

 **BOEING**  
COMPONENT  
MAINTENANCE MANUAL

TO: ALL HOLDERS OF CONTROL ROD ASSEMBLY COMPONENT MAINTENANCE MANUAL 27-00-13

REVISION NO. 2 DATED MAR 01/00

HIGHLIGHTS

Pages which have been added or revised are outlined below together with the highlights of the revision. Remove and insert the affected pages as listed and enter Revision No. and date to the Record of Revision Sheet.

CHAPTER/SECTION

AND PAGE NO.

DESCRIPTION OF CHANGE

TITLE PAGE

Incorporated latest engineering changes that added Top Assembly 65B81011-169 and -306. Deleted Top Assembly 65B81011-304.

1

501

REPAIR-GEN

601

REPAIR 1-1

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REPAIR 3-1

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601,1003-1004,

1006-1010,1012-1013

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Edited text without technical change.

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HIGHLIGHTS

01.1

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## CONTROL ROD ASSEMBLY

PART NUMBERS 65B81011-112,-169,-306,  
-308 THRU -311,  
-1111

COMPONENT MAINTENANCE MANUAL  
WITH  
ILLUSTRATED PARTS LIST

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TITLE PAGE

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REVISION RECORD

- Retain this record in front of manual. On receipt of revision, insert revised pages in the manual, and enter revision number, date inserted and initial.

REVISION NUMBER	REVISION DATE	DATE FILED	BY	REVISION NUMBER	REVISION DATE	DATE FILED	BY

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REVISION RECORD

01

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL

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TR &amp; SB RECORD

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*1	MAR 01/00	01.1	*601	MAR 01/00	01.1
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REVISION RECORD			ILLUSTRATED PARTS LIST		
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TR & SB RECORD			*1003	MAR 01/00	01.1
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\* = REVISED, ADDED OR DELETED

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## INTRODUCTION

The instructions in this manual provide the information necessary to perform maintenance functions ranging from simple checks and replacement to complete shop-type repair.

This manual is divided into separate sections:

- |  |                              |
|--|------------------------------|
| 1. Title Page                                      | 4. List of Effective Pages   |
| 2. Record of Revisions                             | 5. Table of Contents         |
| 3. Temporary Revision &<br>Service Bulletin Record | 6. Introduction              |
|  | 7. Procedures & IPL Sections |

Refer to the Table of Contents for the page location of applicable sections. An asterisked flagnote \*[ ] in place of the page number indicates that no special instructions are provided since the function can be performed using standard industry practices.

The beginning of the REPAIR section includes a list of the separate repairs, a list of applicable standard Boeing practices, and an explanation of the True Position Dimensioning symbols used.

An explanation of the use of the Illustrated Parts List is provided in the Introduction to that section.

All weights and measurements used in the manual are in English units, unless otherwise stated. When metric equivalents are given they will be in parentheses following the English units.

Design changes, optional parts, configuration differences and Service Bulletin modifications create alternate part numbers. These are identified in the Illustrated Parts List (IPL) by adding an alphabetical character to the basic item number. The resulting item number is called an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless otherwise indicated.

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INTRODUCTION

01

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CONTROL ROD ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

- A. This manual covers control rod assemblies in the following series:
- 100, -1100 -- Fixed nonadjustable
  - 300 -- One end adjustable

2. Operation

- A. The control rod assemblies connect actuating units in the various flight control systems.

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DESCRIPTION & OPERATION

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CHECK

- | 1. Check all parts for defects in accordance with standard industry practices.
- | 2. Penetrant check the following parts (Ref IPL Fig. 1) as shown in 20-20-02.
  - | A. End (60, 65, 70 IPL Fig. 1A; 30 IPL Fig. 1B)
  - | B. Tube (15A, IPL Fig. 1)

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CHECK

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REPAIR – GENERAL1. Content

- A. Repair, refinish and replacement procedures are included in separate section as follows:

<u>P/N</u>	<u>NAME</u>	<u>REPAIR</u>
65B81011-112, -169, -1111	ROD	1-1
65B81011-306, -308, -309, -311	ROD	2-1
65B81011-310	ROD	3-1

2. Standard Practices

- A. Refer to the following standard practices as applicable, for details of procedures in individual repairs.

20-30-02 Stripping of Protective Finishes  
 20-30-03 General Cleaning Procedures  
 20-41-01 Decoding Table for Boeing Finish Codes  
 20-41-02 Application of Chemical and Solvent Resistant Finishes  
 20-50-03 Bearing Installation and Retention

3. Materials

NOTE: Equivalent substitutes may be used.

- A. Primer -- BMS 10-11, Type 1 (Ref 20-60-02)
- B. Sealant -- BMS 5-95 (Ref 20-60-04)

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REPAIR-GENERAL

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ROD ASSY - REPAIR 1-1

65B81011-112, -169, -1111

**NOTE:** Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, Fig. 601.

1. Rod End Replacement (IPL Fig. 1, Fig. 601)

- A. Remove rivets (5) and separate rod ends (10) from tube (15A).
- B. Using hole in existing parts as guides, drill holes in replacement part as shown in Fig. 601.
- C. Disassemble parts and deburr holes.
- D. Apply BMS 5-95 sealant to faying surfaces of tube and rod ends. Install rod ends with rivets (5). On 65B81011-169, install rivets (5) with BMS 10-11, type 1 primer as shown in F-20.02.

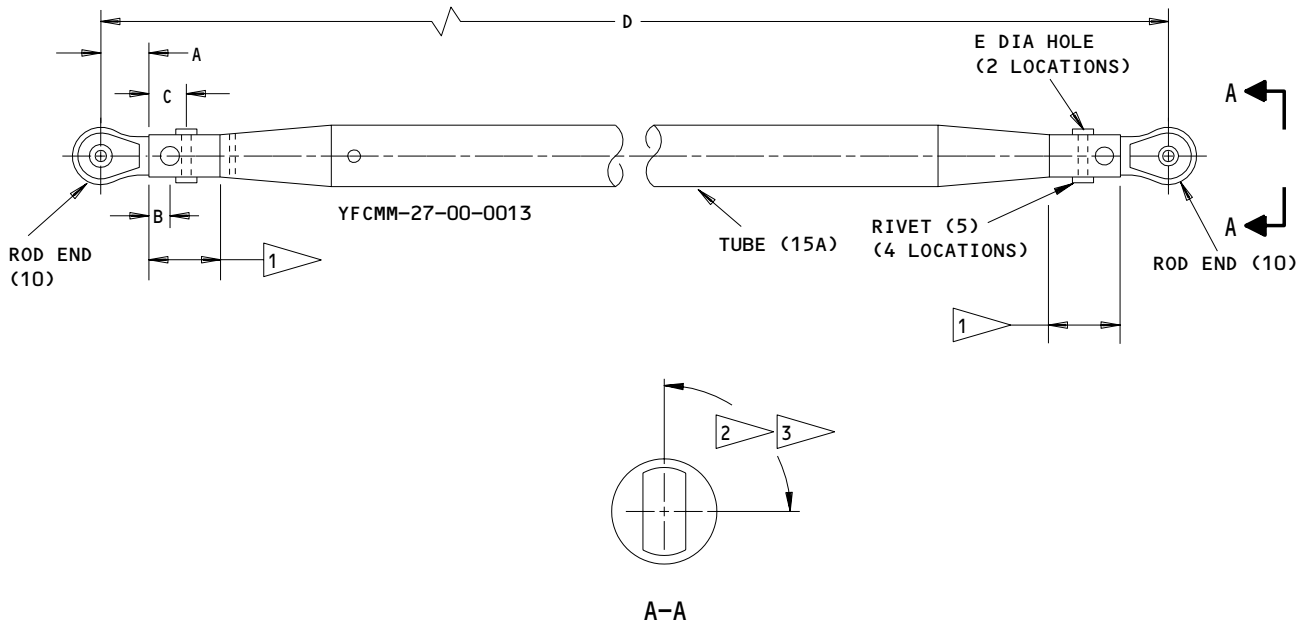
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PART NO.	A	B	C	D	E
65B81011-112, -1111	0.73 0.71	0.38 0.32	0.67 0.61	42.01 41.99	0.191 0.202
65B81011-169	0.73 0.71	0.38 0.32	0.67 0.61	7.01 6.99	0.192 0.202

**REFINISH**

TUBE (15A) -- CHEMICAL TREAT (F-17.01) AND APPLY ONE COAT OF PRIMER BMS 10-11, TYPE 1 (F-20.02) BUT NOT WHEN NOTED BY 1

MATERIAL: AL ALLOY

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

- 1 DO NOT PUT PRIMER ON TUBE INSIDE DIAMETER
- 2 FOR 65B81011-169, 0°-5° ROTATION
- 2 FOR 65B81011-112,-1111, 85°-95° ROTATION

**65B81011-112,-169,-1111  
 Rod End Replacement  
 Figure 601**

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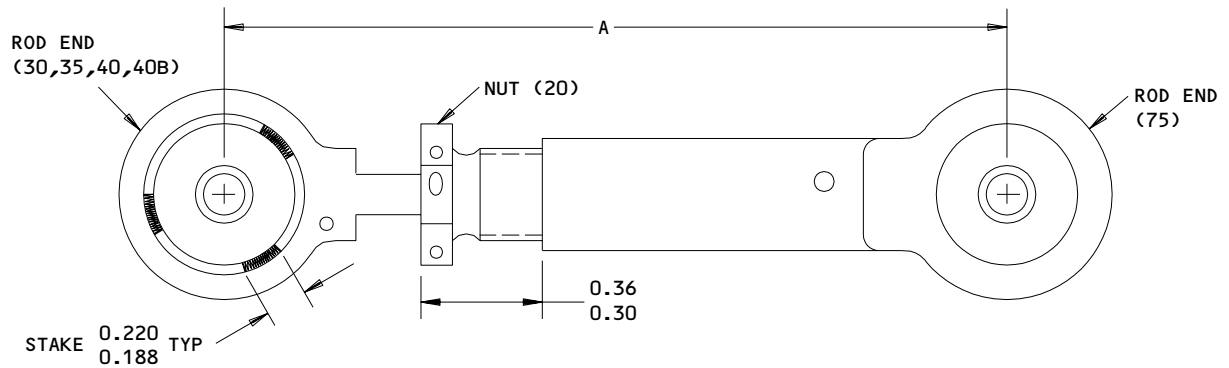
ROD ASSEMBLY – REPAIR 2-1

65B81011-306, -308, -309, -311

**NOTE:** Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, Fig. 601.

 1. Bearing Replacement (Ref Fig. 1A)

- A. Rod End (75) -- Install bearing (80) in rod end (85) and ball stake both sides, 5 points equally spaced  $\pm 0.03$  at 0.72-0.74 dia, stake 0.094-0.100 spherical R, 0.017-0.023 deep (optional roller swage as shown in 20-50-03). Breakout torque shall not exceed 0.05 lb-in after bearing installation.
- B. Rod End (30, 35, 40, 40B) -- Install sleeve (45) and bearing (50) in rod end (60 thru 70). Stake sleeve (45) 3 places both sides as shown in 20-50-03.



Rod End Replacement  
 Figure 601 (Sheet 1)

ASSEMBLY DASH NUMBER	A
-306	4.98
	4.92
-308	4.70
	4.64
-309	6.45
	6.39
-311	6.07
	6.01

REFINISH

ROD END (75) -- ANODIZE OR CHROMIC ACID ANODIZE  
 AND APPLY ONE COAT OF PRIMER BMS 10-11, TYPE 1,  
 (SRF-2.30) BUT NO PRIMER ON BEARING BORE

ROD END (30,35,40,40B) -- APPLY ONE COAT OF  
 PRIMER BMS 10-11, TYPE 1, (F-20.02) BUT NO  
 PRIMER ON THREADS OR BEARING BORE

MATERIAL: AL ALLOY

ALL DIMENSIONS ARE IN INCHES

ITEM NO. REFER TO IPL FIG. 1A

Rod End Replacement  
 Figure 601 (Sheet 2)

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REPAIR 2-1

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ROD ASSEMBLY – REPAIR 3-1

65B81011-310

NOTE: Refer to REPAIR-GEN for list of applicable standard practices.

1. Bearing Installation (Ref Fig. 1B)

- A. Remove bearing (20) and sleeve (15).
- B. Install sleeve (15) and bearing (20) into rod end (25).
- C. Stake sleeve (15) 3 places both sides as shown in 20-50-03. Staking width 0.188 to 0.220 equally spaced.

2. Refinish

- A. Rod end (25) -- Apply one coat of BMS 10-11, type 1 primer (F-20.02) to all surfaces by not on threads and bearing bore.
- B. Rod end (30A) -- Chemical treat all over and apply one coat of BMS 10-11, type 1, primer (F-18.07) but no primer on threads or in 0.190 inch dia holes. Apply water displacing compound (F-19.26) to interior surfaces.

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ILLUSTRATED PARTS LIST

1. This section lists and illustrates replaceable or repairable component parts. The Illustrated Parts Catalog contains a complete explanation of the Boeing part numbering system.

2. Indentures show parts relationships as follows:

Assembly

Detail Parts for Assembly

Subassembly

Attaching Parts for Subassembly

Detail Parts for Subassembly

Detail Installation Parts (Included only if installation parts may be returned to shop as part of assembly)

3. One use code letter (A, B, C, etc.) is assigned in the EFF CODE column for each variation of top assembly. All listed parts are used on all top assemblies except when limitations are shown by use code letter opposite individual part entries.

4. Letter suffixes (alpha-variants) are added to item numbers for optional parts, Service Bulletin modification parts, configuration differences (Except left- and right-hand parts), product improvement parts, and parts added between two sequential item numbers. The alpha-variant is not shown on illustrations when appearance and location of all variants of the part is the same.

5. Service Bulletin modifications are shown by the notations PRE SB XXXX and POST SB XXXX.

A. When a new top assembly part number is assigned by Service Bulletin, the notations appear at the top assembly level only. The configuration differences at detail part level are then shown by use code letter.

B. When the top assembly part number is not changed by the Service Bulletin, the notations appear at the detail part level.

6. Parts Interchangeability

Optional  
(OPT)

The parts are optional to and interchangeable with other parts having the same item number.

Supersedes, Superseded By  
(SUPSDS, SUPSD BY)

The part supersedes and is not interchangeable with the original part.

Replaces, Replaced By  
(REPLS, REPLD BY)

The part replaces and is interchangeable with, or is an alternate to, the original part.

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ILLUSTRATED PARTS LIST

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VENDORS

S0352 NIPPON MINIATURE BEARING CO LTD  
TOKYO, JAPAN

21335 TORRINGTON CO FAFNIR BEARING DIV  
59 FIELD STREET  
TORRINGTON, CONNECTICUT 06790-4942

30163 VALENTEC DAYRON INC  
333 MAGUIRE BLVD PO BOX 140394  
ORLANDO, FLORIDA 32814-0394

38443 MRC BEARINGS  
402 CHANDLER STREET  
JAMESTOWN, NEW YORK 14701-3802

43991 FAG BEARING INCORPORATED  
118 HAMILTON AVENUE  
STAMFORD, CONNECTICUT 06904

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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
ABR4H104		1	10	2
BACB10AC3L		1A	50	1
		1A	80	1
		1B	20	1
BACB10AE10A		1	10	2
BACR15BB6D		1	5	4
HHKSP3L		1A	50	1
		1A	80	1
		1B	20	1
HHRE4H8-1		1	10	2
KSP3L		1A	50	1
		1A	80	1
		1B	20	1
KSP3LE9440A		1A	50	1
		1A	80	1
		1B	20	1
KSP3LFS428		1A	50	1
		1A	80	1
		1B	20	1
KSP3LG27		1A	50	1
		1A	80	1
		1B	20	1
KSP3L2TS		1A	50	1
		1A	80	1
		1B	20	1
REP4H8-4		1	10	2
65B81011-1111		1	1A	RF
65B81011-112		1	1	RF
65B81011-169		1	1B	RF
65B81011-306		1A	15A	RF
65B81011-308		1A	5	RF
65B81011-309		1A	10	RF

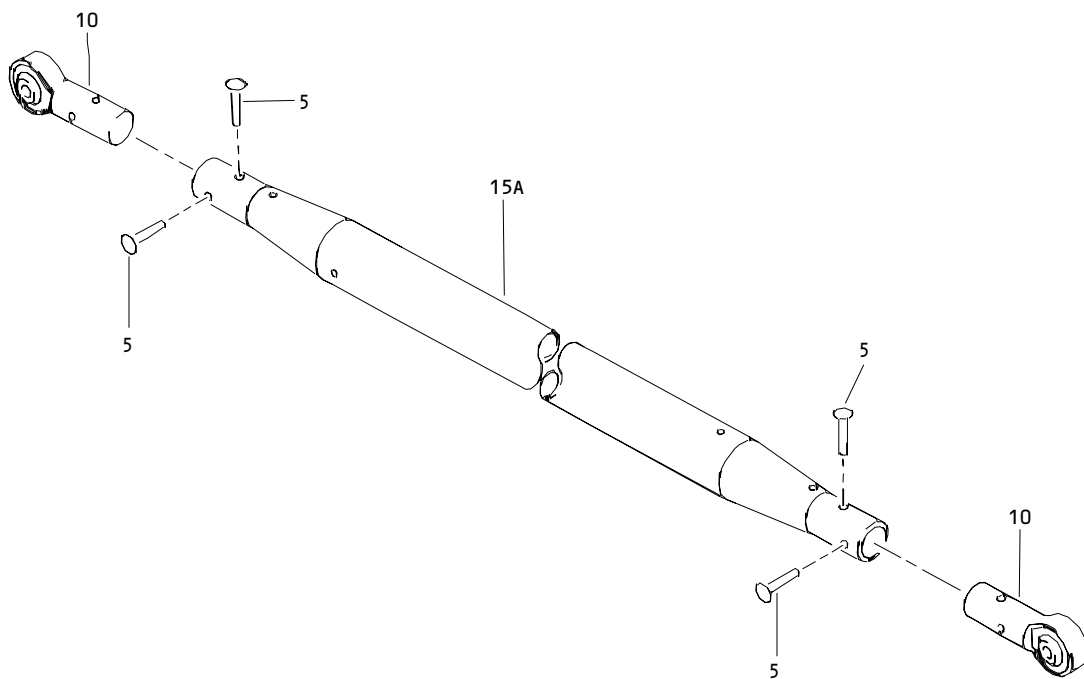
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PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
65B81011-310		1B	1	RF
65B81011-311		1A	15	RF
65B81012-29		1	15C	1
65B81012-38		1	15B	1
65B81012-6		1	15A	1
65B81013-4		1B	30A	1
69-43491-1		1A	75	1
69-43491-2		1A	85	1
69-43493-1		1A	20	1
		1B	5	1
69B81024-1		1B	10	1
69B81024-10		1A	60	1
69B81024-11		1A	35	1
69B81024-12		1A	65	1
69B81024-13		1A	40	1
69B81024-14		1A	70	1
69B81024-2		1B	25	1
69B81024-5		1A	40B	1
69B81024-6		1A	70B	1
69B81024-9		1A	30	1
69B81026-1		1A	45	1
		1B	15	1

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Control Rod Assembly  
Figure 1

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
R -1	65B81011-112		ROD ASSY-CONT	A	RF
R -1A	65B81011-1111		ROD ASSY-CONT	B	RF
R -1B	65B81011-169		ROD ASSY-CONT	C	RF
5	BACR15BB6D		.RIVET- (SIZE DETERMINE ON INST)		4
10	REP4H8FS436		.BEARING- (V21335) (SPEC BACB10AE10A) (OPT ABR4H104 (VS0352)) (OPT HHRE4H8-1 (V38443)) (OPT REP4H8-4 (V38443)) (OPT REP4H8E9171A (V21335))		2
15	69B81012-6		DELETED		
R 15A	65B81012-6		.TUBE	A	1
R -15B	65B81012-38		.TUBE	B	1
R -15C	65B81012-29		.TUBE	C	1

- Item Not Illustrated

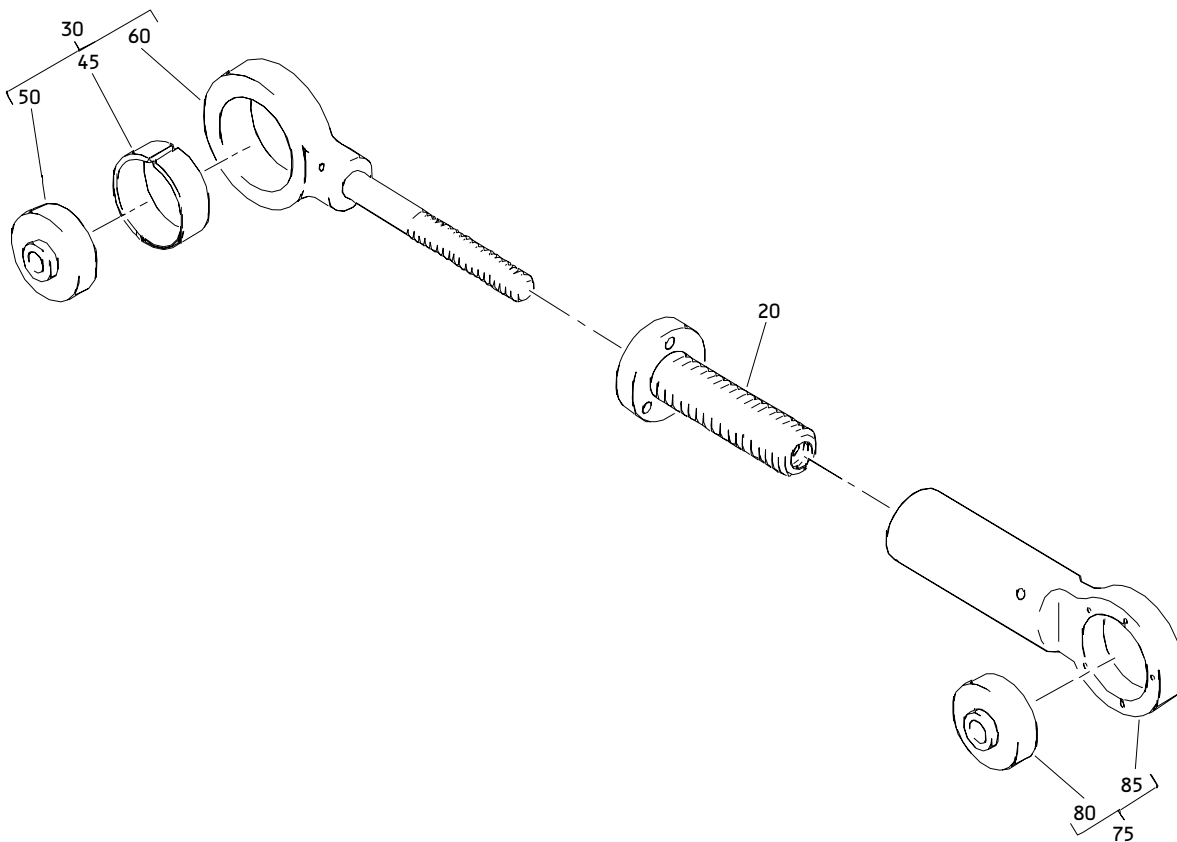
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Control Rod Assembly  
Figure 1A

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01A-					
R -1	65B81011-304		DELETED		
R -5	65B81011-308		ROD ASSY-CONT	B	RF
-5A	65B81011-313		DELETED		
-5B	65B81011-314		DELETED		
R -10	65B81011-309		ROD ASSY-CONT	C	RF
R -15	65B81011-311		ROD ASSY-CONT	D	RF
R -15A	65B81011-306		ROD ASSY-CONT	E	RF
R 20	69-43493-1		.NUT-THUMB		1
25	69B81024-1		DELETED		
R 30	69B81024-9		.ROD END ASSY	B	1
R -35	69B81024-11		.ROD END ASSY	C	1
R -40	69B81024-13		.ROD END ASSY	D	1
-40A	69B81024-15		DELETED		
R -40B	69B81024-5		.ROD END ASSY	E	1
R 45	69B81026-1		..SLEEVE		1
R 50	KSP3L		..BEARING- (V38443) (SPEC BACB10AC3L) (OPT HHKSP3L (V38443)) (OPT KSP3LE9440A (V21335)) (OPT KSP3LFS428 (V21335)) (OPT KSP3L2TS (V43991)) (OPT KSP3LG27 (V30163))		1
55	69B81024-2		DELETED		
R 60	69B81024-10		..END	B	1
R -65	69B81024-12		..END	C	1
R -70	69B81024-14		..END	D	1
-70A	69B81024-16		DELETED		

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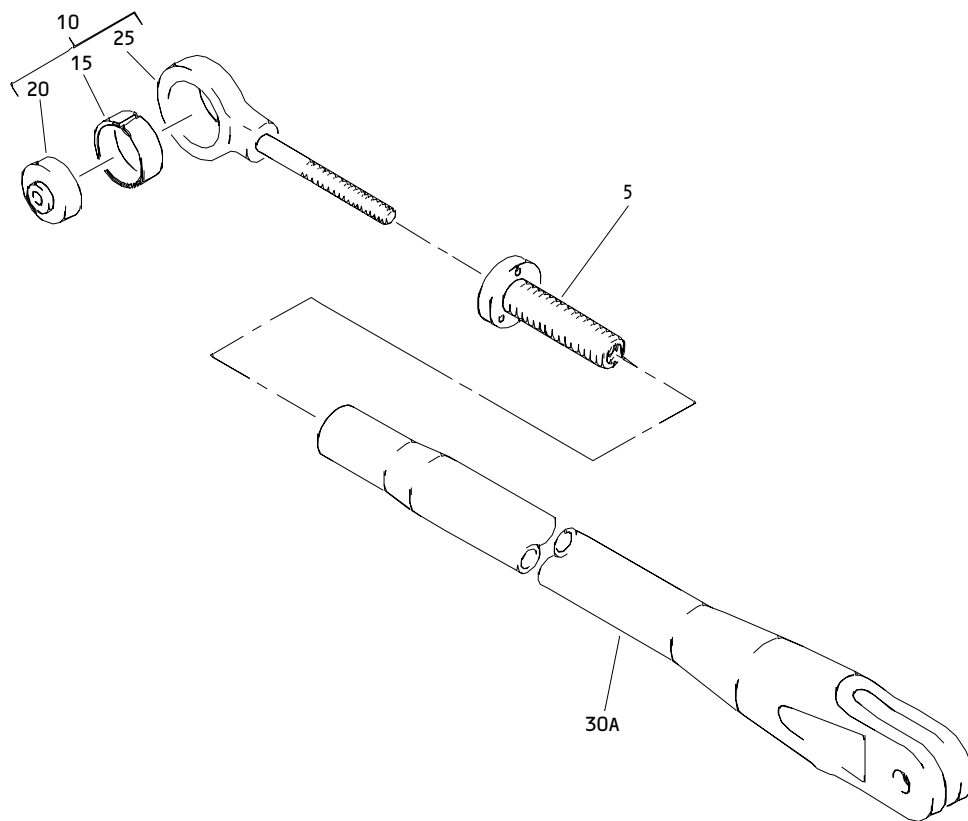
FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01A-					
R -70B	69B81024-6		..END	E	1
R 75	69-43491-1		.ROD END ASSY	B-E	1
R -75A	69-43491-5		DELETED		
R 80	KSP3L		..BEARING- (V38443) (SPEC BACB10AC3L) (OPT HHKSP3L (V38443)) (OPT KSP3LE9440A (V21335)) (OPT KSP3LFS428 (V21335)) (OPT KSP3L2TS (V43991)) (OPT KSP3LG27 (V30163))		1
R 85	69-43491-2		..END		1

- Item Not Illustrated

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Control Rod Assembly  
Figure 1B

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FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
R 01B-					
R -1	65B81011-310		ROD ASSY-CONT		RF
R 5	69-43493-1		.NUT-THUMB		1
R 10	69B81024-1		.ROD END ASSY		1
R 15	69B81026-1		..SLEEVE		1
R 20	KSP3L		..BEARING- (V38443) (SPEC BACB10AC3L) (OPT HHKSP3L (V38443)) (OPT KSP3LE9440A (V21335)) (OPT KSP3LFS428 (V21335)) (OPT KSP3L2TS (V43991)) (OPT KSP3LG27 (V30163))		1
R 25	69B81024-2		..END		1
R 30	69B81013-4		DELETED		
R 30A	65B81013-4		.END		1

- Item Not Illustrated

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