TO: ALL HOLDERS OF CONTROL WHEEL STEERING AILERON DRUM ASSEMBLY OVERHAUL MANUAL, 27-16-10

REVISION NO. 6, DATED MAR 1/01

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D&O	D/Assy	Cleaning	Insp/Chk	Repair	Assy	F/C	Test	T/Shooting	S/Tools	Storage	IPL	L/Overhaul
Changed repair limit on fork					X								
Changed design dimension of mating installation part							X						
Moved magnetic particle check of fork to after the machining step					X								

CONTROL WHEEL STEERING AILERON DRUM ASSEMBLY

27-16-10

BOEING P/N 65-55731-5, -12, -14, -15, -54, -56

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 31705	Mar 10/70
		PRR 32039	Jun 25/73
27-1061			Jun 25/73
		PRR 32900-1	Jul 5/79
		PRR 32912-1	Jul 5/79

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision

F Indicates foldout pages - print one side only

	PAGE	DATE	PAGE	DATE	PAGE	DATE
27-16-10						
	T-1	Dec 5/87				
	T-2	BLANK				
*	LEP-1	Mar 1/01				
	LEP-2	BLANK				
	T/C-1	Jan 5/80				
	T/C-2	BLANK				
	1	Dec 5/87				
	2	Dec 5/87				
*	3	Mar 1/01				
*	4	Mar 1/01				
	5	Dec 5/89				
	6	Dec 5/87				
	7	Jan 5/80				
	8	Jan 5/80				
*	9	Mar 1/01				
	10	Dec 5/87				
	11	Dec 5/87				
	12	Dec 5/87				
	13	Dec 5/87				
	14	Dec 5/87				
	15	Dec 5/87				
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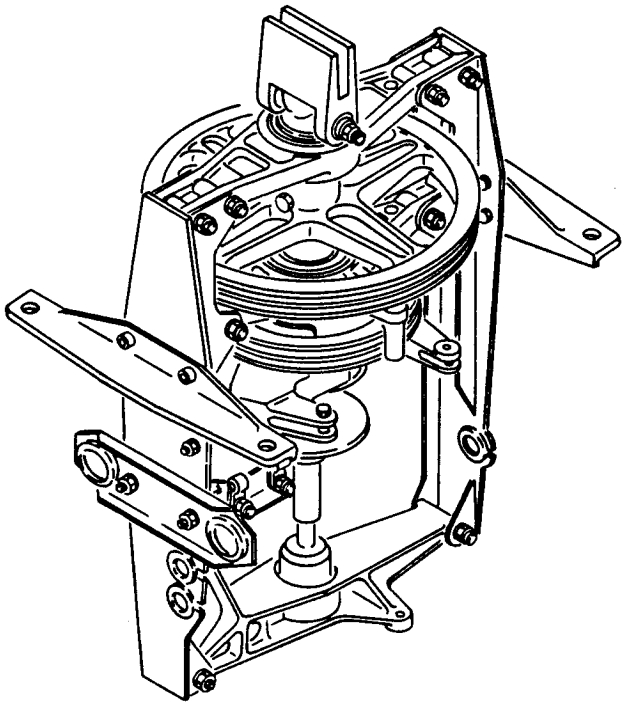
*[1] Special instructions not required. Use standard industry practices and the information contained in 20-30-01 and 20-30-03.

*[2] Special instructions not required. Use standard industry practices and the information contained in 20-44-02 and 20-70-01.

CONTROL WHEEL STEERING AILERON DRUM ASSEMBLY



Control Wheel Steering Aileron Drum Assembly
Figure 1

1. DESCRIPTION AND OPERATION

A. The control wheel steering aileron drum assembly contains bus drum, aileron drum, shafts forks, cables assemblies, and supporting members. The drum assembly is located at the base of the captain's control column and transfers control wheel forces through cables to the aileron/spoiler power control units.

B. Leading Particulars

Width -- 9.5 inches
Length -- 12.8 inches
Height -- 17.0 inches
Weight -- 9.3 pounds

2. DISASSEMBLY (Fig. 4)

A. Remove fasteners (1 thru 3) and remove fork (4) and spacers (8) from shaft (9).

B. Remove bearings (6, 7) from fork assembly (4).

NOTE: Do not remove bearing from fork unless necessary for repair or replacement.

C. Remove items (10 thru 17) and separate forward and aft ribs (18, 19) from bearing housing (20, 21) and bracket (22). Remove fasteners (47 thru 49) and guide (46) from forward rib (18).

NOTE: Do not remove beams (52, 53) or grommets (54, 55) from ribs unless necessary for repair or replacement.

D. Remove bearing housing (20) from shaft (9) and remove bearing (23) from housing.

E. Remove fasteners (24 thru 26), slide bus drum (27) from shaft, and remove cable assemblies (50, 51).

F. Remove bearing housing (21) and spacer (28) from shaft (9), and remove bearing (23), items (30 thru 32) and cable guards (29) from bearing housing.

G. Remove fasteners (33 thru 35), spacers (36), and separate shaft from shaft assembly (39).

H. Slide aileron drum (37) from shaft (9) and remove bearings (38) from drum.

I. Disassemble shaft assembly (39) by removing parts (40 thru 44).

3. INSPECTION/CHECK

A. Check all parts for obvious defects in accordance with standard industry practices. Refer to Fig. 3 for design dimensions and wear limits.

B. Penetrant check per 20-20-02 -- shaft (9), bearing housings (20, 21), bracket (22), bus drum (27) and aileron drum (37) (Fig. 4).

C. Magnetic particle check per 20-20-01 -- fork (5) (Fig. 4).

4. REPAIR

A. Repair (Fig. 4)

(1) Repair minor defects using standard industry practices.

NOTE: Do not repair or rework cable grooves in drums in any manner that will alter pitch diameter of drums.

(2) Fork (5) (Fig. 2)

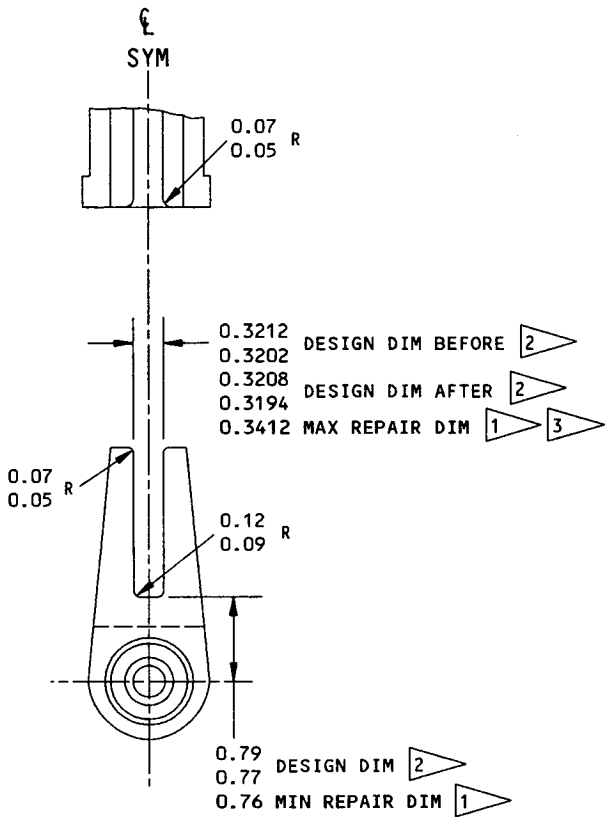
(a) Machine inside flats per SOPM 20-10-01 as required to remove defects. Maintain limits and dimensions shown.

(b) Magnetic particle check per SOPM 20-20-01.

(c) Stress relieve at 300 to 350°F for 2 hours; air-cool at 65 to 75°F.

(d) Restore reworked surfaces to design dimensions by nickel plating.

(e) Apply solid film lubricant to inside flats.



REFINISH

CADMIUM PLATE 4 ALL SURFACES, EXCEPT INSIDE FLATS OF FORK AND BEARING SURFACES. APPLY SOLID FILM LUBRICANT PER 2 TO INSIDE OF FLATS. APPLY NO FINISH ON BEARING SURFACES.

1 BUILD UP WITH NICKEL PLATE (REFER TO SOPM 20-42-09) TO DESIGN DIMENSIONS SHOWN. OBSERVE 0.06 PLATING RUNOUT.

2 APPLY BMS 3-8, CLASS A, SOLID FILM LUBRICANT (0.0004 THICK) (REFER TO SOPM 20-50-08).

3 0.010 MAXIMUM MATERIAL REMOVAL FROM EITHER FLAT.

4 FOR 6-60428-1: F-1.1924
FOR 6-60428-3: F-15.23

REPAIR

DIMENSIONS NOTED BY 1 3

63 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

MATERIAL: 4620 OR 9310
CASE HARDENED STEEL
(CORE STRENGTH 150-210 KSI)

ALL DIMENSIONS ARE IN INCHES

FORK (5)

Fork Repair and Refinish
Figure 2

L80355

B. Refinish (Fig. 4)

NOTE: Refer to 20-30-02 for stripping of protective finishes and to 20-41-01 for explanation of F and SRF finishes.

(1) Fork (5) -- Fig. 2.

(2) Shaft (9) -- Chromic acid anodize (F-2.26) all over. Material: Al alloy.

(3) Drums (27, 37), housings (20, 21) -- Sulfuric acid anodize (F-2.201) plus one coat of MIL-P-8585 color Y primer (SRF-12.205) all over except do not apply primer on ID of hub on drums (27, 37) or recesses for bearings in housings (20, 21). Material: Al alloy.

(4) Bracket (22) - Sulfuric acid anodize (F-2.201, 65-58143-1; F-17.03, 65C19848-1) followed by one coat of BMS 10-11, Type 1 primer (SRF-12.205, 65-58143-1; F-20.02, 65C19848-1) all over except no primer in bolt holes or 0.50 inch diameter hole through vertical web of coating. Material: Al alloy.

(5) Forward and aft ribs (18, 19), forward and aft beam (52, 53) -- Alodize, or chromic acid anodize plus one coat of BMS 10-11, Type 1 primer (SRF-2.30) all over. Material: Al alloy.

(6) Spacers (8, 28) -- Apply one coat of BMS 10-11, Type 1 primer (SRF-12.205) all over. Material: Am alloy.

C. Replacement (Fig. 4)

(1) Replace all unserviceable or irreparable parts.

(2) Cables (50, 51) -- Lubricate cables with grease, MIL-G-25760, on installation.

(3) Beams (52, 53) -- Replace lockbolts (58) with same part number or next larger size fastener.

(4) Grommets (54, 55) -- Replace per 20-50-09.

(5) Bearing (6) -- Install per 20-50-03, except install bearing using sealant BMS 5-95. Roller swage fork (5) to retain bearing.

5. ASSEMBLY (Fig. 4)

NOTE: Install all bearings per 20-50-03.

A. Assemble shaft assembly (39) by installing spool (44), bolt (41), washers (42) (under bolthead and nut), nut (43) and bushings (40) on shaft (45).

B. Install bearings (38) in aileron drum (37) and drum on shaft (9). Transducer attachment arms will be aligned when shaft lug engages recess in drum properly.

C. Join shaft assemblies (9, 39) with bolt (33), washers (34) (under bolthead and nut), nut (35) and spacers (36).

D. Install bearing (23) in bearing housing (21). Attach cable guards (29) to bearing housing with fasteners (30 thru 32). Install spacer (28) and housing (21) on shaft (9).

E. Lubricate cables (50, 51) with grease, MIL-G-25760. Install cables on bus drum (27) and secure with cotter pins (60). Install drum (27) on shaft (9) with terminal ends of cables extending inboard, cable (50) in top groove and cable (51) in bottom groove. Secure with fasteners (24, 25, 26).

F. Install bearing (23) in bearing housing (20), and housing on shaft (9).

G. Install guide (46) on forward rib (18) and secure with fasteners (47, 48, 49). Install forward and aft ribs (18, 19) and brackets (13) or (13A, 13B, 13C) to bearing housings (20, 21) and bracket (22). Secure with fasteners (10, 11, 12). Install clamps (17) with fasteners (14 thru 16, 17A, 17B). Transducer attachment arms will be outboard; cable assemblies (50, 51) will extend inboard.

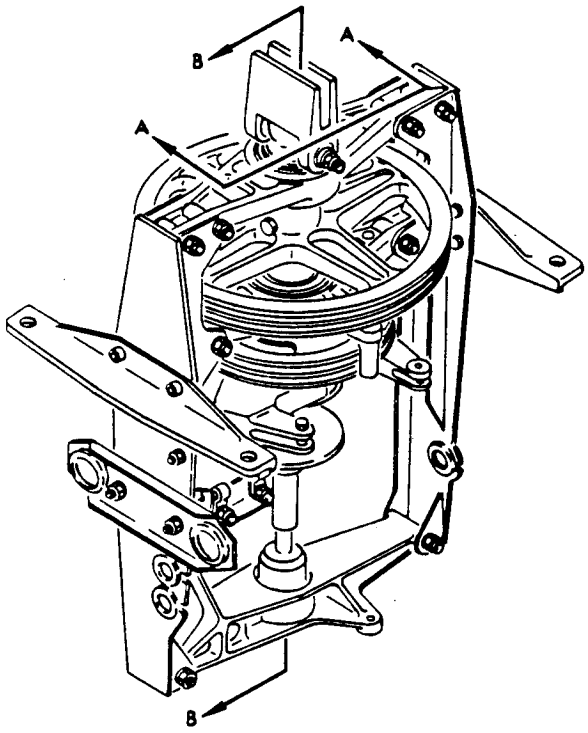
H. Install bearing (7) in fork (5).

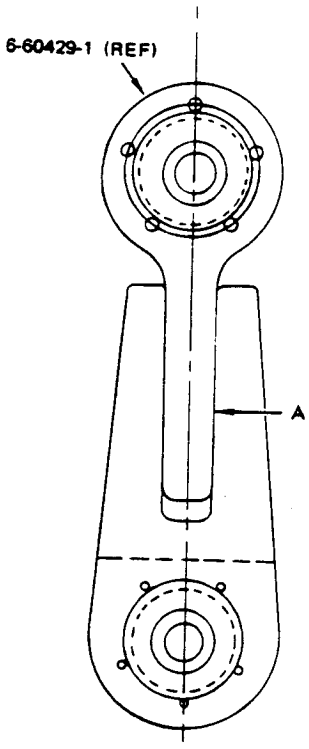
I. Install spacers (8) and fork assembly (4) on shaft (9) and secure with fasteners (1, 2, 3). Tighten nut (2) to 50-70 lb-in. if BACN10HR4 nut is used, and to 30-40 lb-in. if BACB10JC4 nut is used.

WARNING: INSTALL BOLT (1) WITH HEAD INBOARD TO AVOID POSSIBLE BINDING OF CONTROLS WHEN UNIT IS INSTALLED IN AIRPLANE. USE ONLY BACB10JC4 NUT (2) IN COMBINATION WITH 69-40961-1 BOLT (1). IF BACB30CW4-38 BOLT IS USED, EITHER BACN10JC4 OR BACN10HR4 NUT MAY BE USED. WASHER (3) MAY BE OMITTED TO OBTAIN NECESSARY FULL THREAD ENGAGEMENT OF NUT (2) ON BOLT (1). COMPLETE BOLT END CHAMFER MUST PROTRUDE BEYOND NUT (SB 27-1061).

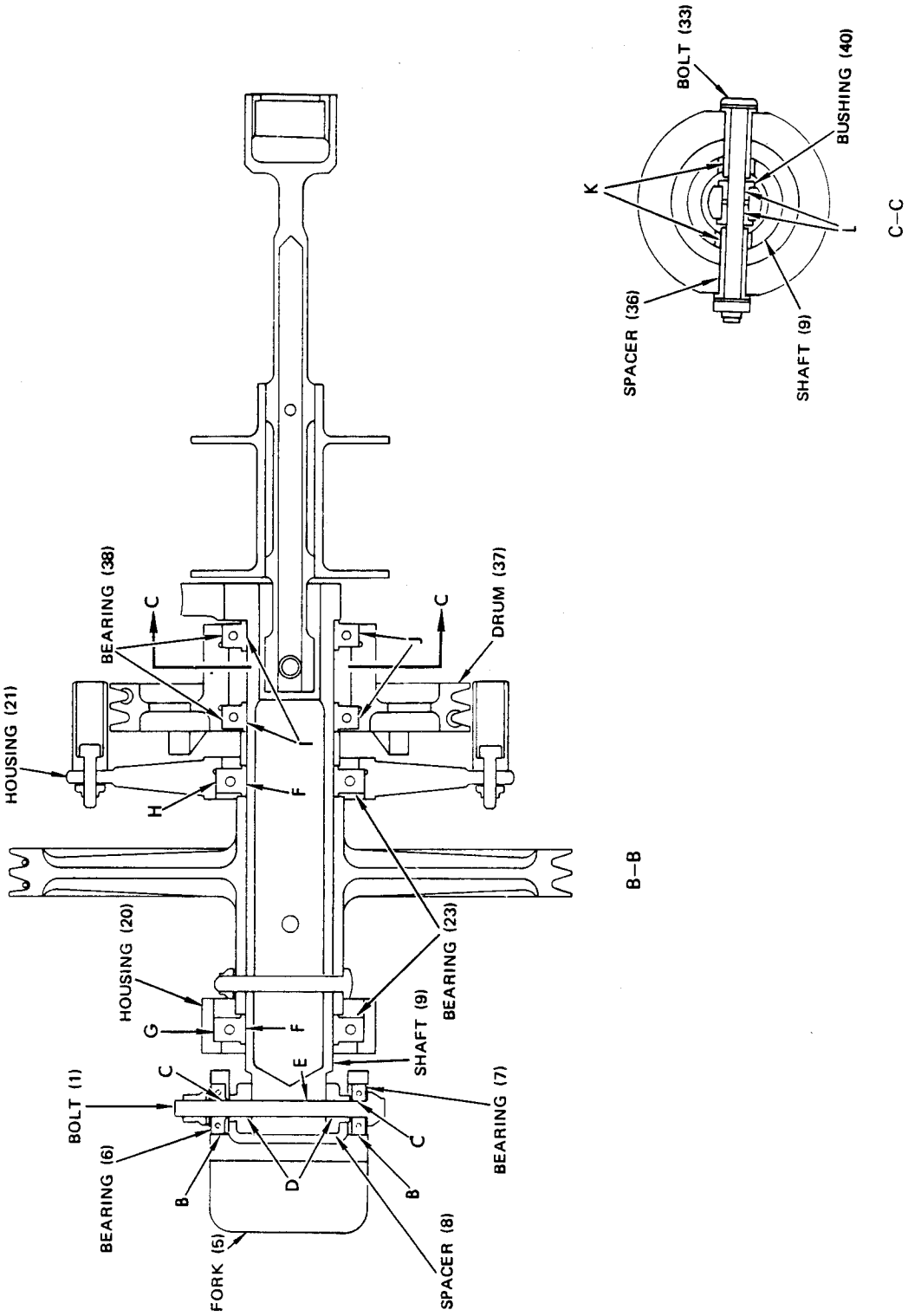
J. Deleted

6. FITS AND CLEARANCES





A–A



Fits and Clearances
Figure 3 (Sheet 2)

Ref Letter Fig. 3	Mating Item No. Fig. 4		Design Dimensions				Service Wear Limits		
			Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inch)		Maximum Allowable Clearance (inch)
			Min	Max	Min	Max	Min	Max	
A		5	0.3194 *[1]	0.3208 *[1]	0.0001 *[1]	0.0024 *[1]		0.3249	0.0060
		*[2]	0.3184 *[1]	0.3193 *[1]			0.3160		
B	ID	5	0.7498	0.7503	-0.0002	0.0008		0.7503	0.0008
	OD	6, 7	0.7495	0.7500			0.7495 *[3]		
C	ID	6, 7	0.2495	0.2500	0.0000	0.0015		0.2500 *[3]	0.0019
	OD	1	0.2485	0.2495			0.2481		
D	ID	8	0.2500	0.2540	0.0005	0.0055		0.2540	0.0055
	OD	1	0.2485	0.2495			0.2485		
E	ID	9	0.2495	0.2505	0.0000	0.0020		0.2505	0.0020
	OD	1	0.2485	0.2495			0.2485		
F	ID	23	1.3120	1.3130	0.0000	0.0020		1.3130 *[3]	0.0020
	OD	9	1.3110	1.3120			1.3110		
G	ID	20	2.2500	2.2510	0.0000	0.0020		2.2510	0.0020
	OD	23	2.2490	2.2500			2.2490		
H	ID	21	2.2500	2.2510	0.0000	0.0020		2.2510	0.0020
	OD	23	2.2490	2.2500			2.2490 *[3]		
I	ID	38	1.3120	1.3130	0.0000	0.0020		1.3130 *[3]	0.0020
	OD	9	1.3110	1.3120			1.3110		

Fits and Clearances
Figure 3 (Sheet 3)

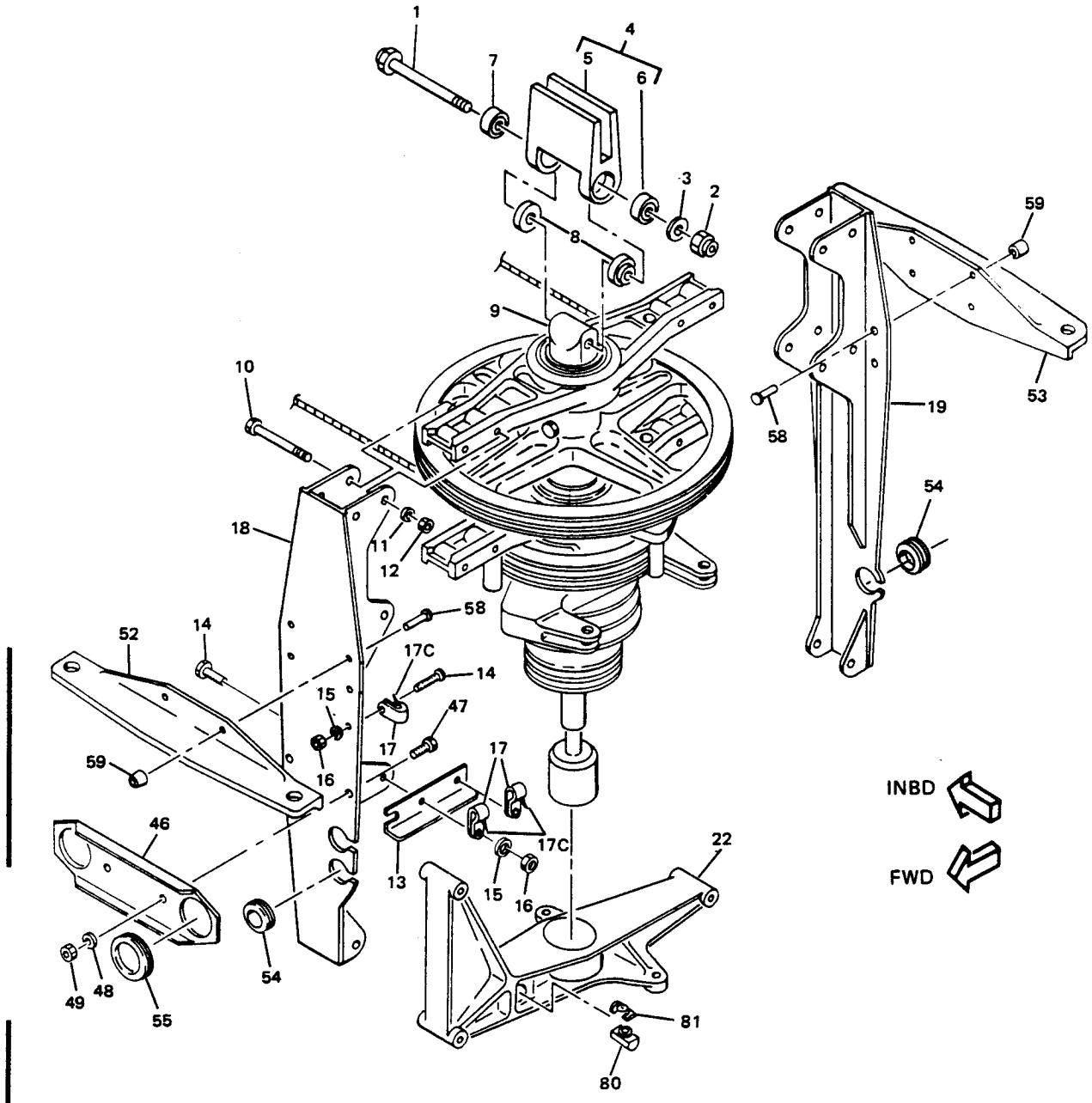
		Design Dimensions				Service Wear Limits		
Ref Letter Fig.3	Mating Item No. Fig.4	Dimensions (inches)		Assembly Clearance (inch)		Dimension Limits (inches)		Maximum Allowable Clearance (inch)
		Min	Max	Min	Max	Min	Max	
J	ID 37	2.0625	2.0635	0.0000	0.0000		2.0635	0.0020
	OD 38	2.0615	2.0625			2.0615 *[3]		
K	ID 9	0.5000	0.5040	0.1239	0.1284		0.5040	0.1284
	OD 36	0.3756	0.3761			0.3756		
L	ID 40	0.2497	0.2507	0.0002	0.0022		0.2507	0.0022
	OD 33	0.2485	0.2495			0.2485		

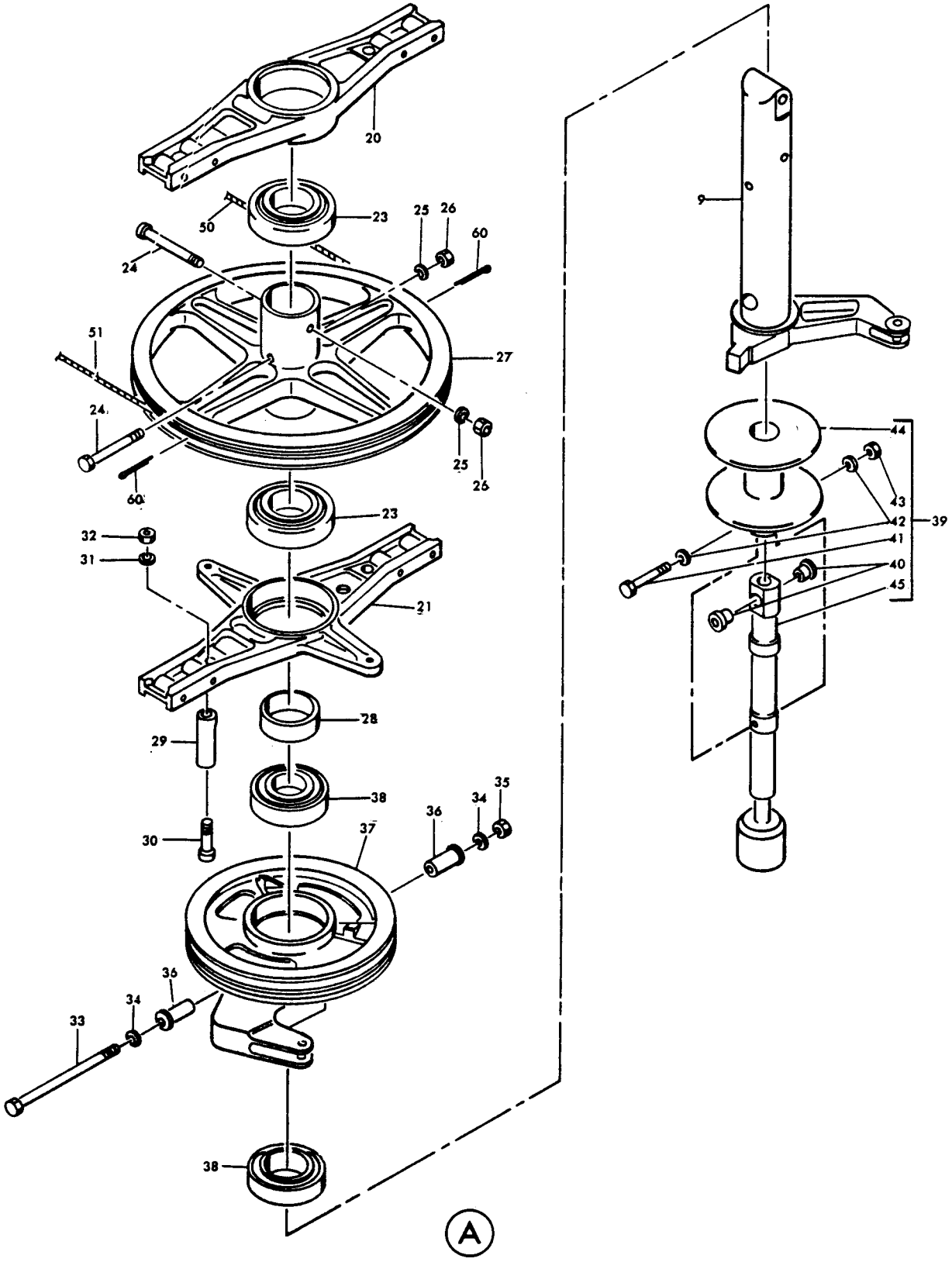
*[1] Dimensions include BMS 3-8 Dry Film Lubricant (0.0004 inch maximum)

*[2] 6-60429-1 (Reference)

*[3] Maximum allowable radial play of bearing 0.0020 inch

7. ILLUSTRATED PARTS LIST





Control Wheel Steering Aileron Drum Assembly
Figure 4 (Sheet 2)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
4-	65-55731-5		DRUM ASSY, CONTROL WHEEL STEERING AIL	A	RF
	65-55731-12		DRUM ASSY, CONTROL WHEEL STEERING AIL	B	RF
	65-55731-14		DRUM ASSY, CONTROL WHEEL STEERING AIL	C	RF
	65-55731-15		DRUM ASSY, CONTROL WHEEL STEERING AIL	D	RF
	65-55731-17		DELETED		
	65-55731-19		DELETED		
	65-55731-54		DRUM ASSY, CONTROL WHEEL STEERING AIL	E	RF
	65-55731-56		DRUM ASSY, CONTROL WHEEL STEERING AIL	F	RF
1	BACB30CW4-38		. BOLT	A	1
1	69-40961-1		. BOLT	B-E	1
1	69-40961-2		. BOLT	F	1
2	BACN10HR4		. NUT (REPLS BACN10CT4)(PRE SB 27-1061)	A	1
2	BACN10JC4		. NUT (POST SB 27-1061)	A	1
2	BACN10JC4		. NUT	B-F	1
3	AN960PD416		. WASHER	A	1
4	6-60428		. FORK ASSY	A-D	1
4	6-60428-2		. FORK ASSY	EF	1
5	6-60428-1		. . FORK	A-D	1
5	6-60428-3		. . FORK	EF	1
6	MS27641-4		DELETED		
6	BACB10BX4		. . BEARING (REPLS AN201KP4A)	A-D	1
6	BACB10BX4		. . BEARING	EF	1
6	BACB10BX4		DELETED		
7	BACB10BX4		. BEARING (REPLS BACB10A661)		1
8	66-24952-1		. SPACER		2
9	65-55710-3		. SHAFT	AB	1
9	65-55710-4		. SHAFT	C-F	1
10	BACB30NE4-23		. BOLT (REPLS BACB30NF4-23)		11
11	AN960PD416L		. WASHER		11
12	BACN10JC4		. NUT (REPLS NAS679A4W)		11
13	69-45429-1		. BRACKET		1
13A	69-71071-1		DELETED		
13B	69-71072-1		DELETED		
13C	69-71073-1		DELETED		
14	BACB30NE3-3		. BOLT		3
14A	NAS623-3-3		DELETED		
14B	BACB30NE3-4		DELETED		
14C	BACB30NE3-6		DELETED		
14D	BACB30NE3-10		DELETED		
15	AN960PD10L		. WASHER		3
15A	AN960PD10		DELETED		

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
4-					
16	BACN10JC3		. NUT		3
17	BACC10DK4		. CLAMP	ABC	3
17	BACC10DK4		. CLAMP (LIMITED)	D	3
17	BACC10DK3		. CLAMP (LIMITED)	D	3
17	BACC10DK3		. CLAMP	EF	3
17A	NAS623-3-36		DELETED		
17B	NAS43DD3-26		DELETED		
17C	BACP20BA		. PLUG, FILLER (USED WITH BACC10DK3)	DEF	3
18	65-59347-1		. RIB, FORWARD		1
18	65-59347-4		DELETED		
19	65-59347-2		. RIB, AFT		1
19	65-59347-3		DELETED		
20	65-55476-4		. HOUSING, BEARING	AB	1
20	65-55476-7		. HOUSING, BEARING	C-F	1
21	65-55476-2		. HOUSING, BEARING	AB	1
21	65-55476-6		. HOUSING, BEARING	C-F	1
22	65-58143-1		. BRACKET		1
22	65C19848-1		DELETED		
23	BACB10A235		. BEARING		2
24	BACB30NE4-26		. BOLT (REPLS BACB30NF4-26)		2
25	AN960PD416L		. WASHER		2
26	BACN10JC4		. NUT (REPLS NAS679A4W)		2
27	65-55711-1		. DRUM , BUS		1
28	69-42919-1		. SPACER		1
29	69-41762-2		. GUARD, CABLE		3
30	MS16998-29		. CAPSCREW		3
31	AN960PD10L		. WASHER		3
32	BACN10JC3		. NUT (REPLS NAS679A3W)		3
33	BACB30GE4-42		. BOLT		1
34	AN960PD416L		. WASHER		2
35	BACN10JC4		. NUT (REPLS NAS679A4W)		1
36	69-46712-1		. SPACER		2
37	65-55729-4		. DRUM, AIL		1
37	65-55729-5		DELETED		
38	BACB10BW21		. BEARING (REPLS BACB10A822)		2
39	69-46277-1		. SHAFT ASSY		1
39	69-46277-2		DELETED		
40	BACB28W4B21		. . BUSHING		2
41	NAS1103-17		. . BOLT		1
41	BACB30LK4-29		DELETED		
42	NAS549L10		. . WASHER		2
42	AN960PD416		DELETED		
43	BACN10JC3		. . NUT (REPLS NAS679A3W)		1
43	BACN10JC4		DELETED		
44	69-45189-1		. . SPOOL		1
44	69-71048-1		DELETED		

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
4-					
45	69-45403-1		. . SHAFT		1
46	69-41789-1		. GUIDE		1
47	BACB30NE3-3		. BOLT		2
48	AN960PD10L		. WASHER		2
49	BACN10JC3		. NUT (REPLS NAS679A3W)		2
50	BACC13AP4C321		. CABLE ASSY (REPLS BACC13AE465-319T)	ABC	1
50	BACC2A4B00321 DG		. CABLE ASSY	DEF	1
51	BACC13AP4B321		. CABLE ASSY	ABC	1
51	BACC2A4B00321 CG		. CABLE ASSY	DEF	1
52	69-41771-1		. BEAM, FORWARD		1
53	69-41772-1		. BEAM, AFT		1
54	NAS1368N10C		. GROMMET		3
55	NAS1368N16A		. GROMMET		2
56	BACN10HC4		DELETED		
57	BACR10V4		DELETED		
58	BACB30DX6-4		. LOCKBOLT		8
59	NAS1080-06		. COLLAR		8
60	MS24665-132		. PIN, COTTER		2
			INSTALLATION PARTS		
80	BACN10HC4		NUT (REPLS BACN10CP4L)		1
81	BACR10V4		RETAINER		1