COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

RUDDER CONTROL QUADRANT ASSEMBLY

PART NUMBER 251A3471–1

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COMPONENT MAINTENANCE MANUAL

Revision No. 9
Jul 01/2009

To: All holders of RUDDER CONTROL QUADRANT ASSEMBLY 27-27-05.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

The COMPONENT MAINTENANCE MANUAL is furnished either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

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INTRODUCTION

1. General

A. The instructions in this manual supply the data necessary to do the maintenance functions together with the test, fault isolation, repair, and replacement of the defective parts.

B. This manual is divided into different parts:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) List of Effective Pages

(5) Table of Contents

(6) Temporary Revision & Service Bulletin Record

(7) Record of Revisions

(8) Record of Temporary Revisions

(9) Introduction

(10) Procedures & IPL Sections

C. Components that can be repaired have a different repair number for each specified repair. To find the repair number location of a component, look in the Repair-General procedure at the beginning of the REPAIR section. The Repair-General procedure also has an explanation of the True Position Dimension symbols used.

D. All dimensions, measures, quantities and weights included are in English units. When metric equivalents are given they will be in the parentheses that follow the English units.

E. The introduction to the Illustrated Parts List (IPL) shows how the IPL data is used.

F. Design changes, optional parts, configuration differences and Service Bulletin modifications may cause different part numbers. These part numbers are identified in the IPL with an alphabetical letter which is added to the end of the basic item number. This new item number is referred to as an alpha-variant. Throughout the manual, IPL basic item number references also apply to alpha-variants unless shown differently.

G. The tool reference numbers found in the individual procedures and in the Special Tools, Fixtures, and Equipment section are used to identify if a tool is a standard tool (STD-XXXX), a commercial tool (COM-XXXX), or a Special Tool (SPL-XXXX). This reference number is also used to distinguish between tools with similar names in the same procedure. These reference numbers are for use in the documentation only. They are not to be used for ordering tools.

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RUDDER CONTROL QUADRANT ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The rudder control quadrant assembly consists of an aluminum attached quadrant attached to an aluminum shaft.

2. Operation

A. The quadrant assembly is part of the rudder control quadrant installation. When a force is applied to the connecting control cables, the assembly rotates. A resulting force is applied to a push-pull rod connecting the quadrant and the rudder control torque tube.

3. Leading Particulars (Approximate)

A. Length – 12.0 inches

B. Width – 16.0 inches

C. Height – 20.0 inches

D. Weight – 4.7 pounds

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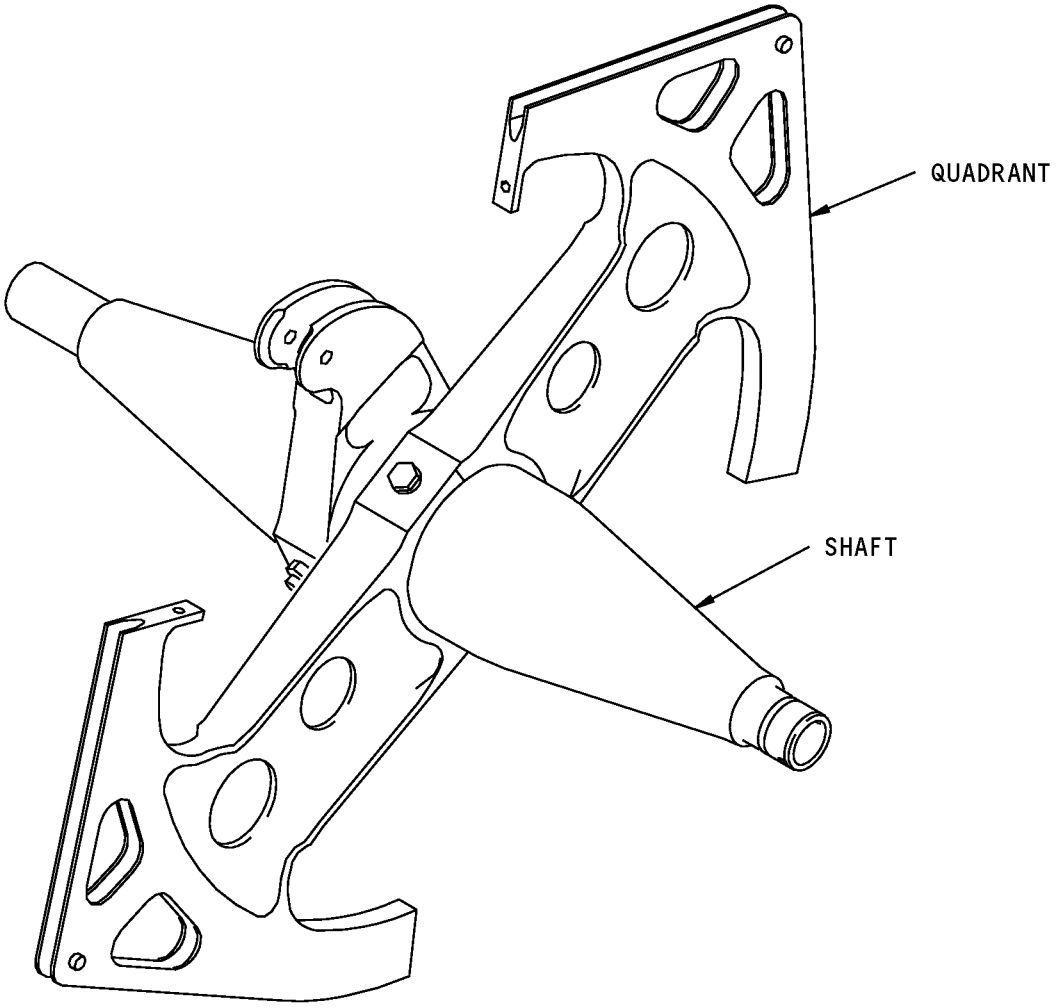

Rudder Quadrant Assembly
Figure 1

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COMPONENT MAINTENANCE MANUAL

TESTING AND FAULT ISOLATION

(NOT APPLICABLE)

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CHECK

1. General

A. This procedure has the data necessary to find defects in the material of the specified parts.

B. Refer to FITS AND CLEARANCES for the design dimension and wear limits.

C. Refer to the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.

D. Refer to IPL Figure 1 for item numbers.

2. Check

A. References

Reference	Title
SOPM 20-20-02	PENETRANT METHODS OF INSPECTION

B. Procedure

(1) Use standard industry procedures to do a visual check of all the parts for defects. Do the penetrant check if the visual check shows possible damage or if you suspect possible damage on the parts listed below:

(2) Do a penetrant check (SOPM 20-20-02) of these parts:

(a) Shaft (30)

(b) Quadrant (35)

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REPAIR

1. General

A. Instructions for repair, refinish, and replacement of the specified subassembly parts are included in each REPAIR when applicable:

Table 601:

PART NUMBER	NAME	REPAIR
—	REFINISH OF OTHER PARTS	1-1
251A3471	QUADRANT ASSEMBLY	2-1
251A3472	QUADRANT	3-1
251A3474	SHAFT	4-1

2. Dimensioning Symbols

A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in REPAIR-GENERAL, Figure 601.

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—	STRAIGHTNESS
▱	FLATNESS
⊥	PERPENDICULARITY (OR SQUARENESS)
//	PARALLELISM
○	ROUNDNESS
⌭	CYLINDRICITY
⌒	PROFILE OF A LINE
⌓	PROFILE OF A SURFACE
◎	CONCENTRICITY
⌯	SYMMETRY
∠	ANGULARITY
↗	RUNOUT
↗↗	TOTAL RUNOUT
⌴	COUNTERBORE OR SPOTFACE
∨	COUNTERSINK
⌖	THEORETICAL EXACT POSITION OF A FEATURE (TRUE POSITION)
∅	DIAMETER
S ∅	SPHERICAL DIAMETER
R	RADIUS
SR	SPHERICAL RADIUS
()	REFERENCE
BASIC (BSC) OR [DIM]	A THEORETICALLY EXACT DIMENSION USED TO DESCRIBE SIZE, SHAPE OR LOCATION OF A FEATURE. FROM THIS FEATURE PERMISSIBLE VARIATIONS ARE ESTABLISHED BY TOLERANCES ON OTHER DIMENSIONS OR NOTES.
[-A-]	DATUM
Ⓜ	MAXIMUM MATERIAL CONDITION (MMC)
Ⓛ	LEAST MATERIAL CONDITION (LMC)
Ⓢ	REGARDLESS OF FEATURE SIZE (RFS)
Ⓟ	PROJECTED TOLERANCE ZONE
FIM	FULL INDICATOR MOVEMENT

EXAMPLES

— | 0.002	STRAIGHT WITHIN 0.002
⊥ | 0.002 | B	PERPENDICULAR TO DATUM B WITHIN 0.002
// | 0.002 | A	PARALLEL TO DATUM A WITHIN 0.002
○ | 0.002	ROUND WITHIN 0.002
⌭ | 0.010	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER
⌒ | 0.006 | A	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM A
⌓ | 0.020 | A	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.020 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE
◎ | ∅ 0.0005 | C	CONCENTRIC TO DATUM C WITHIN 0.0005 DIAMETER
⌯ | 0.010 | A	SYMMETRICAL WITH DATUM A WITHIN 0.010
∠ | 0.005 | A	ANGULAR TOLERANCE 0.005 WITH DATUM A
⌖ | ∅ 0.002 Ⓢ | B	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
⊥ | ∅ 0.010 Ⓜ | A 0.510 Ⓟ	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010 INCH DIAMETER, PERPENDICULAR TO DATUM A, AND EXTENDING 0.510 INCH ABOVE DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

True Position Dimensioning Symbols
Figure 601

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REFINISH OF OTHER PARTS - REPAIR 1-1

1. General

A. This procedure has the data necessary to refinish the parts which are not given in the specified repairs.

B. Refer to the Standard Overhaul Practice Manual (SOPM) for the SOPM subjects identified in this procedure.

C. Refer to IPL Figure 1 for item numbers.

2. Refinish of Other Parts

A. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES

B. General

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01.

(1) Instructions for the repair of the parts listed in REPAIR 1-1, Table 601 are for repair of the initial finish.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
Spacer (15)	Aluminum	Chromic acid anodize (F-2.157).

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QUADRANT ASSEMBLY - REPAIR 2-1

251A3471–1

1. General

A. This procedure has the data necessary to refinish and assemble the quadrant assembly (1A).

B. Refer to the Standard Overhaul Practice Manual (SOPM) for the SOPM subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Figure 601 for the True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

2. Quadrant Assembly Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Apply chemical treatment (F-17.10) to the surfaces noted by flagnote 1.

(2) Apply chemical treatment (F-17.10) and apply primer, C00259 (F-20.02) to the surfaces noted by flagnote 2.

3. Quadrant Assembly

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

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B. References

Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-50-19	GENERAL SEALING
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure

NOTE: For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Install the quadrant (35) onto the shaft (30).

(2) Install the bolts (5), the washers (10, 20), and the nuts (25) (SOPM 20-50-01) onto the quadrant (35) and shaft (30) with sealant, A00247 (F-19.48) as shown in SOPM 20-50-19 and flagnote 3.

(3) Obey flagnotes 1 and 2 using primer, C00259 and chemical treatment where indicated.

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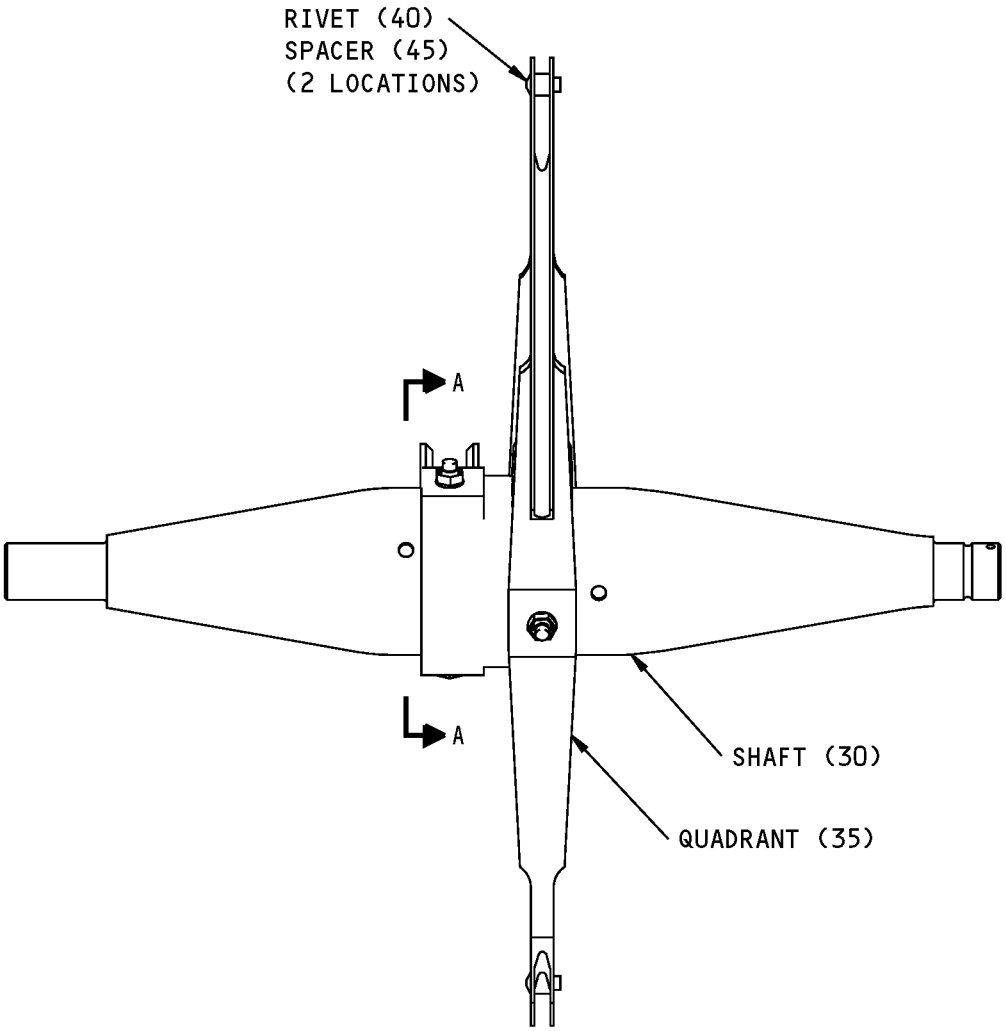

251A3471-1 Quadrant Assembly Repair
Figure 601 (Sheet 1 of 2)

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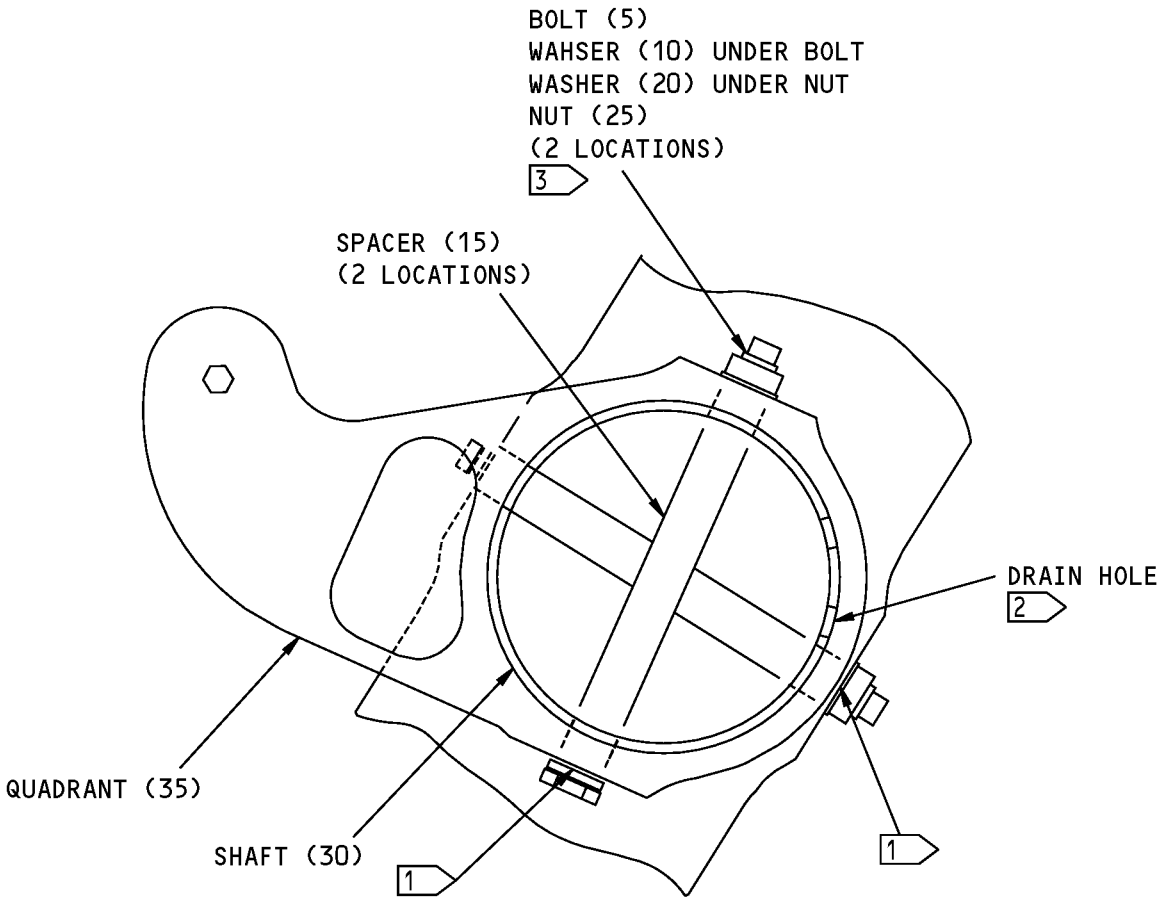

A–A

1 APPLY COLORED CHEMICAL COATING (F–17.10) AS SHOWN IN SOPM 20–43–03

2 APPLY COLORED CHEMICAL COATING (F–17.10) AS SHOWN IN SOPM 20–43–10 AND BMS 10–11, TYPE 1 PRIMER (F–20.02) AS SHOWN IN SOPM 20–41–02

3 INSTALL THE FASTENERS WITH BMS 5–95 SEALANT (F–19.48) AS SHOWN IN SOPM 20–50–19

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

251A3471-1 Quadrant Assembly Repair
Figure 601 (Sheet 2 of 2)

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QUADRANT - REPAIR 3-1

251A3471–2, –3

1. General

A. This procedure has the data necessary to repair and refinish the quadrant (35).

B. Refer to the Standard Overhaul Practice Manual (SOPM) for the SOPM subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Figure 601 for the True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Quadrant Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure (REPAIR 3-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Boric acid-sulfuric acid anodize or chromic acid anodize (F-17.35) and apply primer, C00259 (F-20.02) to all surfaces unless noted by flagnote 1.

(2) Do not apply primer to the surfaces noted by flagnote 1.

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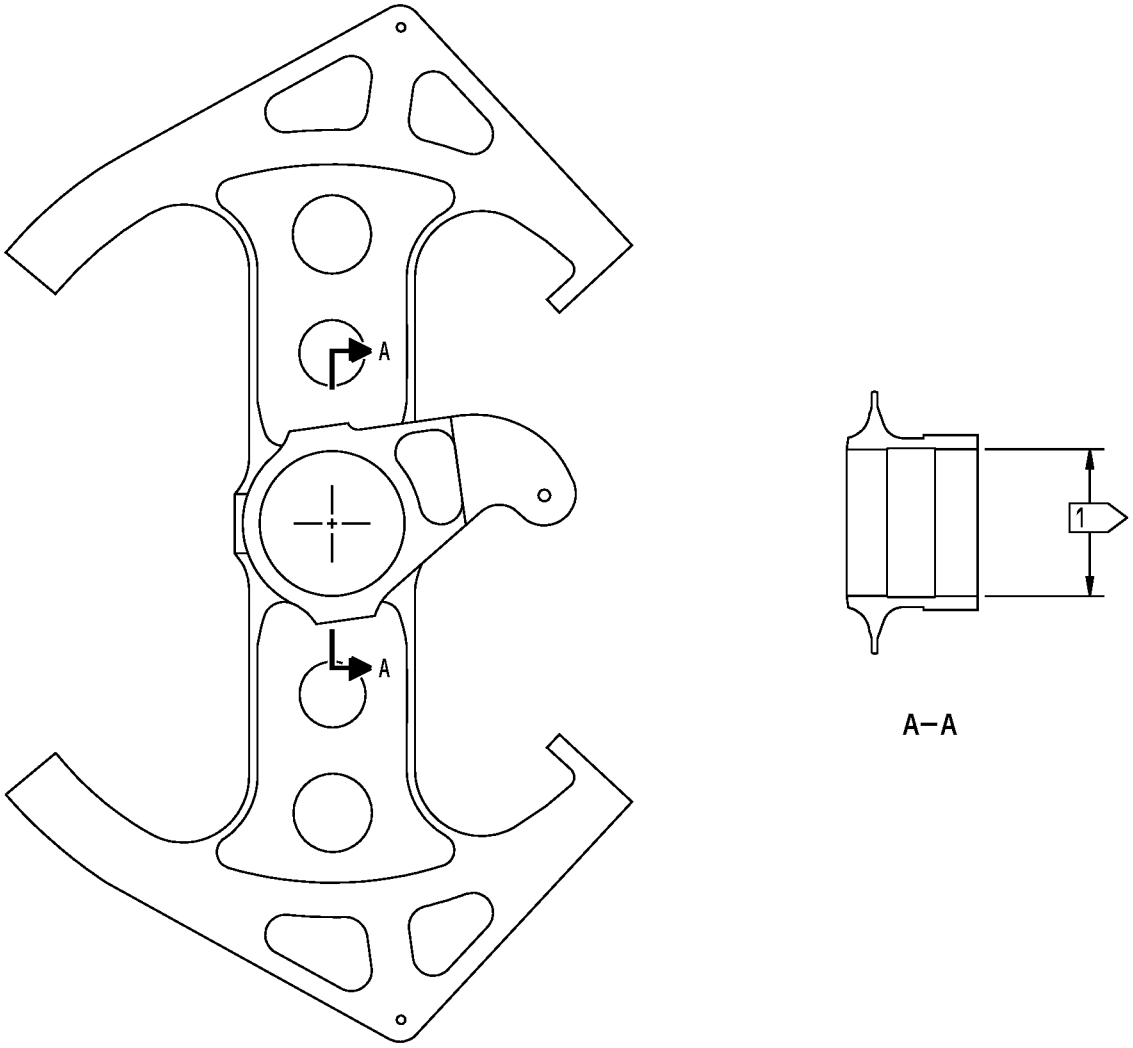

1 DO NOT APPLY PRIMER ON THIS SURFACE.

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

251A3472-2,-3 Quadrant Repair
Figure 601

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SHAFT - REPAIR 4-1

251A3474–1

1. General

A. This procedure has the data necessary to refinish the shaft (30).

B. Refer to the Standard Overhaul Practice Manual (SOPM) for the SOPM subjects identified in this procedure.

C. Refer to REPAIR-GENERAL, Figure 601 for the True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Shaft Refinish

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure (REPAIR 4-1, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Apply chemical treatment (F-17.08) in the inside and outside surfaces of the shaft (30).

(2) Apply primer, C00259 (F-20.48) all over except to surfaces noted by flagnote 1.

(3) Do not apply primer to the surfaces noted by flagnote 1.

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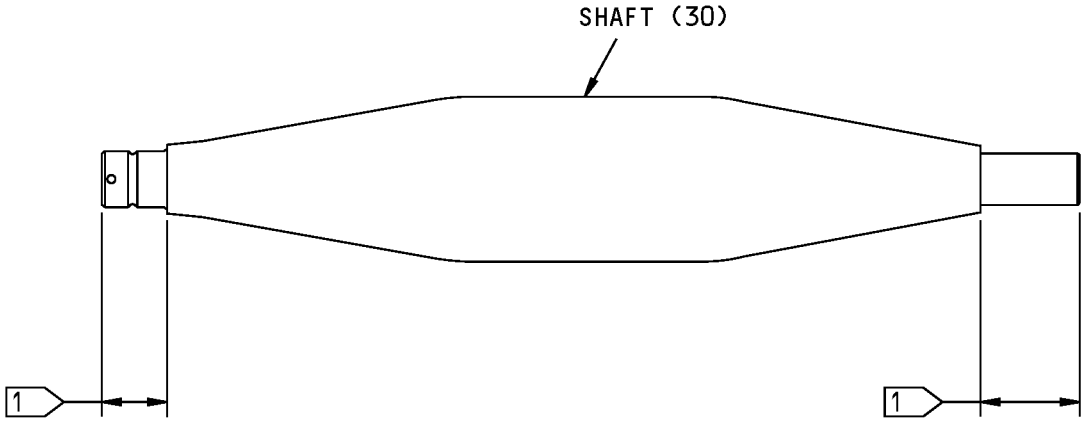

1 DO NOT APPLY PRIMER IN THIS AREA.

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

251A3474-1 Shaft Repair
Figure 601

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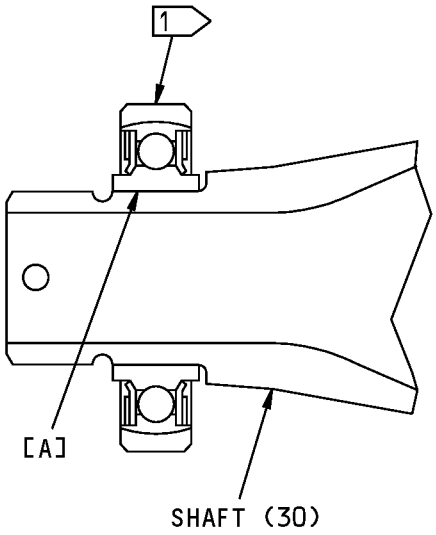
FITS AND CLEARANCES



REF LETTER	REF IPL FIG. 1, MATING ITEM NO.	DESIGN DIMENSION*				SERVICE WEAR LIMIT*		
		DIMENSION		ASSEMBLY CLEARANCE		DIMENSION		MAXIMUM CLEARANCE
		MIN	MAX	MIN	MAX	MIN	MAX	
[A]	ID 1	0.9990	1.0000	0.0000	0.0020		1.0030	0.0040
	OD 30	0.9980	0.9990			0.9970		

* ALL DIMENSIONS ARE IN INCHES

1 BACB10EX16 BEARING (USED ON 65-45152-4) INSTALLATION PART

Fits and Clearances
Figure 801

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ILLUSTRATED PARTS LIST

1. Introduction

A. The Illustrated Parts List (IPL) contains an illustration and a list of component parts you can repair or replace. The Illustrated Parts Catalog (IPC) shows how to use the Boeing part number system.

B. This shows how parts are related: The relation of each item to its next higher assembly (NHA) is shown in the NOMENCLATURE column. Use the indenture system that follows:

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

C. Each top assembly is given one use code letter (A, B, C, etc.) in the USAGE CODE column. All subsequent component parts in the list can have one or more of the use code letters to show effectivity to top assemblies. A component part without a use code applies to all top assemblies.

D. An alphabetical letter is added after the item number for optional parts, parts changed by a Service Bulletin, configuration differences (except left-handed and right-handed parts), last engineering releases, and parts added between item numbers in a sequence. The alphabetical letter will not be shown on the illustration for equivalent parts of the same part number.

E. Color-coded parts are identified with a single digit alpha following the dash number or with ''SP'' suffix. If the ''SP'' suffix is used, it represents consolidation of all color codes applicable for a given usage which are not separately listed. Orders for color-coded parts should include the registry number of the airplane for which the parts are ordered.

F. If a part number is 15 characters long but will not fit in the part number column, the part number will be displayed with a ''~'' at the end of the line and will be continued on the next line. The ''~'' denotes that the part number continues on the next line.

G. Parts changed by a Service Bulletin are shown by PRE SB XXXX and POST SB XXXX added to the NOMENCLATURE column.

(1) When a new top assembly is added by a Service Bulletin, PRE SB XXXX and POST SB XXXX will be added at the top assembly level only. The configuration differences at the detail part level are shown by use code letters.

(2) When the top assembly part number is not changed by the Service Bulletin, PRE SB XXXX and POST SB XXXX will be added at the detail level.

H. Interchangeable Parts

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Optional (OPT)	The part is optional to and interchangeable with other parts that have the same item number.
Replaces, Replaced by and not interchangeable with (REPLACES, REPLACED BY AND NOT INTCHG/W)	The part replaces and is not interchangeable with the initial part.
Replaces, Replaced by (REPLACES, REPLACED BY)	The part replaces and is interchangeable with, or is an alternative to, the initial part.

VENDOR CODES

Code	Name
15653	ALCOA GLOBAL FASTENERS INC DIV KAYNAR PRODUCTS 800 S STATE COLLEGE BLVD FULLERTON, CALIFORNIA 92831-3001 FORMERLY VK6405 MICRODOT AEROSP LTD; FORMERLY KAYNAR TECH FORMERLY FAIRCHILD FASTENERS KAYNAR DIV
62554	SIMMONDS MECAERO FASTENERS INC 1734 SEQUOIA AVENUE ORANGE, CALIFORNIA 92668

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NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
251A3471-1		1	1A	RF
251A3472-2		1	35	1
251A3472-3		1	35A	1
251A3474-1		1	30	1
66-14200-1		1	15	2
BACB30NR4K57		1	5	2
BACN10YR4CD		1	25	2
BACR15BB6D10C		1	40	2
BACW10BN4AC		1	10	2
H52732-4CD		1	25	2
NAS1149D0432J		1	20	2
NAS42DD6-18FC		1	45	2
PLH54CD		1	25	2

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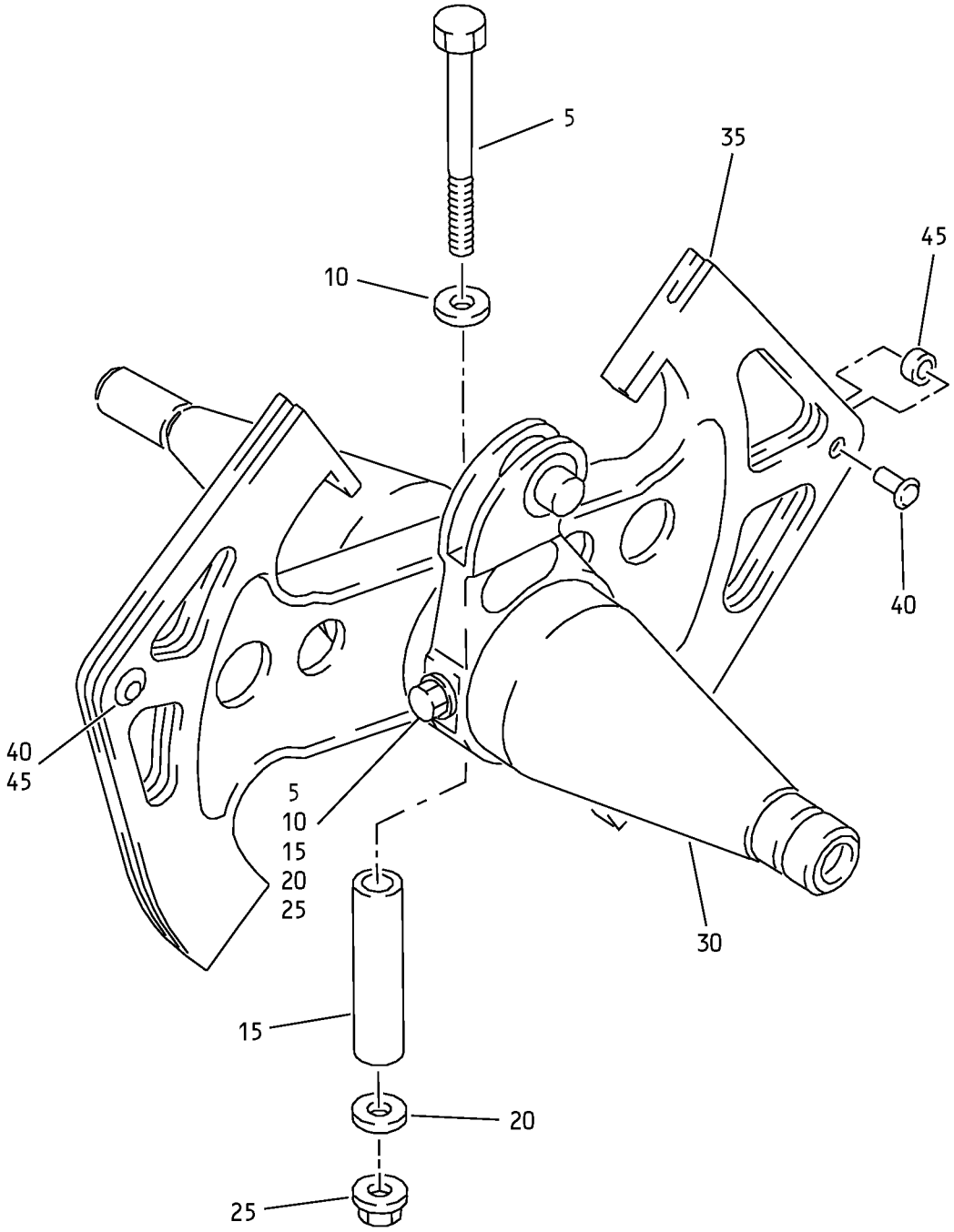

Rudder Control Quadrant Assembly
IPL Figure 1

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FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	251A3471-1		QUADRANT ASSY-RUDDER CONT AFT		RF
5	BACB30NR4K57		. BOLT		2
10	BACW10BN4AC		. WASHER		2
15	66-14200-1		. SPACER		2
20	NAS1149D0432J		. WASHER		2
25	H52732-4CD		. NUT (V15653) (SPEC BACN10YR4CD) (OPT PLH54CD (V62554))		2
30	251A3474-1		. SHAFT		1
35	251A3472-2		. QUADRANT (OPT ITEM 35A)		1
–35A	251A3472-3		. QUADRANT (OPT ITEM 35)		1
40	BACR15BB6D10C		. RIVET		2
45	NAS42DD6-18FC		. SPACER		2

–Item not Illustrated

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