WITHOUT RESTRAINT.

- (6) Remove stop (15), slides (18), and spring (16).
 (7) Remove rivets (19) that hold stop (14).
 (8) Remove stop (14).
 (9) Remove plugs (13).

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3. CLEANING

A. General (See figure 4.)

- (1) Wash and rinse parts, except rod end bearings (5 and 11), in dry cleaning solvent, Specification P-D-680 or equivalent, and dry parts with clean, lint-free cloth or moisture-free compressed air.
- (2) Clean all bores, holes, threads, nuts, and washers using a stiff-bristle brush.
- (3) For further information, refer to "General Cleaning Procedures," Subject 20-30-03.

B. Bearings

- (1) Clean all bearings per "Cleaning and Relubricating Antifriction Bearings," Subject 20-30-01.

4. INSPECTION/CHECK

A. Visual Check

- (1) Examine all parts for cracks, scratches, burrs, chips, and corrosion using strong light and 10-power magnification.
- (2) Examine all threads for cross-threadings, stripping, and dirt accumulation.
- (3) Check rod end bearings for roughness, binding, and excessive radial or axial play.
- (4) Examine all plated or painted surfaces for blisters and flaking.
- (5) Check all rivet holes for elongation.

B. Special Check (See figure 4.)

- (1) If visual examination discloses evidence of defects in any of listed parts, perform following checks:

- (a) Dye Penetrant Check -- Stops (4, 8, 14, and 15), rod (17), and slide (18).

NOTE: Refer to Subject 20-20-02 for penetrant check methods.

- (b) Magnetic Particle Check -- Spring (16).

NOTE: Refer to Subject 20-20-01 for magnetic particle check methods.

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- (2) Check spring (16) for the following:
 - (a) The load required to compress the spring to a 5.94 inch length should be 81.0 to 99.0 pounds.
 - (b) The load required to compress the spring to a 4.55 inch length should be 108.0 to 132.0 pounds.

NOTE: No permanent set should result from test load.
- (3) Free length of the spring should be approximately 10.0 inches.
- (4) Roll spring on flat surface; there should be no wobble.

5. REPAIR

A. Repair

- (1) Remove corrosion and minor defects from metal parts by polishing lightly with abrasive cloth, 220 grit or finer. Refinish as necessary for protection against corrosion.
- (2) Repair minor thread damage with a triangular file or thread chaser.

B. Refinish (See figure 4.)

NOTE: Refer to Subject 20-30-02 for stripping of protective finishes and to Subject 20-41-01 for decoding of F and SRF finish symbols and their BAC equivalents.

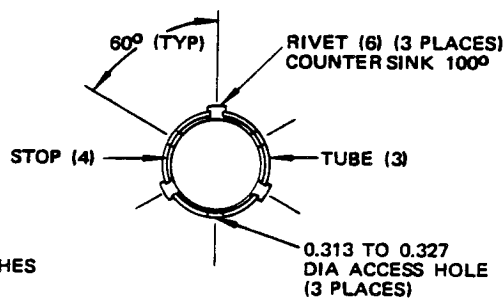
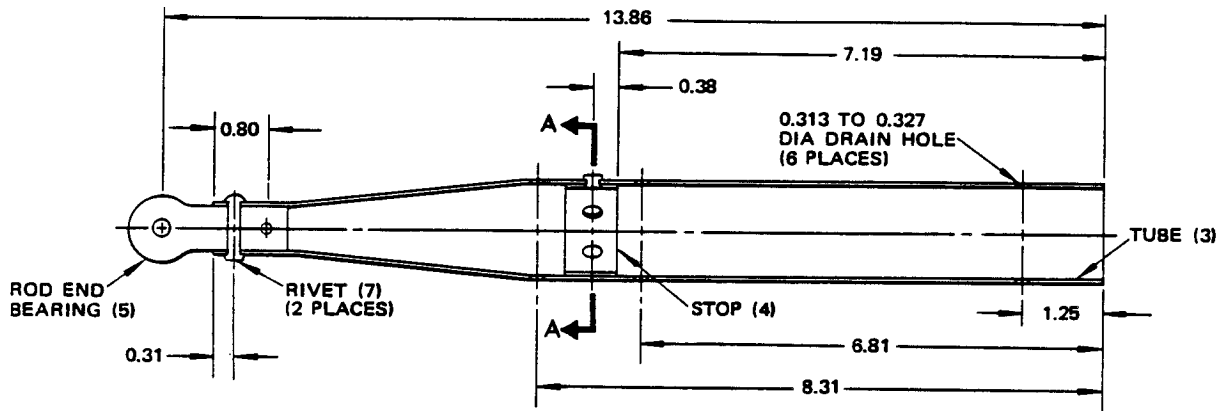
- (1) If plated or painted surfaces are worn or chipped, refinish the following parts as indicated:
 - (a) Stops (4, 8, 14, and 15) and Plugs (13) -- Apply SRF-2.30 all over.
 - (b) Rod (17) -- Apply SRF-2.901 all over except threaded areas, plus F-2.940 and SRF-12.205 on bare holes.
 - (c) Spring (16) -- Apply SRF-1.92 all over.
 - (d) Rod End Bearing (11) -- Apply F-12.14 all over.
 - (e) Tube (3) -- Apply SRF-2.30 all over plus F-2.940 and SRF-12.205 on bare holes.

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C. Replacement (See figure 4.)

- (1) Replace all parts found unserviceable or damaged beyond simple repair.
- (2) If rod end bearing (5) or stop (4) are replaced, drill holes per figure 2 and brush or swab BMS 10-11, type 1 primer on all areas of the countersink and/or holes and install rivets (6 or 7) immediately.

CAUTION: IF TUBE (3) IS USED AS A TEMPLATE TO DRILL HOLES, USE CARE NOT TO DAMAGE EXISTING HOLES.



NOTE: ALL DIMENSIONS IN INCHES

SECTION A-A

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6. ASSEMBLY

- A. Insert plugs (13, figure 4) into rod (17) and position per figure 3.
- B. Install stop (14) with rivets (19).

NOTE: Brush or swab BMS 10-11, type 1 primer on all areas of the countersink and/or holes and install rivets immediately.

If new stop (14), plugs (13), or rod (17) are installed, drill holes per figure 3. Finish bare holes on rod (17) per refinish section.

- C. Insert slides (18) and spring (16) on rod (17).
- D. Install stop (15) with rivets (19). Install rivets with wet BMS 10-11, type 1 primer.

WARNING: SPRING (16) MUST BE COMPRESSED TO APPROXIMATELY 90.0 POUND LOAD TO ALLOW PROPER POSITIONING OF STOP (15). USE A SUITABLE DEVICE TO HOLD SPRING IN PLACE WHILE RIVETING TO PREVENT INJURY.

NOTE: If new stop (15) is installed, drill holes per figure 3.

- E. Assemble rod end assemblies (2 and 12) and stop (8) with rivets (1). Install rivets with wet BMS 10-11, type 1 primer.

NOTE: If new stop (8) is installed, drill holes per figure 3.

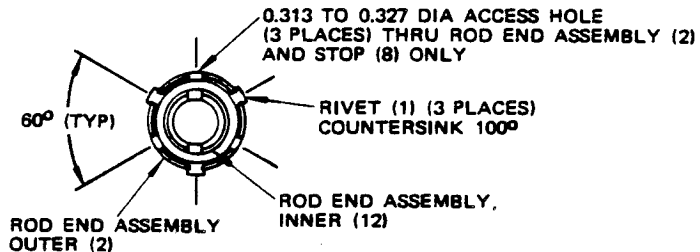
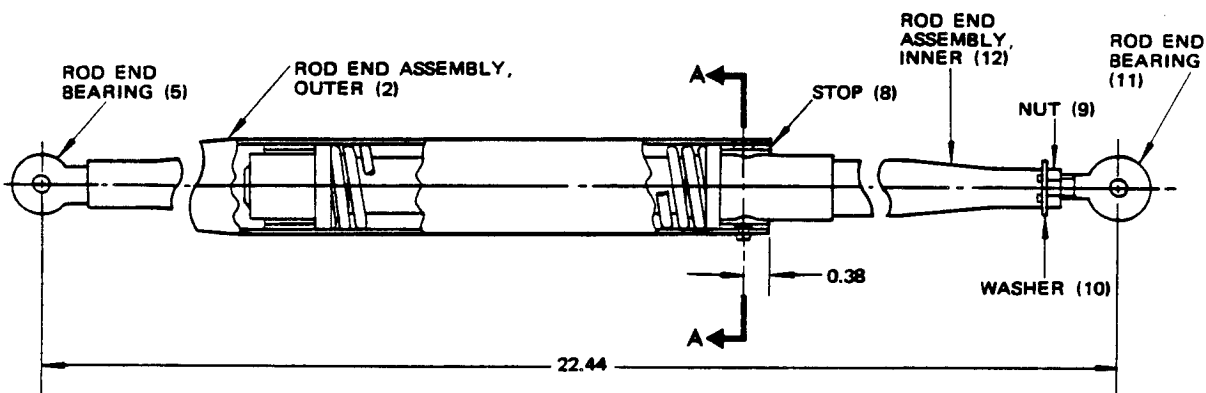
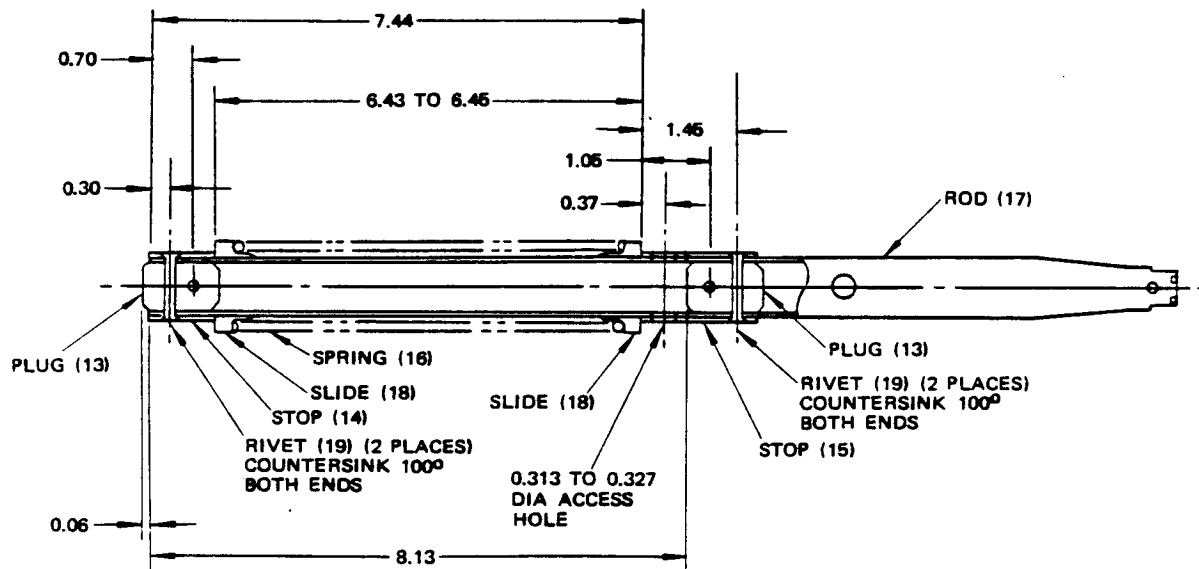
If new tube (3) is installed, drill holes per figures 2 and 3. Finish bare holes per refinish section.

Maximum allowable end play between rod end assemblies (2 and 12) is 0.003 inch.

- F. Install washer (10), rod end bearing (11), and nut (9).

NOTE: Distance between center of rod end bearings (5 and 11) is given in figure 3; adjustment may be necessary during installation of assembly on the airplane.

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NOTE: ALL DIMENSIONS IN INCHES

SECTION A-A

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7. FITS AND CLEARANCES

A. None.

8. TESTING

A. No formal testing is required. Assembly should be compressed and extended several times and checked for interference or excessive friction.

9. TROUBLE SHOOTING

A. None.

10. STORAGE INSTRUCTIONS

A. Wrap assembly in vapor barrier paper, secure with tape, and tag with overhaul date.

B. For general storage information, refer to "Temporary Protective Coatings," Subject 20-44-02.

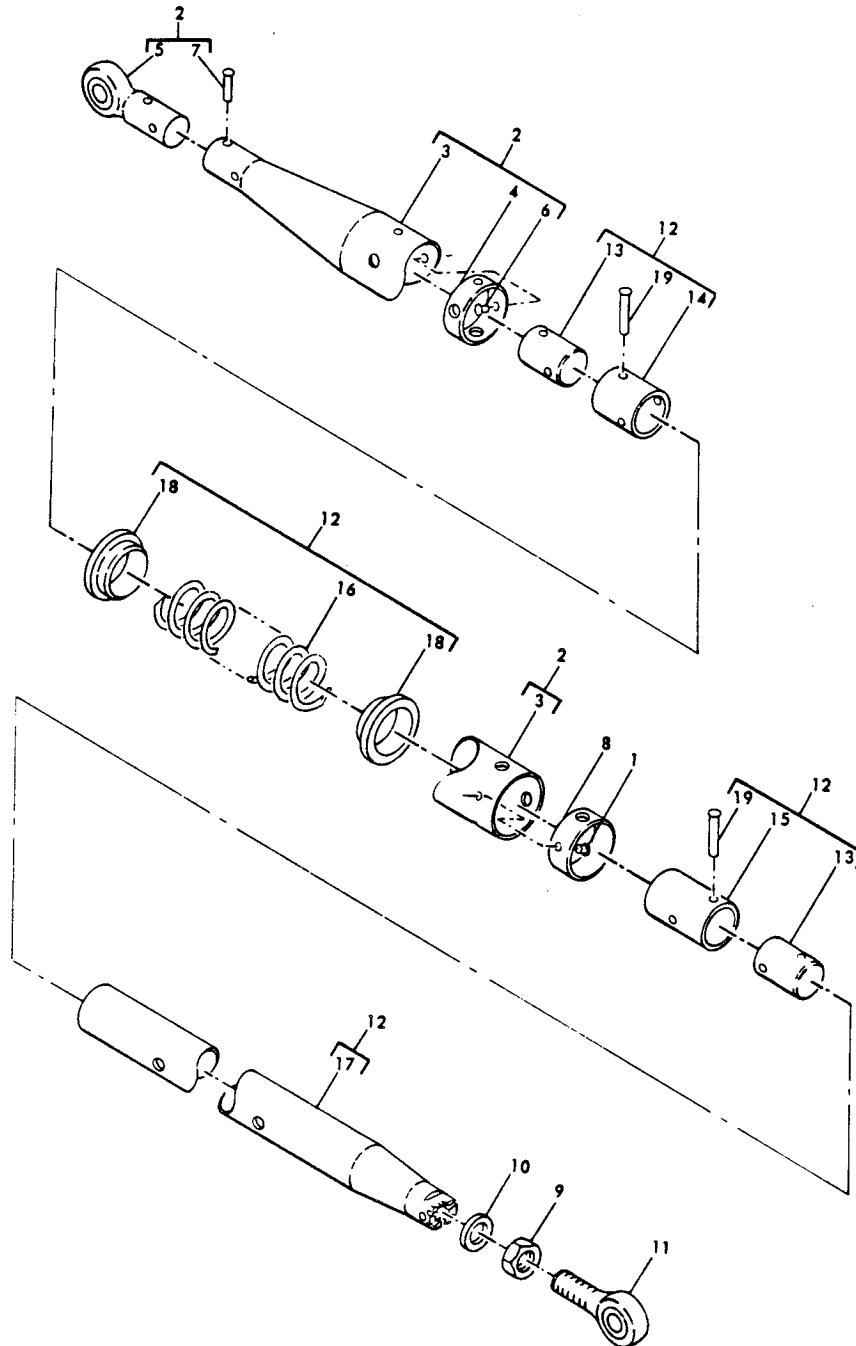
11. SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

A. None.

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12. ILLUSTRATED PARTS LIST

A. Exploded View



Elevator Controls Feel and Centering Rod Assembly
 Figure 4

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B. Group Assembly Parts List

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	N O M E N C L A T U R E							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
4-	65-60584-1		ELEVATOR CONTROLS FEEL AND CENTERING ROD ASSEMBLY								
1	BACR15CE5D		. RIVET								3
2	65-60581-1		. ROD END ASSEMBLY, Outer								1
3	65-60581-2		. . TUBE								1
4	69-48229-1		. . STOP								1
5	BACB10AD11		. . BEARING, Rod end.								1
6	BACR15CE5D		. . RIVET								3
7	MS20470D5		. . RIVET								2
8	69-48229-1		. STOP								1
9	NAS509-6		. NUT								1
10	NAS513-6		. WASHER								1
11	BACB10A446H		. BEARING, Rod end.								1
12	65-60583-1		. ROD END ASSEMBLY, Inner								1
13	66-16733-1		. . PLUG								2
14	66-16740-1		. . STOP								1
15	66-16740-2		. . STOP								1
16	69-48218-1		. . SPRING								1
17	69-48233-1		. . ROD								1
18	69-48234-1		. . SLIDE								2
19	MS20426D5		. . RIVET								4