TO: ALL HOLDERS OF RUDDER CONTROL FEEL CENTERING ASSEMBLY COMPONENT MAINTENANCE MANUAL 21-21-40

REVISION NO. 6 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 on the Record of Revision Sheet.

CHAPTER/SECTION AND PAGE NO.	DESCRIPTION OF CHANGE
TITLE PAGE	Added 251T3120-1 aft quadrant top assembly.
1	
TR & SB RECORD	
1	
DESCRIPTION & OPERATION	
1	
301	
501	
REPAIR 1-1	
602-604	
701-708	
801	
1002-1007,1009,	
1013-1022	
1010	Edited with no technical change.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

BOEING

COMPONENT
MAINTENANCE MANUAL

RUDDER CONTROL ASSEMBLIES

PART NUMBERS 251T3200-2 THRU -9, 251T3120-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

170360

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

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

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR B11586 PRR B11799-1 PRR B13204	APR 10/87 OCT 01/88 MAR 01/00

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

PAGE	DATE	CODE
27-21-40		
TITLE PAGE		
*1	MAR 01/00	01.1
2	BLANK	
REVISION RECORD		
1	JUL 10/85	01
2	BLANK	
TR & SB RECORD		
*1	MAR 01/00	01.1
2	BLANK	
LIST OF EFFECTIVE PAGES		
*1	MAR 01/00	01
THRU LAST PAGE		
CONTENTS		
1	JUL 10/85	01
2	BLANK	
INTRODUCTION		
1	JAN 10/86	01.1
2	BLANK	
DESCRIPTION & OPERATION		
*1	MAR 01/00	01.1
2	BLANK	
DISASSEMBLY		
*301	MAR 01/00	01.1
302	BLANK	
CHECK		
*501	MAR 01/00	01.1
502	BLANK	
REPAIR-GENERAL		
601	JUL 10/85	01
602	BLANK	

PAGE	DATE	CODE
REPAIR 1-1		
*601	MAR 01/00	01.101
*602	MAR 01/00	01.1
*603	MAR 01/00	01.1
*604	MAR 01/00	01.1
ASSEMBLY		
*701	MAR 01/00	01.1
*702	MAR 01/00	01.1
*703	MAR 01/00	01.1
*704	MAR 01/00	01.1
*705	MAR 01/00	01.1
*706	MAR 01/00	01.1
*707	MAR 01/00	01.1
*708	MAR 01/00	01.1
FITS AND CLEARANCES		
*801	MAR 01/00	01.1
802	BLANK	
ILLUSTRATED PARTS LIST		
1001	JUL 10/85	01
*1002	MAR 01/00	01.1
*1003	MAR 01/00	01.1
*1004	MAR 01/00	01.1
*1005	MAR 01/00	01.1
*1006	MAR 01/00	01.1
*1007	MAR 01/00	01.1
*1008	MAR 01/00	01.101
*1009	MAR 01/00	01.1
*1010	MAR 01/00	01.1
*1011	MAR 01/00	01.101
*1012	MAR 01/00	01.101
*1013	MAR 01/00	01.1
*1014	MAR 01/00	01.1
*1015	MAR 01/00	01.1
*1016	MAR 01/00	01.1
*1017	MAR 01/00	01.1
*1018	MAR 01/00	01.1
*1019	MAR 01/00	01.1
*1020	MAR 01/00	01.1
*1021	MAR 01/00	01.1
*1022	MAR 01/00	01.1

* = REVISED, ADDED OR DELETED

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

TABLE OF CONTENTS

*[1] Special instructions not required. Use standard industry practices.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

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
2. Record of Revisions
3. Temporary Revision & Service Bulletin Record
4. List of Effective Pages
5. Table of Contents
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, and a list of applicable standard Boeing practices.

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.

Verification:

Disassembly	Aug 26/85
Assembly	Aug 26/85

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

RUDDER CONTROL ASSEMBLIES

DESCRIPTION AND OPERATION

1. Rudder Control Feel Centering Assembly
   Ref: P/N 251T3200-( )

   A. The rudder control feel centering assembly consists of a spring arm assembly pivoted on a torque tube assembly and a spring-loaded cam roller arm assembly mounted on the spring arm assembly.

   B. The feel centering assembly provides centering force and artificial feel to the rudder input.

   C. Leading Particulars (Approximate)

      Length -- 16 inches
      Height -- 19 inches
      Width -- 14 inches
      Weight -- 16 pounds

2. Rudder Control Aft Quadrant Assembly
   Ref: P/N 251T3120-( )

   A. The rudder control aft quadrant assembly consists of two spring arm assemblies which pivot on a torque tube assembly that is attached to an aft quadrant assembly with a transducer assembly.

   B. The aft quadrant assembly provides positioning force and artificial feel to the rudder input.

   C. Leading Particulars (Approximate)

      Length -- 20 inches
      Height -- 20 inches
      Width -- 12 inches
      Weight -- 15 pounds

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

DISASSEMBLY

NOTE: Disassemble this component only as necessary to complete fault isolation, determine the serviceability of parts, perform required repairs, and restore the unit to serviceable condition.

1. Parts Replacement

   NOTE: The following parts are recommended for replacement. Unless otherwise noted, actual replacement of parts may be based on in-service experience.

   A. Nuts (65, 70, 72, 105, 110, IPL Fig. 1; 100, 160, 165, 245, 250, 320, 325, IPL Fig. 2)

   B. Lockwire

2. Disassembly

   A. Disassemble this component using standard industry practices and the following special instructions.

   B. Back off nuts (7, IPL Fig. 1; 15, IPL Fig. 2) and fine adjusting nuts (5, IPL Fig. 1; 10, IPL Fig. 2)) to release spring force prior to disassembly.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

CHECK

1. Check all parts for obvious defects in accordance with standard industry practices.

2. Magnetic particle check the following parts per 20-20-01.

   A. Nuts (5, IPL Fig. 1; 10, IPL Fig. 2) - Class B

   B. Eyebolts (15, IPL Fig. 1; 5, IPL Fig. 2) - Class B

   C. Springs (20, 25, IPL Fig. 1)

   D. Bushings (140, 230, IPL Fig. 2) - Class C

3. Penetrant check the following parts per 20-20-02.

   A. Springs (25, 30, IPL Fig. 2)

   B. Retainers (115, IPL Fig. 1; 305, IPL Fig. 2)

   C. Quadrant (200, IPL Fig. 2)

   D. Spacer (240, IPl Fig. 2)

   E. Support (280, IPL Fig. 2)

4. Check spring (20, IPL Fig. 1; 30, IPL Fig. 2)

   A. Visually check for nicks, scratches, notches or other damage.

   B. Extend spring to 5.983-6.003 inch and check that load is 12.7-16.7 pounds.

   C. Extend spring to 7.290-7.310 inch and check that load is 119.8-131.8 pounds.

5. Check spring (25, IPL Fig. 1; 25, IPL Fig.2)

   A. Visually check for nicks, scratches, notches or other damage.

   B. Extend spring to 7.11-7.13 inch and check that load is 9.3-13.3 pounds.

   C. Extend spring to 8.81-8.83 inch and check that load is 92.0-102.0 pounds.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

REPAIR - GENERAL

1. Content

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

P/N	NAME	REPAIR
- -	MISC PARTS REFINISH	1-1

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
   20-43-01 Chromic Acid Anodizing
   20-50-08 Application of Dry Lubricant

3. Materials

   NOTE: Equivalent substitutes may be used.

   A. Lubricant -- BMS 3-8 (Ref 20-60-03)

   B. Primer -- BMS 10-11, type 1 (Ref 20-60-02)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

MISCELLANEOUS PARTS REFINISH - REPAIR 1-1

1. Repair of parts listed in Fig. 601 consists of restoration of the original finish.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Nuts (5)	15-5PH CRES, 150-170 ksi	Passivate (F-17.09).
Eyebolts (15)	15-5PH CRES, 150-170 ksi	Passivate (F-17.09) and apply dry lubricant to threads.
Springs (20,25)	17-7 CRES wire	Passivate (F-17.09).
Retainers (115)	Al alloy	Chromic acid anodize (F-17.04) and apply 2 coats of primer (F-20.03) all over.
Fig. 2		
Strap (20)	Al alloy	Chemical treat and apply BMS 10-11, type 1 primer (F-18.06) then apply type 27 abrasion resistant finish (F-14.9625).
Springs (25,30)	Ti alloy	Apply Duralon primer and enamel (F-21.14) as shown in Fig. 601.
Bushings (140)	15-5 PH CRES, 150-170 ksi	Cadmium plate (F-15.06).

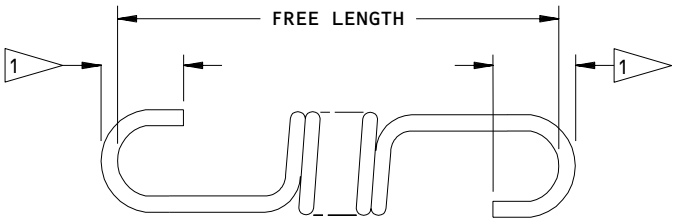
Refinish Details
Figure 601 (Sheet 1)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 2 (cont)		
Plate (190,265)	Al alloy	Chemical treat (F-17.07) and apply BMS 10-11, type 1 primer (F-20.02).
Quadrant (200) Support (280,285)	Al alloy	Boric acid - sulfuric acid anodize or chrome acid anodize (F-17.31) and apply BMS 10-11, type 1 primer (F-20.02).
Bushing (230)	4340 Steel, 125-145 ksi	Cadmium plate (F-15.06) on outer diameter and ends only. Plating in chamfer is allowed.
Spacer (240)	Al alloy	Chromic acid anodize and apply BMS 10-11, type 1 primer (F-18.13).
Support (255)	Al alloy	Touch up machined surfaces with chemical treat (F-17.10) and apply BMS 10-11, type 1 primer (F-20.02) as required.
Retainer (305)	Al alloy	Chromic acid anodize (F-17.04) and apply BMS 10-11, type 1 primer (F-20.03).

Refinish Details
Figure 601 (Sheet 2)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



SPRING REFINISH
(IPL FIG. 2; 25,30)

1 APPLY DURALON PRIMER AND ENAMEL (F-21.14) TO HOOKS AS INDICATED. OVERSPRAY IS ALLOWED, COLOR BLACK. TOP COAT THICKNESS 0.004-0.008 INCHES

Miscellaneous Parts Refinish
Figure 601

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

ASSEMBLY

1. Material

NOTE: Equivalent substitutes may be used.

A. Grease -- BMS 3-24 (Ref 20-60-03)

2. Assembly of Rudder Control Feel Centering Assembly (IPL Fig. 1)

A. Install spacer (60) and bearing (75) in arm assembly (80) with grease.

CAUTION: DO NOT RETIGHTEN NUT (105).

B. Install bearing (120) in spring arm assembly (125) with grease. Position spring arm assembly (125) on torque tube assembly (135) and install bolt assembly (85), retainers (115) and nut (105). Install bolt assembly (85) with grease. Tighten nut (105) to 60-80 lb-ins. then install washer (100) and nut (110). Tighten nut (110) to 30-40 lb-ins. Do not retighten nut (105).

CAUTION: DO NOT RETIGHTEN NUT (65).

C. Position cam roller arm assembly (80) on spring arm assembly (125) and install bolt assembly (30), washer (45, 47) and nut (65). Install bolt assembly (30) with grease. Tighten nut (65) to 60-80 lb-ins. then install washer (50) and nut (70, 72). Tighten nut (70, 72) to 30-40 lb-ins. Do not retighten nut (65).

D. Install springs (20, 25) on spring arm assembly (125). Position wrenching strap (10) and eyebolts (15) on springs (20, 25). Install eyebolts (15) with grease on cam roller arm assembly (80) and install fine adjustment nuts (5). Thread nuts (7) loosely on eyebolts (15).

NOTE: Spring tension adjustment will be completed upon installation.

3. Assembly of Rudder Control Aft Quadrant Assembly (IPL Fig. 2)

A. Install bearing (270) in support assembly (255) with BMS 5-95 sealant.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

B. Fay seal bearing (270) with BMS 5-95 sealant.

C. Install bearings (150, 195, 310) and bushings (140, 145, 155) in quadrant assembly (170) with 3-33 grease as shown in Fig. 701.

D. Install bolt assemblies (115, 205, 290) as follows:

(1) Install using BMS 3-33 grease as shown in SOPM 20-50-03 and Fig. 701.

(2) Torque nuts (160, 245, 320) to 60-80 in-lbs.

CAUTION: DO NOT RESET TORQUE VALUE OF NUTS (160, 245, 320) AFTER SETTING VALUE OF NUTS (165, 250, 325).

(3) Torque nuts (165, 250, 325) to 30-40 in-lbs.

E. Install transducer (105) as follows:

(1) Install bushings (85, 90) and bolts (80) with BMS 3-33 grease as shown in SOPM 20-50-03 and Fig. 701.

(2) Adjust transducer installation to set an equal distance gap (±0.0025) at both ends and set the radius between the offset tube (340) and the quadrant (200) at 2.115 to 2.135 as shown in Fig. 701.

(3) Lockwire and install tamperproof seal per SOPM 20-50-02 (double twist method) as shown in Fig. 701.

F. Attach the jumper (110) to the transducer as shown in SOPM 20-11-03 and apply BMS 5-142 sealant as shown in Fig. 701

G. On jumper (110) verify installation or install 1 or 2 wraps of scotch 79, teflon tape (color optional) to mark installation locations as shown in Fig. 701.

H. Verify installation or install black spiral wrap on jumper (110) in clamp locations "B" and "C" as shown in Fig. 701.

I. Assemble wrenching strap (20) and both eye bolts (5) to arm (335).

J. Install (turn threads of) both fine adjustment nuts (10) and check nuts (15) loosely into position shown in Fig. 701.

K. Install springs (25, 30) as follows:

(1) Assembly shall be pivoted at Joints A and B and grounded at Joint C as shown in Fig. 701.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

(2) Force shall be applied to quadrant tangentially to quadrant radius via a short cable or twine attached to quadrant and laying in plane of cable groove.

(3) Provisions shall be made for applying force in both directions

(4) Install spring (30) and adjust nut (10) (with check nut (15) loose) as required to achieve a breakout force in clockwise direction of 4.4 to 4.8 lbs.

NOTE: One half turn equals approximately 0.3 lbs.

(5) Install spring (25) and adjust nut (10) (with check nut (15) loose) as required to achieve a breakout force in clockwise direction of 9.1 to 9.5 lbs (both springs combined).

NOTE: One half turn equals approximately 0.3 lbs.

(6) Perform AFT Quadrant Assembly Functional Test as shown in Check Section.

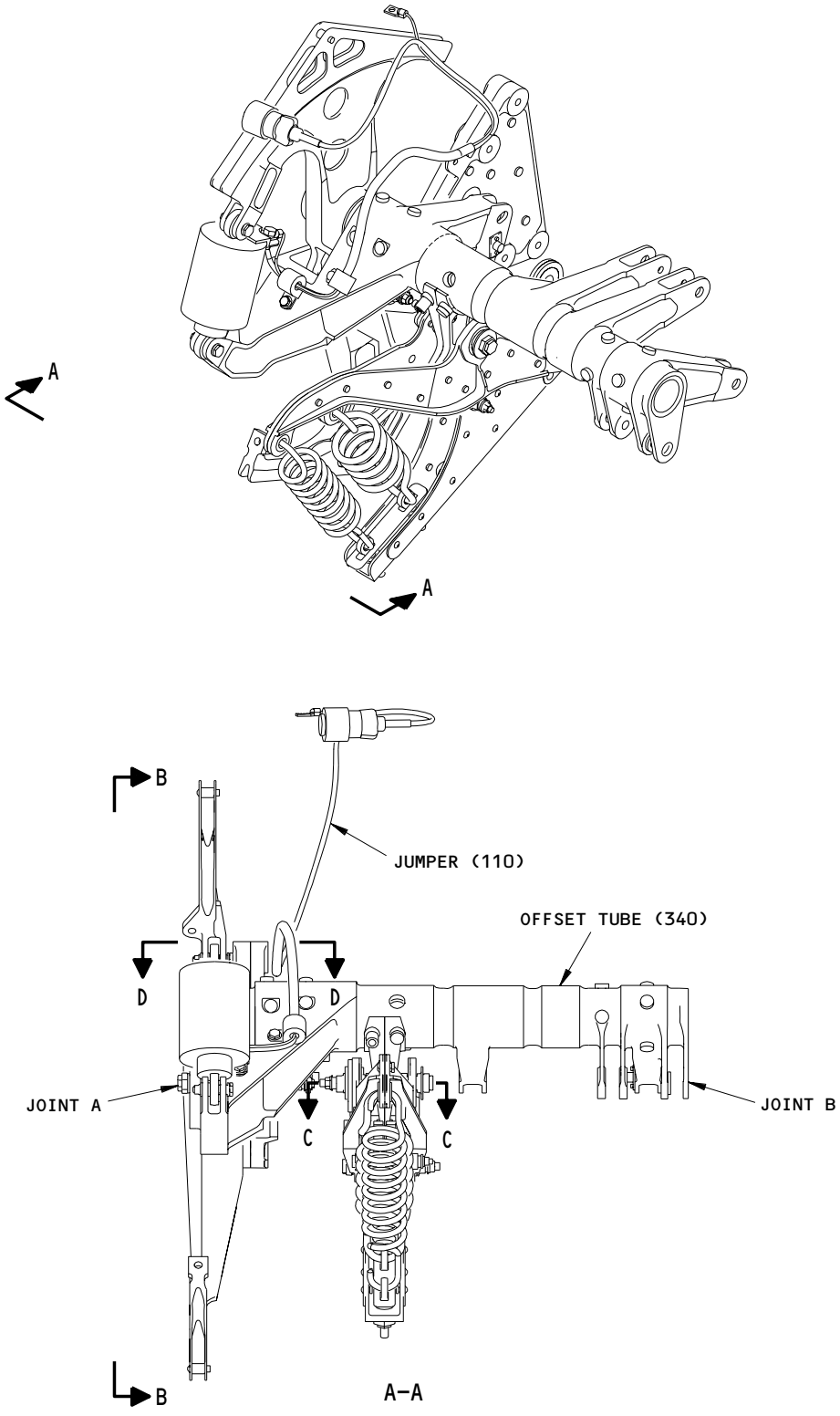
(7) Torque both check nuts (15) to 50-75 in-lbs.

(8) Lockwire nuts (15) and install tamperproof seal per SOPM 20-50-02 (double twist method) as shown in Fig. 701.

4. Storage

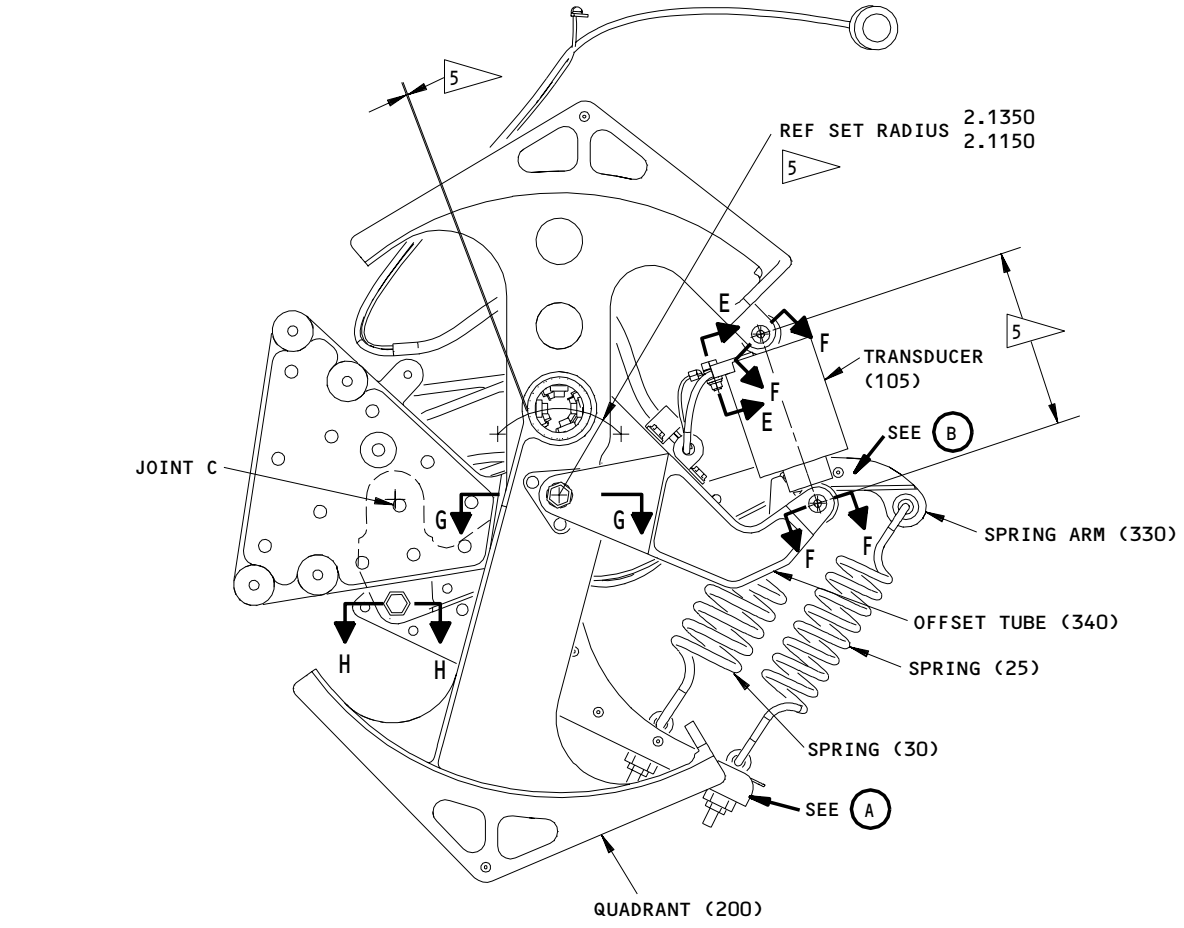
A. Store this component using standard industry practices.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

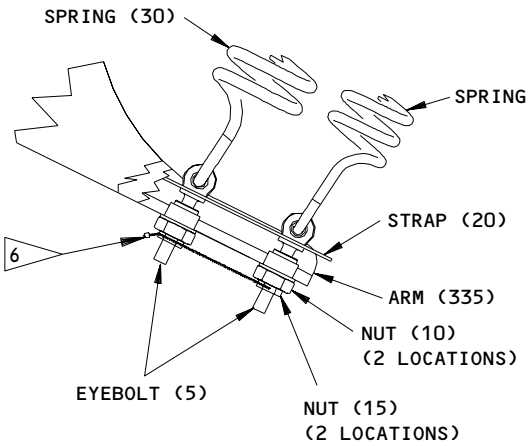


Aft Quadrant Assembly
Figure 701 (Sheet 1)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

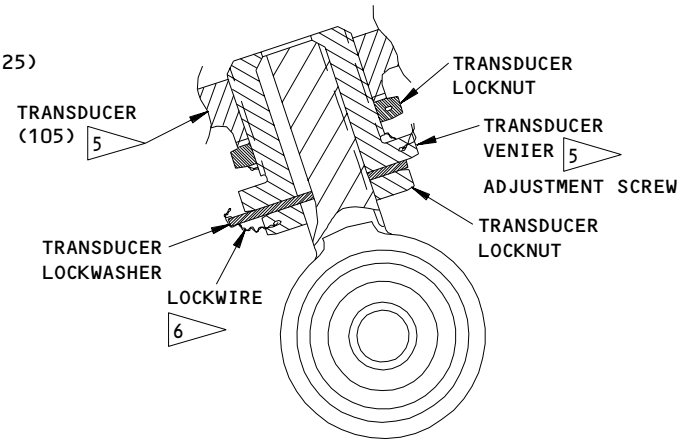


B–B



NOTE: QUADRANT (170) NOT SHOWN FOR CLARITY.

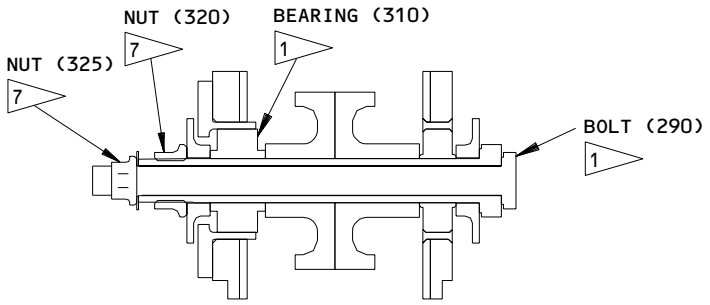
A



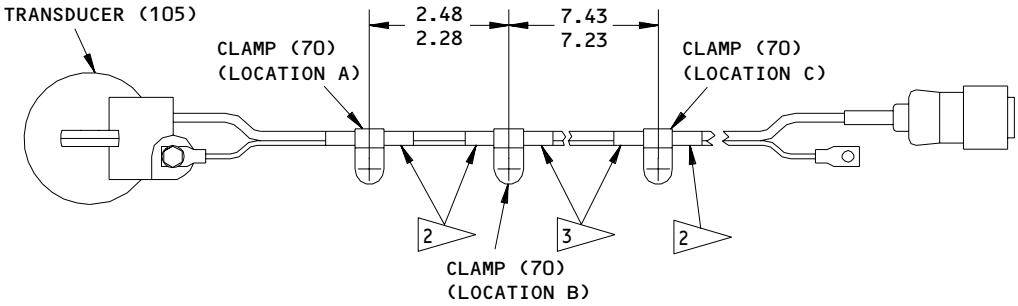
B

Aft Quadrant Assembly
Figure 701 (Sheet 2)

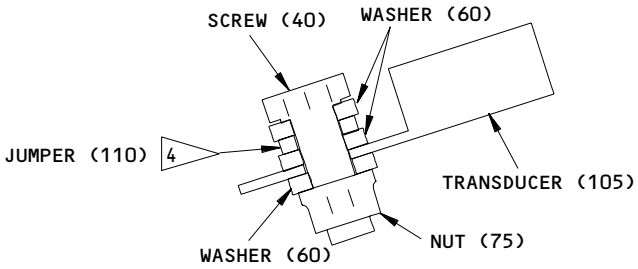
BOEING PROPRIETARY – Copyright (C) – Unpublished Work – See title page for details.



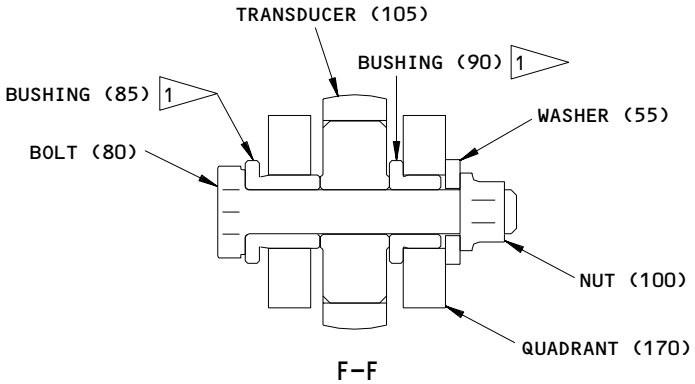
C-C



D-D



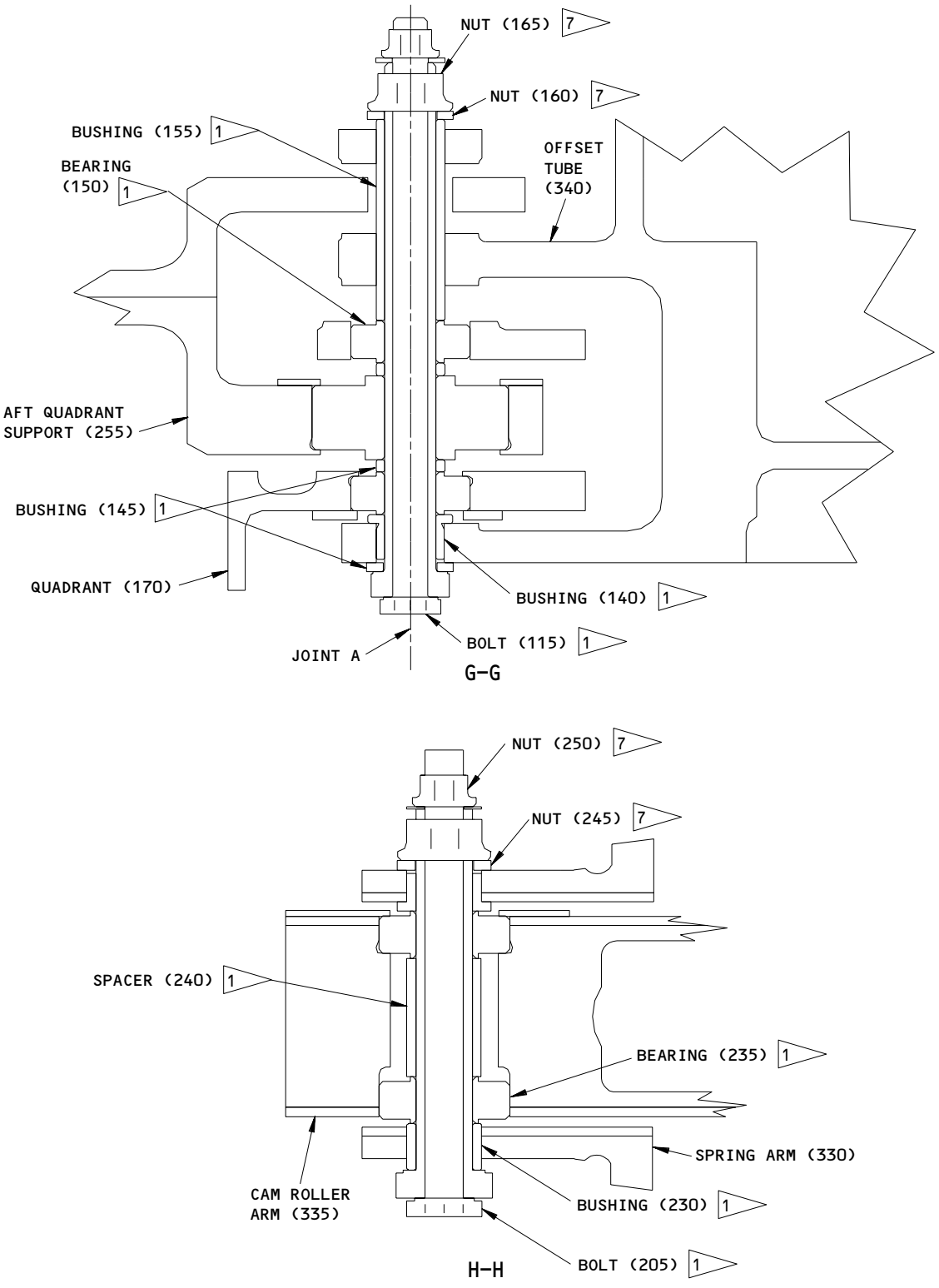
E-E



F-F

Aft Quadrant Assembly
Figure 701 (Sheet 3)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Aft Quadrant Assembly
Figure 701 (Sheet 4)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

1 INSTALL WITH BMS 3-33 GREASE AS SHOWN IN SOPM 20-50-03.

2 APPLY 1 OR 2 WRAPS OF SCOTCH 79, TEFLON TAPE (COLOR OPTIONAL) TO MARK INSTALLATION LOCATIONS.

3 INSTALL HEIGHT 0.25 INCH BLACK SPIRAL WRAP MANUFACTURED BY M.N. NEWMAN CORP. OVER CABLES FROM AND THROUGH EACH NOTED CLAMP INSTALLATION LOCATIONS "B" AND "C".

4 INSTALL JUMPER AS SHOWN IN SOPM 20-11-03 AND APPLY BMS R-142 SEALANT.

5 USE TRANSDUCER VENIER ADJUSTMENT TO SET EQUAL DISTANCE GAP (±0.0025) AT BOTH ENDS AND TO SET RADIUS BETWEEN THE OFFSET TUBE AND QUADRANT.

6 LOCKWIRE AND INSTALL TAMPER PROOF SEAL AS SHOWN IN SOPM 20-50-02 (DOUBLE TWIST METHOD).

7 DO NOT RESET TORQUE VALUE OF NUTS (160, 245, 320) AFTER SETTING VALUE OF NUTS (165, 250, 325).

Aft Quadrant Assembly
Figure 701 (Sheet 5)

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FITS AND CLEARANCES

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	7	NUT	50-75	
1	65,105	NUT	60-80	
1	70,72,110	NUT	30-40	
2	15	NUT	50-75	
2	160,245,320	NUT	60-80	
2	165,250,325	NUT	30-40	

* REFER TO SOPM 20-50-01 FOR TORQUE VALUES OF STANDARD FASTENERS.

Torque Table
Figure 801

170363

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

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.

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

VENDORS

15653 MICRODOT AEROSPACE FASTENING SYS DIV OF MICRODOT INC
800 SOUTH COLLEGE BLVD PO BOX 3001
FULLERTON, CALIFORNIA 92634

21335 TEXTRON INC FAFNIR BEARING DIVISION
37 BOOTH STREET
NEW BRITAIN, CONNECTICUT 06050

22863 KAVLICO CORP
14501 E LOS ANGELES AVE
MOORPARK, CALIFORNIA 93021-9738

30163 DAYRON CORP
333 MAGUIRE BLVD PO BOX 20394
ORLANDO, FLORIDA 32814

38443 TRW INC BEARING DIV
402 CHANDLER STREET
JAMESTOWN, NEW YORK 14701

43991 FAG BEARING INCORPORATED
HAMILTON AVENUE
STAMFORD, CONNECTICUT 06904

52828 REPUBLIC FASTENER MFG CORP
1300 RANCHO CONEJO BLVD
NEWBURY PARK, CALIFORNIA 91320

71087 BOOTS ACFT NUT DIV TOWNSEND CO SEE TEXTRON INC CHERRY
FASTENER TOWNSEND DIV V11815

72962 AMERACE CORP ESNA DIV
2330 VAUXHALL ROAD
UNION, NEW JERSEY 07083

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

VENDORS

77896 REXNORD CORP BEARING OPN
2400 CURTISS STREET
DOWNERS GROVE, ILLINOIS 60515-4307

80539 SPS TECHNOLOGIES INC AEROSPACE PRODUCTS DIV
2701 SOUTH HARBOR BOULEVARD PO BOX 1259
SANTA ANA, CALIFORNIA 92702

92215 VOI-SHAN DIV OF VSI CORP SUB OF FAIRCHILD INDUSTRIAL INC
8463 HIGUERA STREET
CULVER CITY, CALIFORNIA 90230

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
AN960PD416L		1	50	AR
		1	100	1
AN960PD616		1	45	AR
BACB10AC6A		1	120	1
		1	75A	1
BACB10FP06A		2	35	1
BACB10FP6A		1	75B	1
		1	120B	1
BACB10FS06J		2	50	1
		2	95	1
BACB28X3C016		2	90	2
BACB28X3C026		2	85	2
BACB28Y6C009		2	45	2
BACB28Y6C147		2	55	1
BACB30NM3K13		2	80	2
BACC10DK4		2	70	2
BACJ40A20-26		2	10	1
BACN10JC4		1	72	1
		1	110	1
BACN10JC4CD		1	65A	AR
BACN10JC6		1	65	A9
		1	105	1
BACN10JC6CD		1	72	1
BACN10YR3CD		2	00	2
		2	75	3
BACN10YR4CD		2	25	1
		2	50	1
		2	65	1
BACN10YR6CD		2	20	1
		2	45	1
		2	60	1
BACP20BA1		2	65	2
BACR15BA4AD		2	60	3
BACR15BA5AD		2	85	3
BACR15BB5AD		2	75	12
BACR15FT5KE		2	75	2
BACS12GU3K11		2	35	2
BACW10BP3APU		2	60	3
BRH10A4		1	72	1
BRH10A6		1	65	A9
GM10242		2	05	1
HHKSP6A		1	120	1
H10-4BAC		1	70	AR
		1	110	1
H10-6BAC		1	65	AR
		1	105	1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
KSP6A		1	75	
		1	120	1
KSP6AE9440A		1	120	1
KSP6AFS428		1	120	1
KSP6AG27		1	120	1
KSP6A2TS		1	120	1
MS21042L4		1	110A	1
MS21042L6		1	105A	1
MS27649-6G		1	120A	1
		2	10	1
NAS1149D0316J		2	45	2
NAS1149D0332J		2	50	2
NAS1149D0363J		2	55	2
NAS1149D0416J		1	50A	AR
		1	100A	1
		2	15	1
		2	25	1
NAS1149D0432J		2	35	1
NAS1149D0663J		1	47	AR
		2	20	1
		2	30	2
NAS1149E0363P		2	95	2
NAS1423-4		1	7	2
		2	15	2
NAS1802-3-9		2	40	1
NAS42DD5-26		2	80	2
NAS6704U39		1	35	1
NAS6704U41		1	35A	1
		2	15	1
NAS6704U47		1	90	1
NAS6704U49		1	90A	1
		2	00	1
NAS6704U61		2	25	1
NS202101-048		1	72	1
RMLH9075-4W		1	72	1
RMLH9075-6		1	65	A9
SA6-23A1-501		2	70	1
S012T236-400		2	70	1
S253T401-3		2	05	1
T6S428J		1	72	1
VN303A048		1	72	1
251T0200-10		1	95	1
		2	95	1
251T0200-11		1	30	1
251T0200-12		1	40	1
		2	10	1

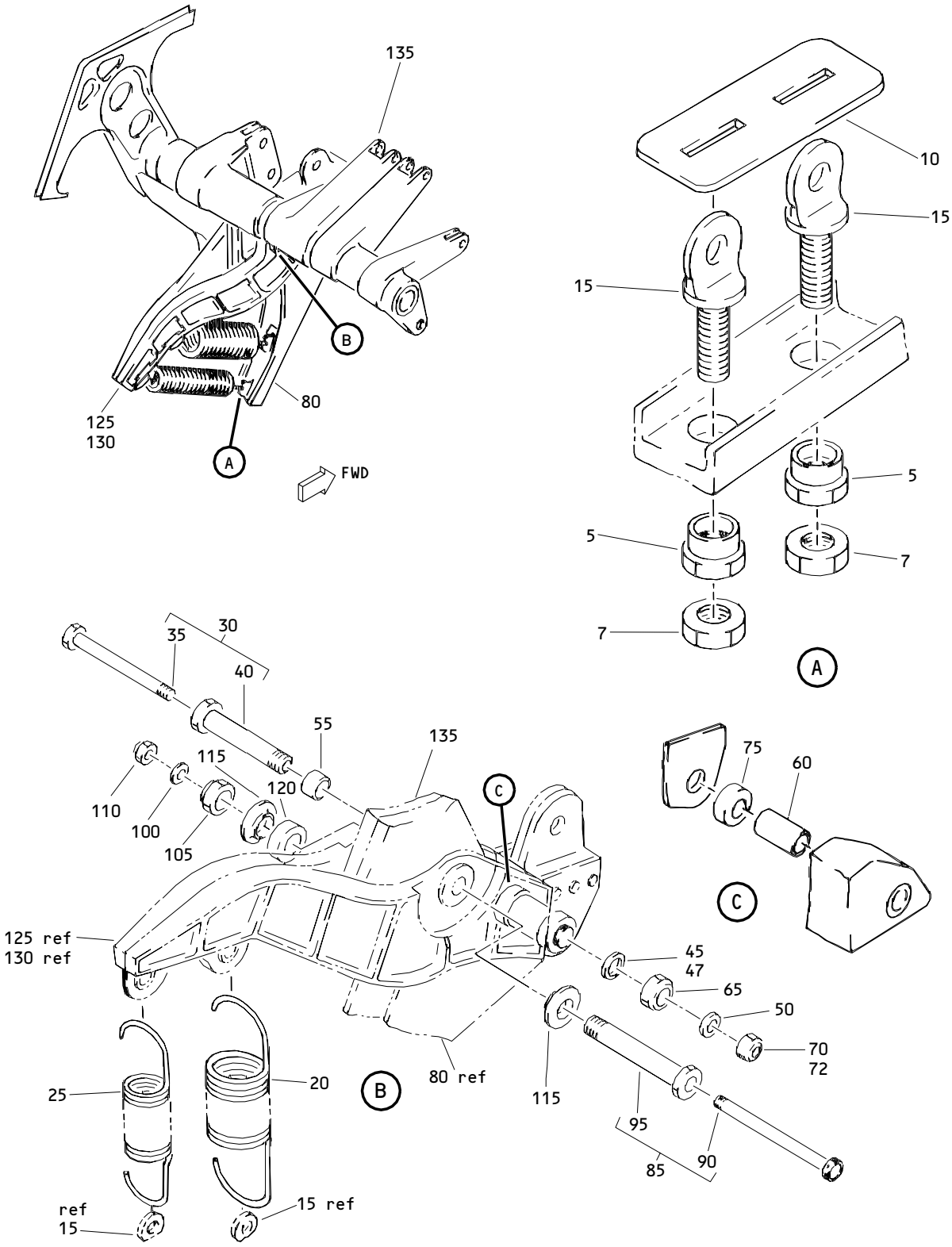
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
251T0200-65		1	85A	1
		2	90	1
251T0200-66		1	30A	1
		2	05	1
251T0200-70		2	15	1
251T0200-71		2	20	1
251T0200-9		1	85	1
251T3120-1		1	1G	RF
		2	1A	RF
251T3200-2		1	1	RF
251T3200-3		1	1A	RF
251T3200-4		1	1B	RF
251T3200-6		1	1C	RF
251T3200-7		1	1D	RF
251T3200-8		1	1E	RF
251T3200-9		1	1F	RF
251T3210-11		1	135	1
251T3210-12		1	135A	1
251T3210-13		1	135B	1
251T3210-14		1	135C	1
251T3210-15		1	135D	1
251T3210-17		1	135E	1
251T3210-18		2	40	1
251T3215-19		2	00	1
251T3215-20		2	70	1
251T3216-10		1	80A	1
		2	35	1
251T3216-7		1	80	1
251T3220-7		1	130	1
251T3224-1		1	115	2
		2	05	2
251T3237-2		1	60	1
		2	40	1
251T3237-3		1	60A	1
251T3238-1		1	125	1
251T3238-5		1	125A	1
		2	30	1
251T3250-1		1	10	1
		2	20	1
251T3253-1		1	15	2
251T3253-2		1	15A	2
		1	15B	2
		2	5	2
251T3254-1		1	5	2
		2	10	2
251T3255-1		1	20	1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
251T3255-2		1	20A	1
		2	30	1
251T3256-1		1	25	1
251T3256-2		1	25A	1
		2	25	1
251T3414-1		2	55	1
251T3414-2		2	80	1
251T3414-3		2	85	1
251T3453-3		2	65	1
251T3453-4		2	90	1
251T3741-11		1	55	1
		2	30	1
251T3742-38		2	40	1
96-048		1	72	1
96-064		1	65	A9

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Feel Centering Assembly
Figure 1

T99167

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	251T3200-2		CENTERING ASSY-RUD CONT FEEL	A	RF
-1A	251T3200-3		CENTERING ASSY-RUD CONT FEEL	B	RF
-1B	251T3200-4		CENTERING ASSY-RUD CONT FEEL	C	RF
-1C	251T3200-6		CENTERING ASSY-RUD CONT FEEL	D	RF
-1D	251T3200-7		CENTERING ASSY-RUD CONT FEEL	E	RF
-1E	251T3200-8		CENTERING ASSY-RUD CONT FEEL	F	RF
-1F	251T3200-9		CENTERING ASSY-RUD CONT FEEL	G	RF
-1G	251T3120-1		QUADRANT ASSY-RUD CONT AFT (SEE IPL Fig. 2)	H	RF
5	251T3254-1		.NUT-FINE ADJUSTING		2
7	NAS1423-4		.NUT		2
10	251T3250-1		.STRAP-WRENCHING		1
15	251T3253-1		.EYEBOLT-FINE ADJUSTING (OPT ITEM 15B)	A	2
-15A	251T3253-2		.EYEBOLT-FINE ADJUSTING	B-G	2
-15B	251T3253-2		.EYEBOLT-FINE ADJUSTING (OPT ITEM 15)	A	2
20	251T3255-1		.SPRING-TNSN	A-E	1
20A	251T3255-2		.SPRING-TNSN	F,G	1
25	251T3256-1		.SPRING-TNSN	A-E	1
25A	251T3256-2		.SPRING-TNSN	F,G	1
30	251T0200-11		.BOLT ASSY	A-D	1
30A	251T0200-66		.BOLT ASSY	E,F,G	1
35	NAS6704U39		..BOLT	A-D	1
35A	NAS6704U41		..BOLT	E-G	1
40	251T0200-12		..BOLT-OUTER HOLLOW		1
45	AN960PD616		.WASHER	A-E	AR
47	NAS1149D0663J		.WASHER	F,G	AR
50	AN960PD416L		.WASHER	A-E	AR
50A	NAS1149D0416J		.WASHER	F,G	AR
55	251T3741-11		.BUSHING		1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
60	251T3237-2		.SPACER-		1
			(OPT ITEM 60A)		
-60A	251T3237-3		.SPACER-		1
			(OPT ITEM 60)		
65	H10-6BAC		.NUT-	A-E	AR
			(V15653)		
			(SPEC BACN10JC6)		
			(OPT RMLH9075-6		
			(V72962))		
			(OPT 96-064		
			(V80539))		
			(OPT BRH10A6		
			(V52828))		
65A	BACN10JC4CD		.NUT-	F,G	AR
70	H10-4BAC		.NUT-	A-E	AR
72	BACN10JC6CD		.NUT-	F-G	1
			(V15653)		
			(SPEC BACN10JC4)		
			(OPT NS202101-048		
			(V80539))		
			(OPT RMLH9075-4W		
			(V72962))		
			(OPT T6S428J		
			(V71087))		
			(OPT VN303A048		
			(V92215))		
			(OPT 96-048		
			(V80539))		
			(OPT BRH10A4		
			(V52828))		
75	KSP6A		DELETED		
75A	BACB10AC6A		.BEARING		1
			(OPT ITEM 75B)		
75B	BACB10FP6A		.BEARING		1
			(OPT ITEM 75A)		
			(V43991))		
80	251T3216-7		.ARM ASSY-CAM ROLLER	A-F	1
			(REF CMM 27-21-59)		
80A	251T3216-10		.ARM ASSY-CAM ROLLER	G	1
			(REF CMM 27-21-59)		
85	251T0200-9		.BOLT ASSY	A-D	1
85A	251T0200-65		.BOLT ASSY	E-G	1
90	NAS6704U47		..BOLT	A-D	1
90A	NAS6704U49		..BOLT	E-G	1

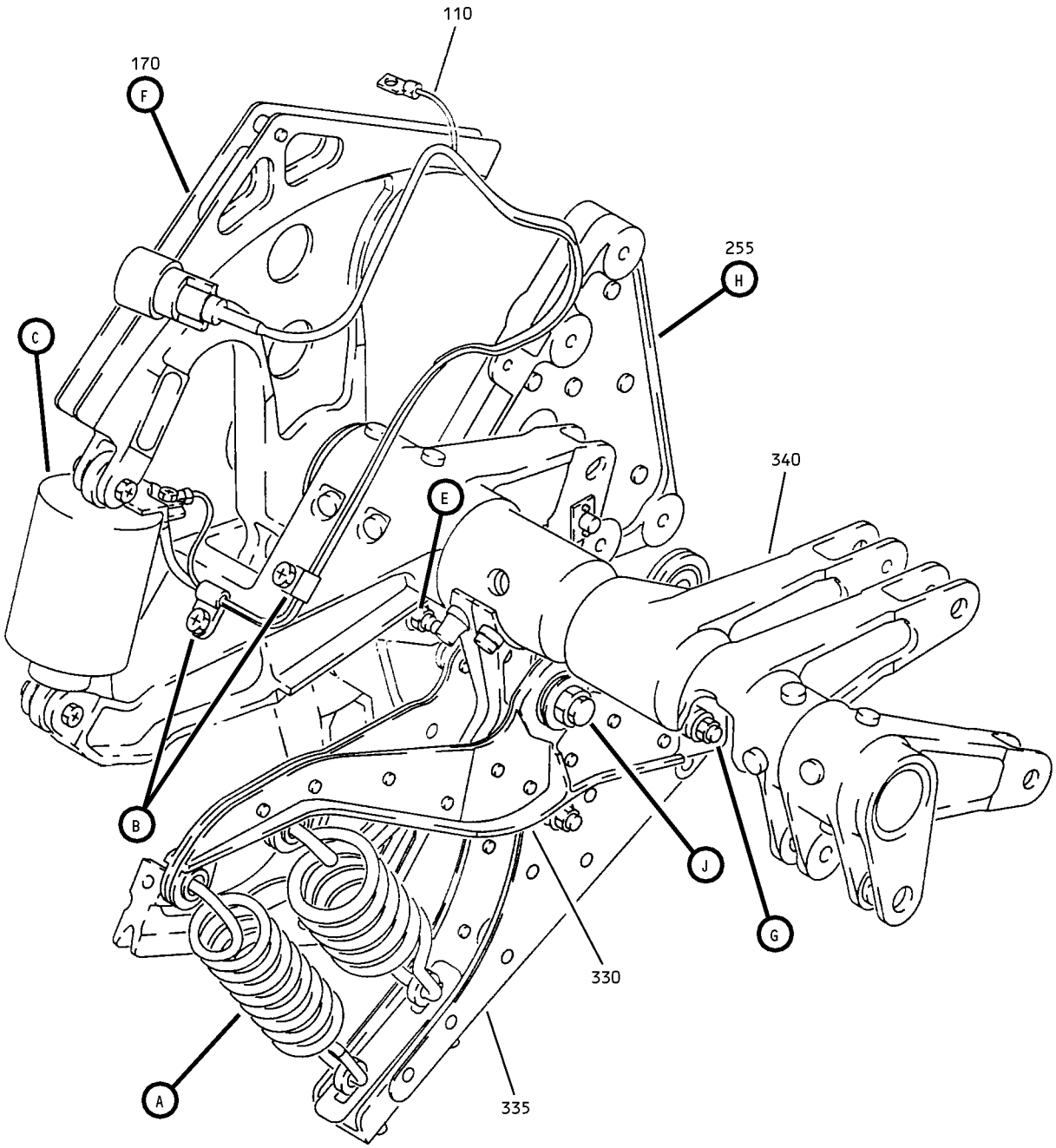
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
95	251T0200-10		..BOLT-OUTER HOLLOW		1
100	AN960PD416L		.WASHER	A-E	1
100A	NAS1149D0416J		.WASHER	F,G	1
105	H10-6BAC		.NUT (V15653) (SPEC BACN10JC6) (REFER TO ITEM 65 FOR OPT PARTS)	ABC	1
-105A	MS21042L6		.NUT	DEFG	1
110	H10-4BAC		.NUT (V15653) (SPEC BACN10JC4) (REFER TO ITEM 70 (FOR OPT PARTS)	ABC	1
-110A	MS21042L4		.NUT	DEFG	1
115	251T3224-1		.RETAINER		2
120	KSP6A		.BEARING (V38443) (SPEC BACB10AC6A) (OPT HHKSP6A (V38443)) (OPT KSP6AE9440A (V21335)) (OPT KSP6AFS428 (V21335)) (OPT KSP6A2TS (V43991)) (OPT KSP6AG27 (V30163)) (OPT ITEM 120B)	ABC	1
-120A	MS27649-6G		.BEARING	D-G	1
-120B	BACB10FP6A		.BEARING (OPT ITEM 120)	A-C	1
125	251T3238-1		.SPRING ARM ASSY (OPT ITEM 130) (REF CMM 27-21-59)	ABC	1
-125A	251T3238-5		.SPRING ARM ASSY (REF CMM 27-21-59)	D-G	1
130	251T3220-7		.SPRING ARM ASSY (OPT ITEM 125) (REF CMM 27-21-59)	A-C	1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-135	251T3210-11		.TUBE ASSY-TORQUE (OPT ITEMS 135A, 135B) (REF CMM 27-21-43)	AB	1
-135A	251T3210-12		.TUBE ASSY-TORQUE (OPT ITEMS 135, 135B) (REF CMM 27-21-43)	AB	1
-135B	251T3210-13		.TUBE ASSY-TORQUE (OPT ITEMS 135, 135A) (REF CMM 27-21-43)	AB	1
-135C	251T3210-14		.TUBE ASSY-TORQUE (OPT ITEM 135D) (REF CMM 27-21-43)	C	1
-135D	251T3210-15		.TUBE ASSY-TORQUE (OPT ITEM 135C) (REF CMM 27-21-43)	C	1
-135E	251T3210-17		.TUBE ASSY-TORQUE (REF CMM 27-21-43)	D-G	1

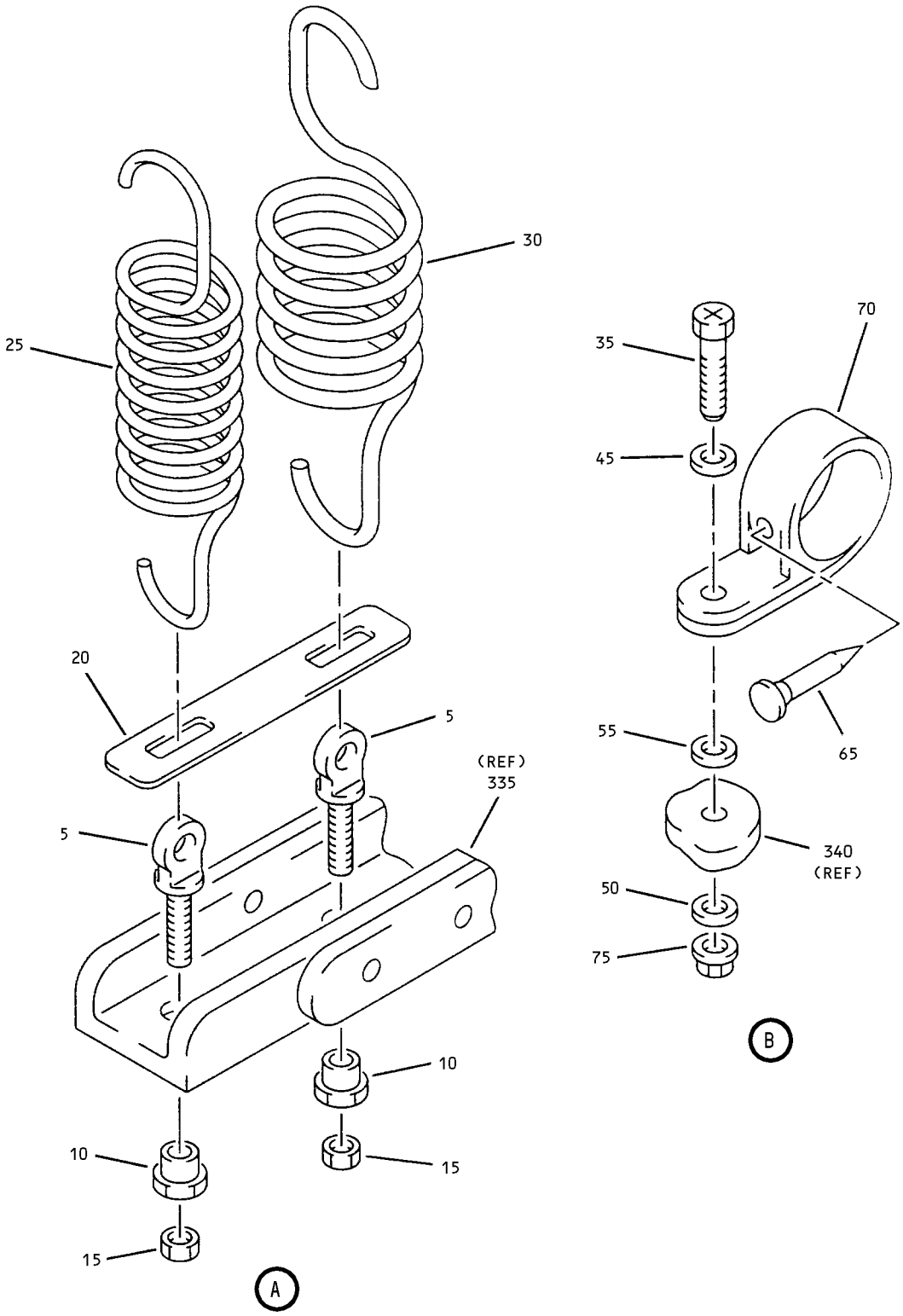
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 1)

K93200

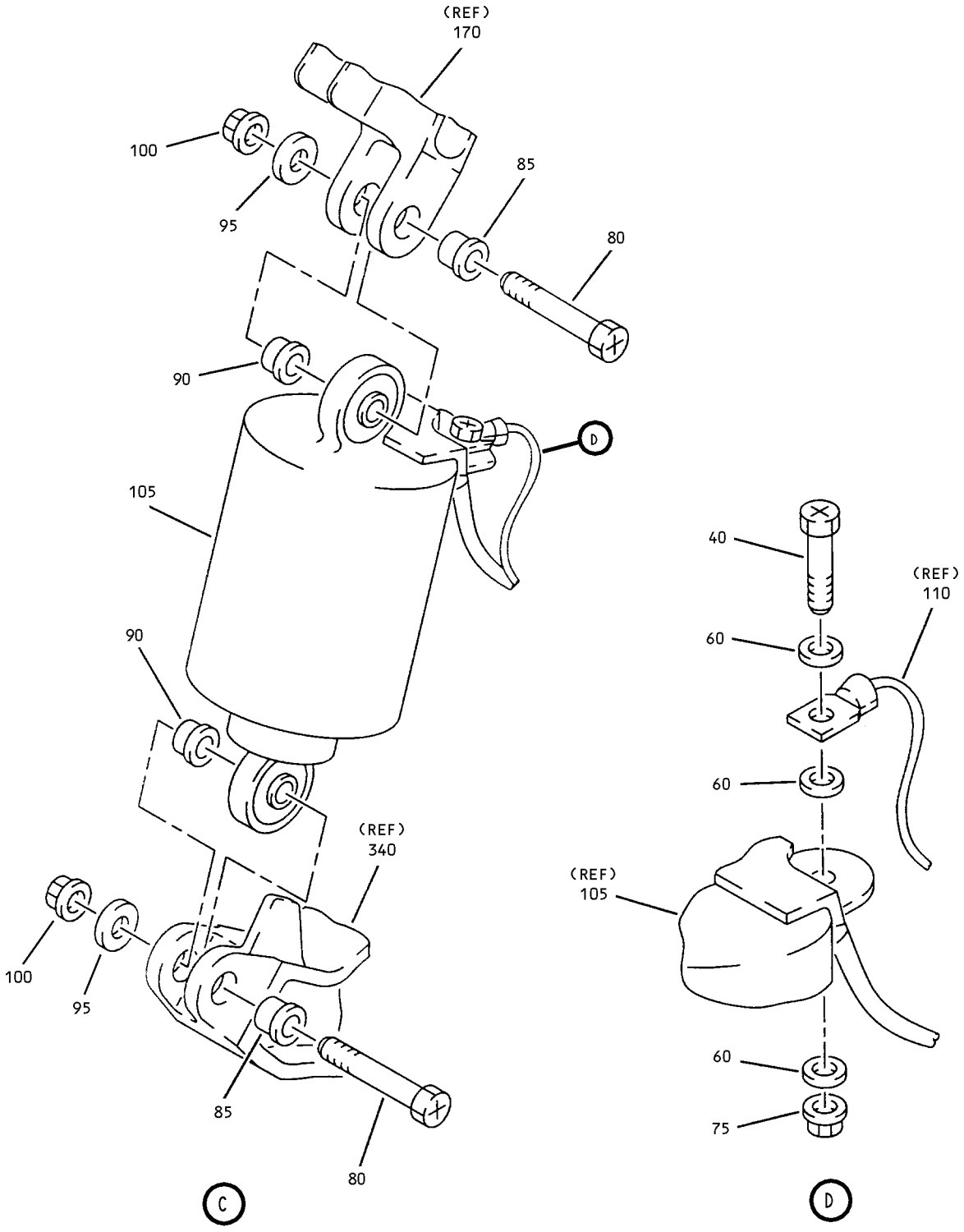
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 2)

K93222

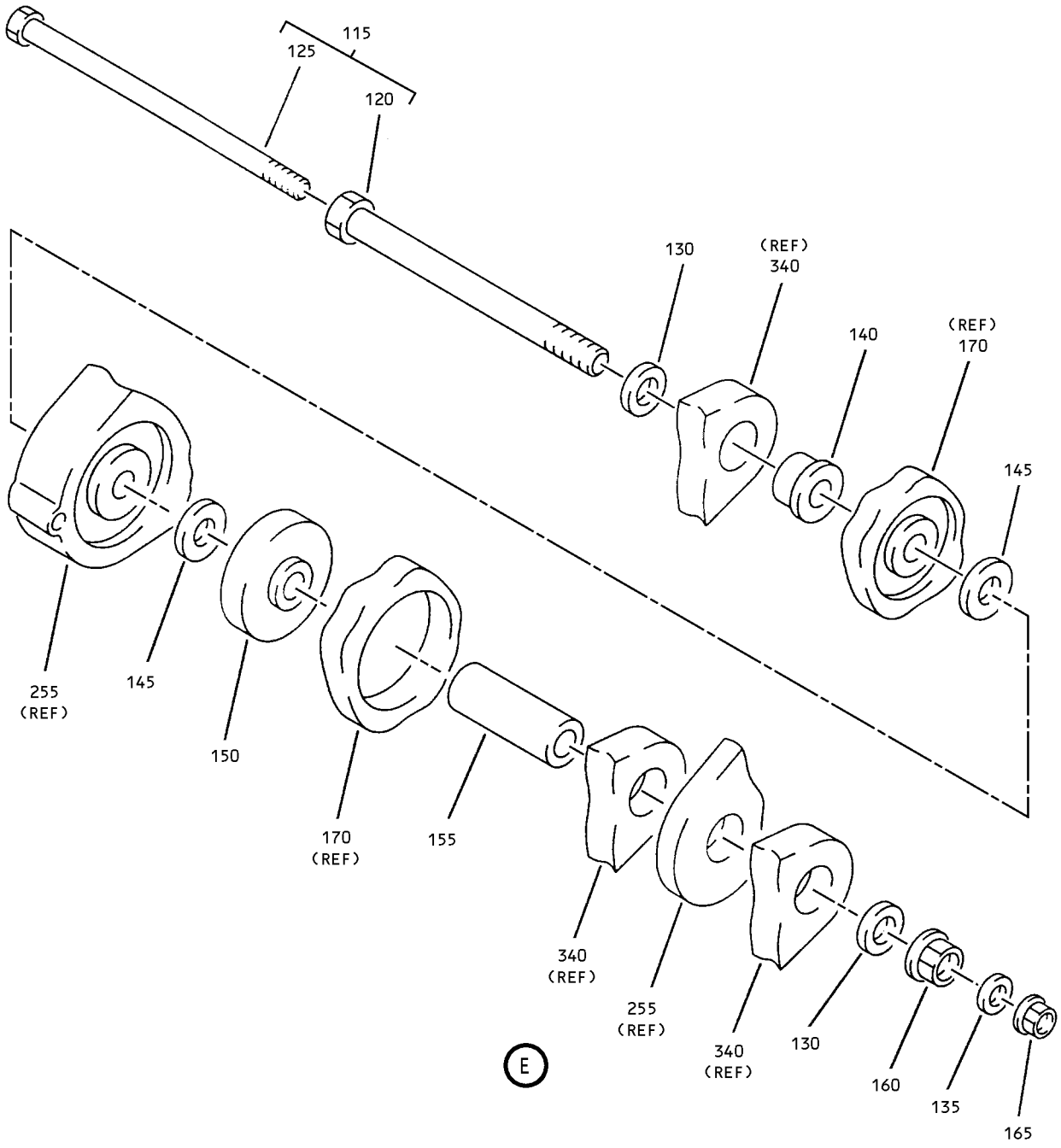
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 3)

K93226

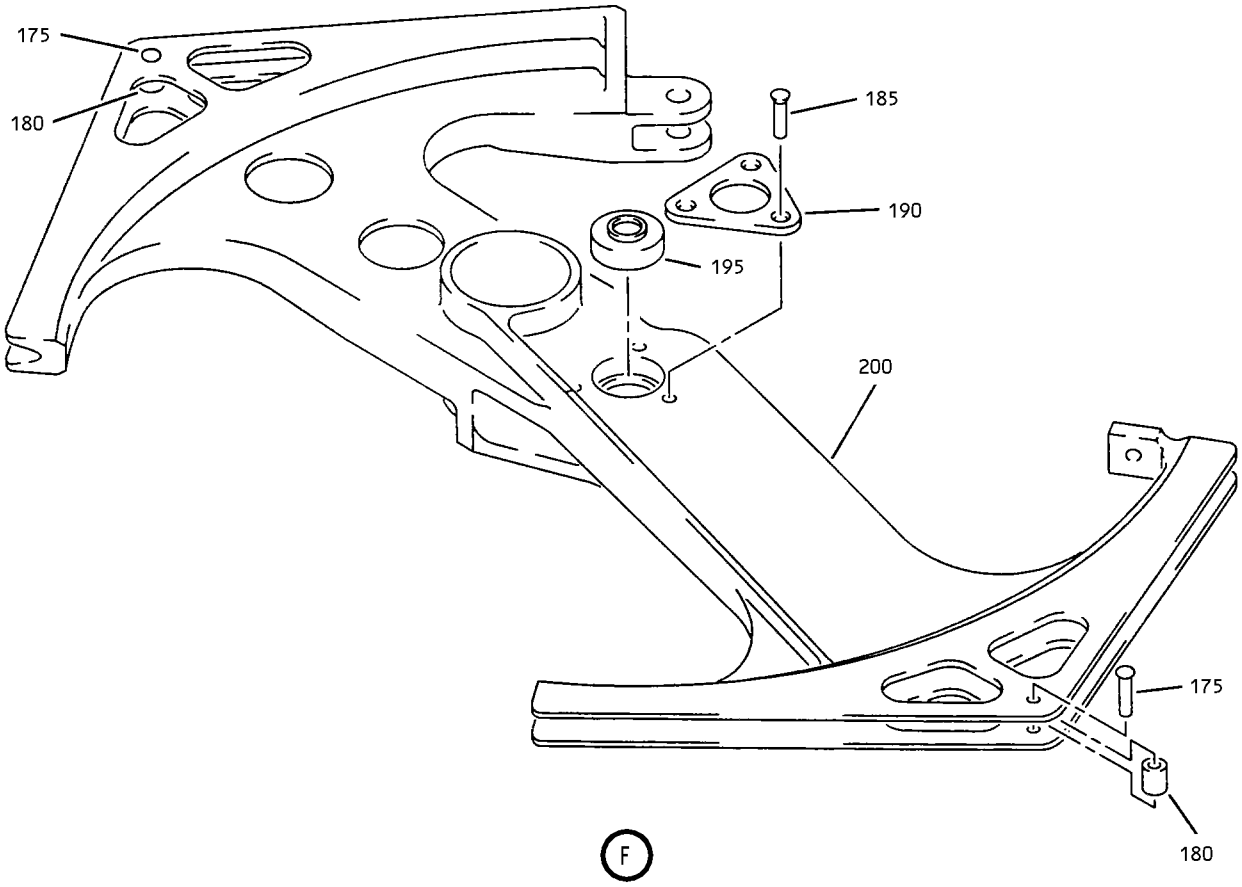
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 4)

K93248

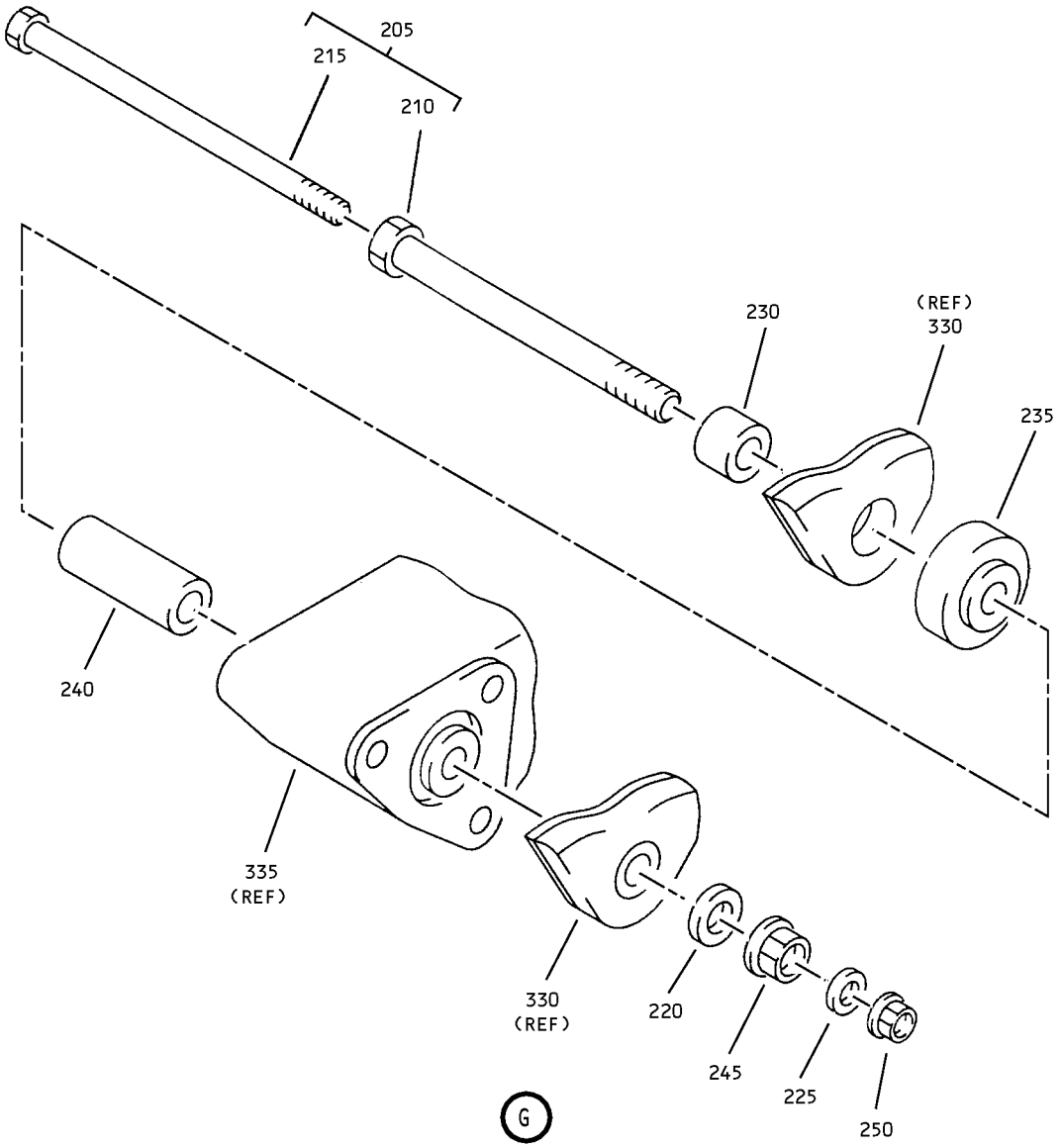
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 5)

K93270

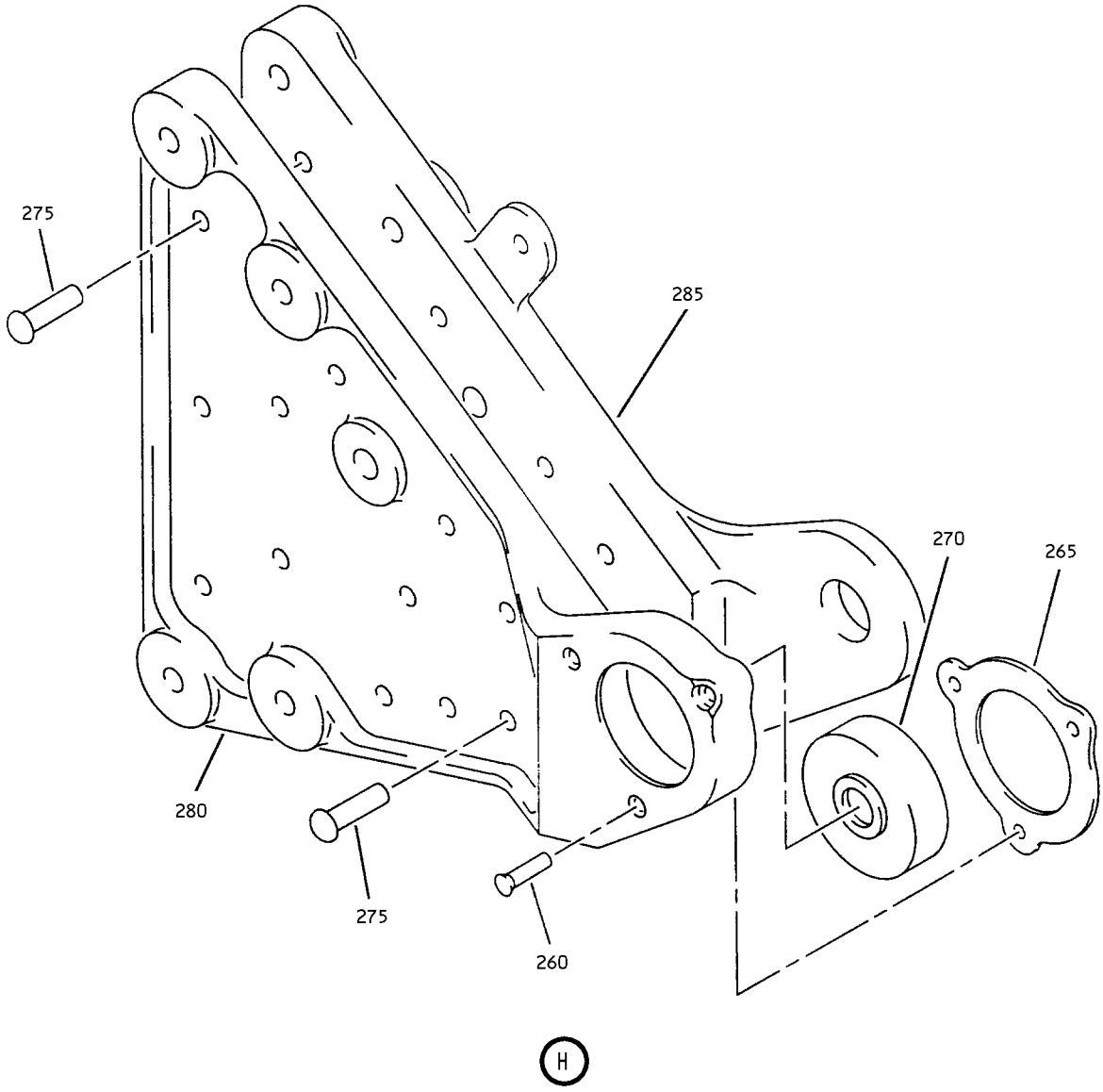
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 6)

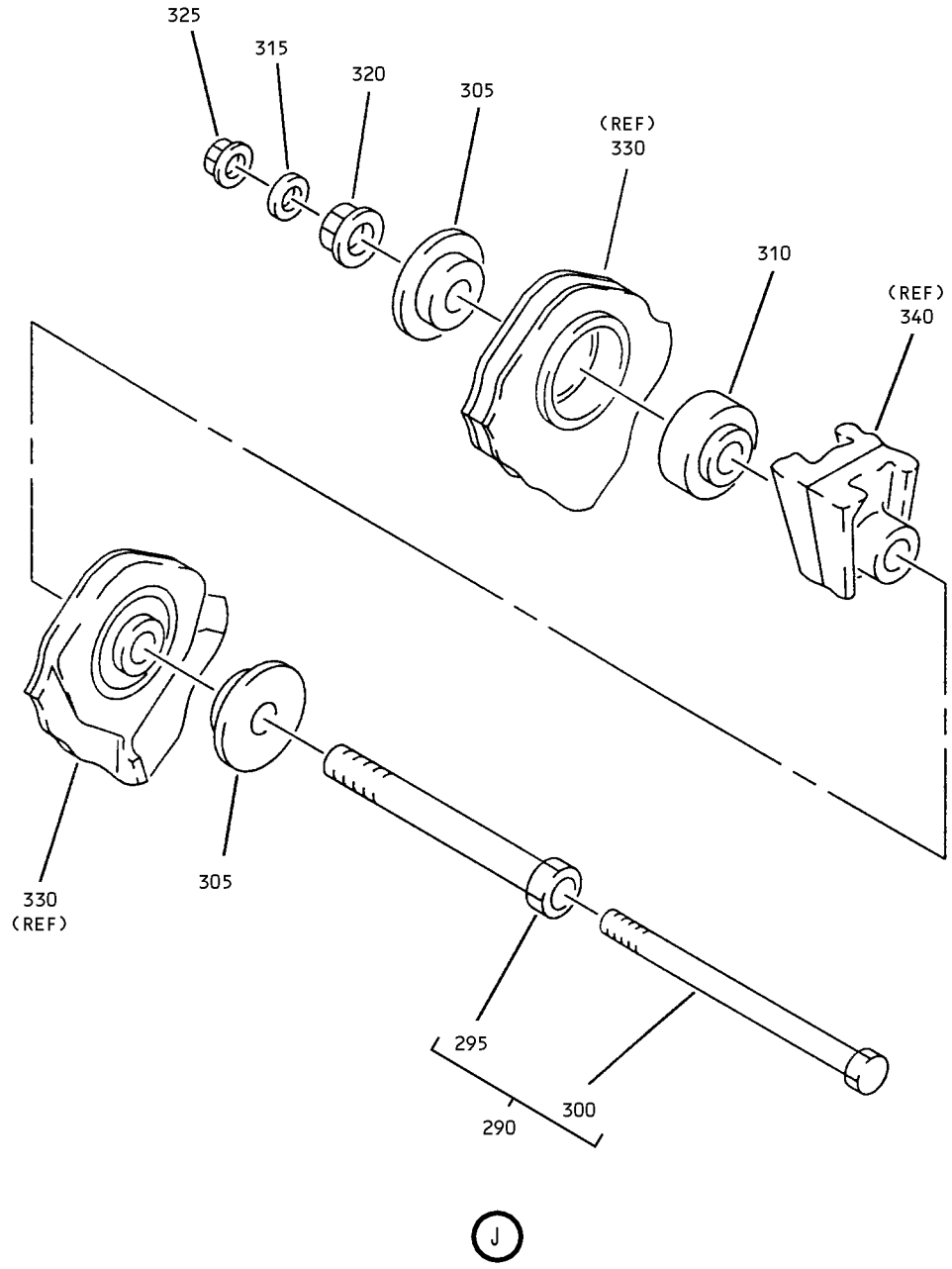
K93297

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 7)

K93300
BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.



Rudder Control Aft Quandrant Assembly
Figure 2 (Sheet 8)

K93302

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
02-					
1A	251T3120-1		QUADRANT ASSY-AFT	H	RF
5	251T3253-2		.EYEBOLT-FINE ADJUST	H	2
10	251T3254-1		.NUT-FINE ADJUST	H	2
15	NAS1423-4		.NUT	H	2
20	251T3250-1		.STRAP-WRENCHING	H	1
25	251T3256-2		.SPRING-TENSION	H	1
30	251T3255-2		.SPRING-TENSION	H	1
35	BACS12GU3K11		.SCREW	H	2
40	NAS1802-3-9		.SCREW	H	1
45	NAS1149D0316J		.WASHER	H	2
50	NAS1149D0332J		.WASHER	H	2
55	NAS1149D0363J		.WASHER	H	2
60	BACW10BP3APU		.WASHER	H	3
65	BACP20BA1		.PLUG	H	2
70	BACC10DK4		.CLAMP	H	2
75	BACN10YR3CD		.NUT	H	3
80	BACB30NM3K13		.BOLT	H	2
85	BACB28X3C026		.BUSHING	H	2
90	BACB28X3C016		.BUSHING	H	2
95	NAS1149E0363P		.WASHER	H	2
100	BACN10YR3CD		.NUT	H	2
105	GM10242		.TRANSDUCER ASSY (V22863) (SPEC S253T401-3)	H	1
110	BACJ40A20-26		.JUMPER	H	1
115	251T0200-70		.BOLT ASSY	H	1
120	251T0200-71		..BOLT-OUTER HOLLOW		1
125	NAS6704U61		..BOLT		1
130	NAS1149D0663J		.WASHER	H	2
135	NAS1149D0432J		.WASHER	H	1
140	251T3742-38		.BUSHING-FLANGED	H	1
145	BACB28Y6C009		.BUSHING	H	2
150	BACB10FS06J		.BEARING	H	1
155	BACB28Y6C147		.BUSHING	H	1
160	BACN10YR6CD		.NUT	H	1
165	BACN10YR4CD		.NUT	H	1
170	251T3215-20		.QUADRANT ASSY	H	1
175	BACR15FT5KE		..RIVET (SIZE DETERMINED ON INST)		2
180	NAS42DD5-26		..SPACER		2
185	BACR15BA5AD		..RIVET (SIZE DETERMINED ON INST)		3
190	251T3453-4		..PLATE-BEARING RETENTION		1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
02-					
195	BACB10FS06J		..BEARING		1
200	251T3215-19		..QUADRANT		1
205	251T0200-66		.BOLT ASSY	H	1
210	251T0200-12		..BOLT-OUTER HOLLOW		1
215	NAS6704U41		..BOLT		1
220	NAS1149D0663J		.WASHER	H	1
225	NAS1149D0416J		.WASHER	H	1
230	251T3741-11		.BUSHING	H	1
235	BACB10FP06A		.BEARING	H	1
240	251T3237-2		.SPACER	H	1
245	BACN10YR6CD		.NUT	H	1
250	BACN10YR4CD		.NUT	H	1
255	251T3414-1		.SUPPORT ASSY-AFT QUADR	H	1
260	BACR15BA4AD		..RIVET (SIZE DETERMINED ON INST)		3
265	251T3453-3		..PLATE		1
270	SA6-23A1-501		..BEARING (V77896) (SPEC S012T236-400)		1
275	BACR15BB5AD		..RIVET (SIZE DETERMINED ON INST)		12
280	251T3414-2		..SUPPORT		1
285	251T3414-3		..SUPPORT		1
290	251T0200-65		.BOLT ASSY	H	1
295	251T0200-10		..BOLT-OUTER HOLLOW		1
300	NAS6704U49		..BOLT		1
305	251T3224-1		.RETAINER	H	2
310	MS27649-6G		.BEARING	H	1
315	NAS1149D0416J		.WASHER	H	1
320	BACN10YR6CD		.NUT	H	1
325	BACN10YR4CD		.NUT	H	1
330	251T3238-5		.SPRINGARM ASSY (REF CMM 27-21-59)	H	1
335	251T3216-10		.ARM ASSY-CAM ROLLER (REF CMM 27-21-59)	H	1
340	251T3210-18		.TUBE ASSY-OFFSET (REF CMM 27-21-43)	H	1

BOEING PROPRIETARY - Copyright (C) - Unpublished Work - See title page for details.