TO: ALL HOLDERS OF NOSE WHEEL STEERING SPRING CARTRIDGE ASSEMBLY COMPONENT MAINTENANCE MANUAL 32-51-51

REVISION NO. 6 DATED JAN 01/92

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
REPAIR 1-1 603 1004-1005	Changed bolt BACB30FM6A quantity 8 to BACB30FM6A3 and BACB30FM6A5 quantity 4 each and rod end BACB10DE607 to BACB10DE6-07.

NOSE WHEEL STEERING SPRING CARTRIDGE ASSEMBLY

PART NUMBER 257T4311-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

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

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

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

PAGE	DATE	CODE
32-51-51		
TITLE PAGE		
1	JUL 10/83	01
2	BLANK	
REVISION RECORD		
1	JUL 10/83	01
2	BLANK	
TR & SB RECORD		
1	JUL 10/83	01
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LIST OF EFFECTIVE PAGES		
*1	JAN 01/92	01
THRU LAST PAGE		
CONTENTS		
1	JUL 10/83	01
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INTRODUCTION		
1	JUL 10/83	01
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DESCRIPTION & OPERATION		
1	JUL 01/90	01.101
2	BLANK	
TESTING & TROUBLE SHOOTING		
101	JUL 10/83	01.1
102	BLANK	
DISASSEMBLY		
301	JUL 01/90	01.1
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CHECK		
501	JUL 10/83	01
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REPAIR-GENERAL		
601	JUL 01/90	01.1
602	BLANK	
REPAIR 1-1		
601	JUL 01/90	01.1
602	JUL 01/90	01.1
*603	JAN 01/92	01.1
604	JUL 01/90	01.1
REPAIR 2-1		
601	JUL 01/90	01.1
602	BLANK	
REPAIR 3-1		
601	JUL 10/83	01
602	BLANK	
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601	JUL 10/83	01
602	BLANK	
ASSEMBLY		
701	JUL 10/83	01.1
702	BLANK	
FITS AND CLEARANCES		
801	JUL 10/83	01
802	BLANK	
SPECIAL TOOLS		
901	JUL 10/83	01.1
902	BLANK	
ILLUSTRATED PARTS LIST		
1001	JUL 10/83	01
1002	JUL 01/90	01.1
1003	BLANK	
*1004	JAN 01/92	01.1
*1005	JAN 01/92	01.1
1006	BLANK	

* = REVISED, ADDED OR DELETED

TABLE OF CONTENTS

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

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, 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.

Verification:

Disassembly	June 10/82
Assembly	June 10/82

NOSE WHEEL STEERING SPRING CARTRIDGE ASSEMBLY

DESCRIPTION AND OPERATION

1. The spring cartridge assembly consists of a steel cylinder, a spring, a steel rod and a cap assembly. The assembly centers the nose wheel during retraction.

2. Leading Particulars (approximate)

   Length (overall) -- 20 inches
   Diameter (outer cylinder) -- 3 inches

TESTING AND TROUBLE SHOOTING

1. Test Equipment and Materials

NOTE: Equivalent substitutes may be used.

A. A32071-1 -- Buildup/Testing Fixture

2. Prepare for Test

A. Mount spring cartridge assembly in buildup/testing fixture A32071-1 minus rodend (15).

3. Test

A. Slowly begin to apply force to cartridge. Extend breakout force shall be 220-270 lbs.

B. Extend cartridge to 1.41 inches. Force shall be 325-375 lbs.

NOTE: Minimum travel shall be 1.41 inches and cartridge shall extend freely with no binding.

C. If binding occurs, disassemble unit per DISASSEMBLY and check spring for defects.

DISASSEMBLY

NOTE: Refer to TESTING/TROUBLE SHOOTING to establish condition or probable cause of any malfunction to determine extent of disassembly and repair.

1. Equipment

   NOTE: Equivalent substitutes may be used.

   A. A32071-1 -- Buildup/Testing Fixture

2. Parts Replacement (IPL Fig. 1)

   NOTE: The following listed parts are recommended for replacement. Actual replacement may be based on in-service experience.

   A. Collars (25)

   B. Lockbolts (20)

3. Disassembly (IPL Fig. 1)

   A. Loosen nut (5) and remove rod end (15) and lockwasher (10) from inner rod (60).

   B. Mount unit in fixture A32071-1.

   WARNING: MAKE SURE UNIT IS CORRECTLY RESTRAINED IN FIXTURE A32071-1 AND USE EXTREME CARE WHEN REMOVING COLLARS (25) AND BOLTS (20) TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO PARTS. SPRING (50) IS HEAVILY LOADED.

   C. Carefully remove collars (25) and bolts (20) on retainer (45).

   D. Slowly release spring (50) until spring is fully expanded. Remove cap assembly (30) and cylinder (55) from spring (50).

   E. Remove inner rod (60), spring (50) and retainer (45) from fixture.

      NOTE: Do not remove cap assembly (30) from cylinder (55) unless necessary for repair or replacement.

CHECK

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

2. Magnetic particle check per 20-20-01

   A. Retainer (45, IPL Fig. 1)

   B. Spring (50)

   C. Cylinder (55)

   D. Rod (60)

3. Penetrant check per 20-20-02 -- Cap (40)

4. Check Spring (50)

   A. Compress spring to a length of 6.41 inches and check that load is 325-375 lbs.

   B. Compress spring to a length of 7.82 inches and check that load is 220-270 lbs.

REPAIR - GENERAL

1. Content

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

P/N	NAME	REPAIR
257T4308	END CAP ASSY	1-1
257T4327	CYLINDER, OUTER	2-1
257T4328	ROD, INNER	3-1
- - -	MISC PARTS REFINISH	4-1

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
   20-42-03 Hard Chrome Plating
   20-42-05 Bright Cadmium Plating
   20-50-03 Bearing Installation & Retention

3. Materials

   NOTE: Equivalent substitutes may be used.

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

   B. Enamel -- BMS 10-60, 707 Gray (Ref 20-60-02)

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

END CAP ASSEMBLY - REPAIR 1-1

257T4308-1, -3

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

1. End Cap Replacement (Fig. 601)

   WARNING: USE EXTREME CARE WHEN REMOVING BOLTS (20) AND COLLARS (25) TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO PARTS. SPRING (50) IS HEAVILY LOADED.

   A. Remove bolts (20, IPL Fig. 1) and collars (25) from cylinder (55) and remove end cap assy (30).

   B. Position new end cap assy (30) in outer cylinder (55) and drill four 0.187-0.190 inch diameter holes, as shown, on replacement. Use the holes on the cylinder (55) as guides for drilling the new end cap assy (30).

   C. Secure end cap (40) to cylinder (55) with bolts (20) and collars (25).

2. Bearing Replacement (Fig. 601) (Ref 20-50-03)

   A. Remove bearing (35, IPL Fig. 1) from end cap (40).

   B. Install new bearing with BMS 3-24 grease.

   C. Roller swage bearing (both sides) over housing.

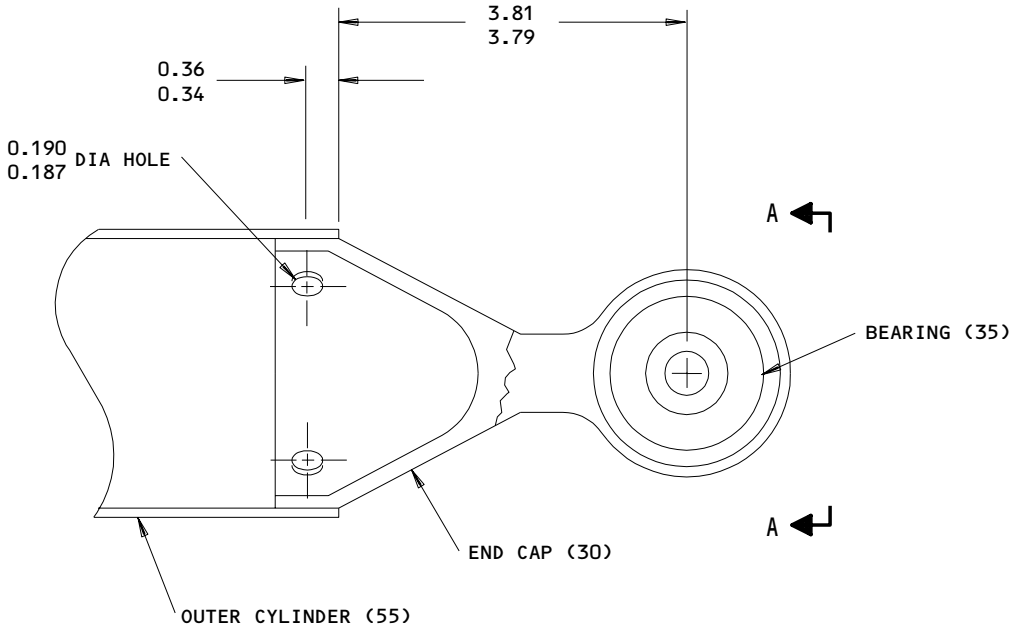
3. Lube Fitting Replacement (257T4308-3 only) (Fig. 601)

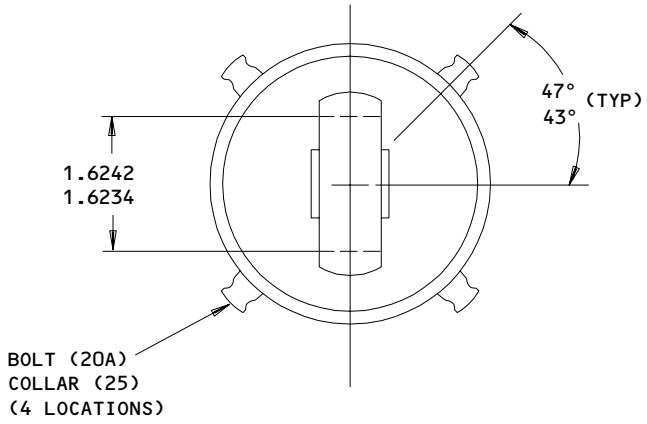
   A. Install lube fitting (42).

   B. Fill grease passage with BMS 3-24 grease.

4. Refinish

A. Apply enamel as shown in Fig. 601.



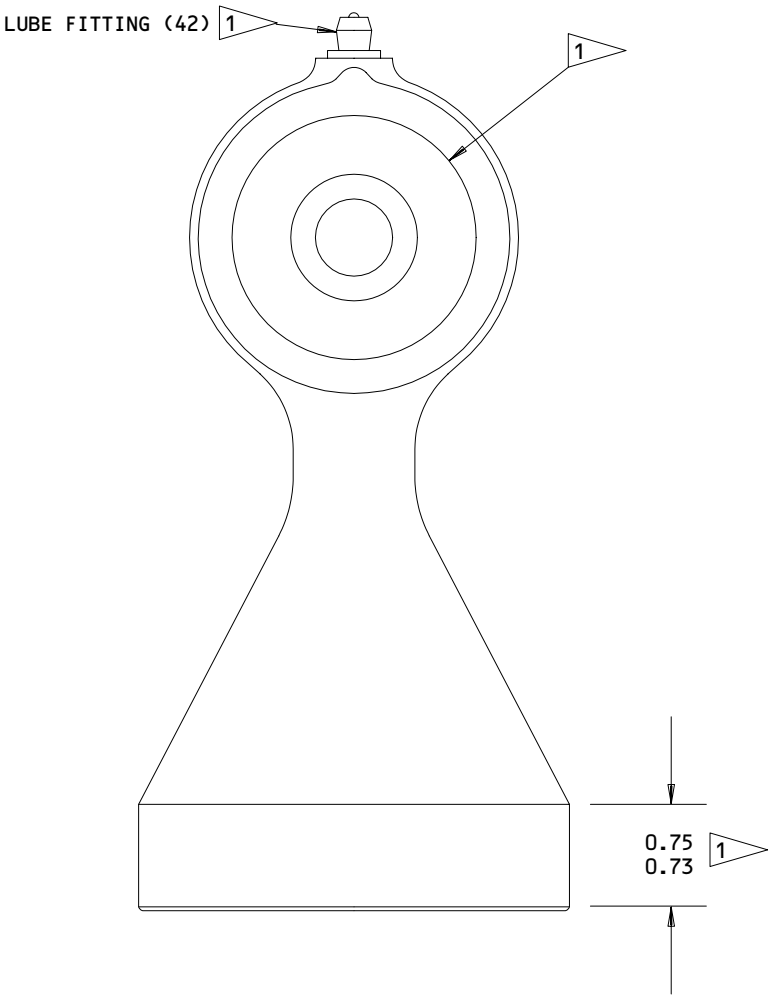


A-A

ALL DIMENSIONS ARE IN INCHES

257T4308-1 SHOWN
257T4308-3

End Cap Assembly - End Cap and Bearing Replacement
Figure 601 (Sheet 1)



REFINISH

APPLY ENAMEL (SRF-14.9813) ALL OVER EXCEPT AS NOTED.

1 MASK PRIOR TO PAINTING

257T4308-1
257T4308-3 SHOWN

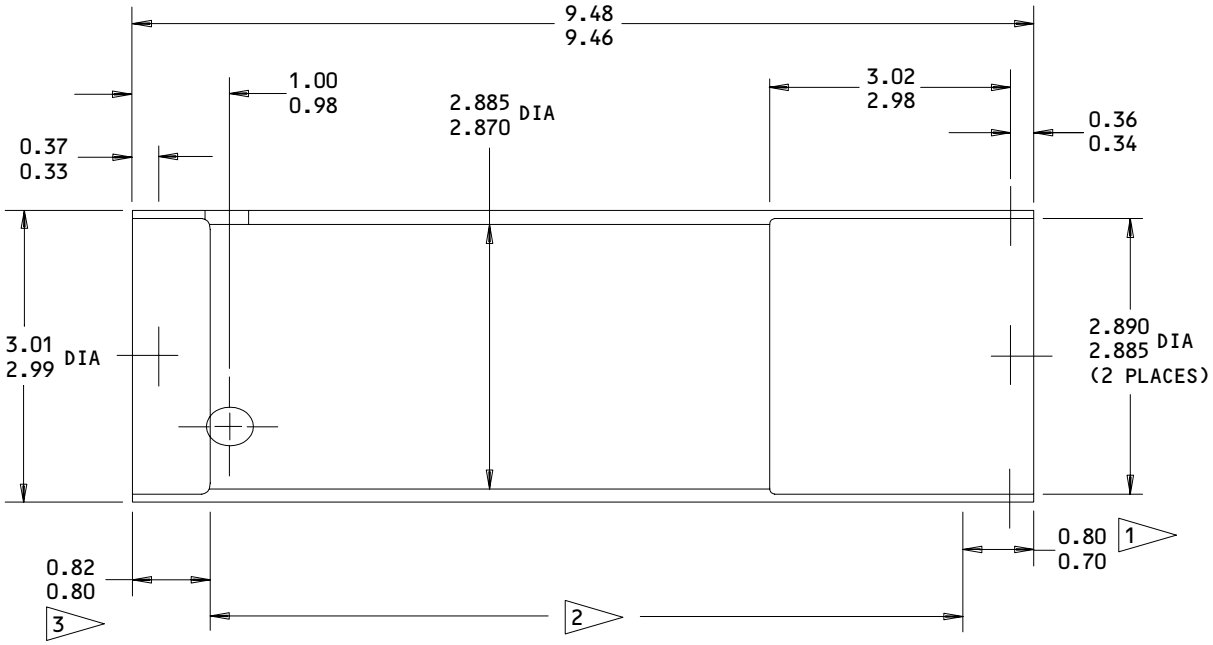
End Cap Assembly - End Cap and Bearing Replacement
Figure 601 (Sheet 2)

CYLINDER, OUTER - REPAIR 2-1

257T4327-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions, Fig. 601 and to REPAIR-GEN for list of applicable standard practices.



REFINISH

PASSIVATE (F-17.09) PLUS APPLY ONE COAT PRIMER, BMS 10-11 TYPE 1 (F-20.02) PLUS APPLY BMS 10-60, GRAY GLOSS ENAMEL (SRF-14.9813) ON EXTERIOR ONLY.

MATERIAL: 15-5PH CRES, 150-170 KSI

ALL DIMENSIONS ARE IN INCHES

1 CADMIUM PLATE (F-15.06) INTERIOR

2 CHROME PLATE (F-15.03) (0.0005-0.0010 THICK) INTERIOR

3 PASSIVATE (F-17.09) INTERIOR

257T4327-1
Outer Cylinder - Refinish
Figure 601

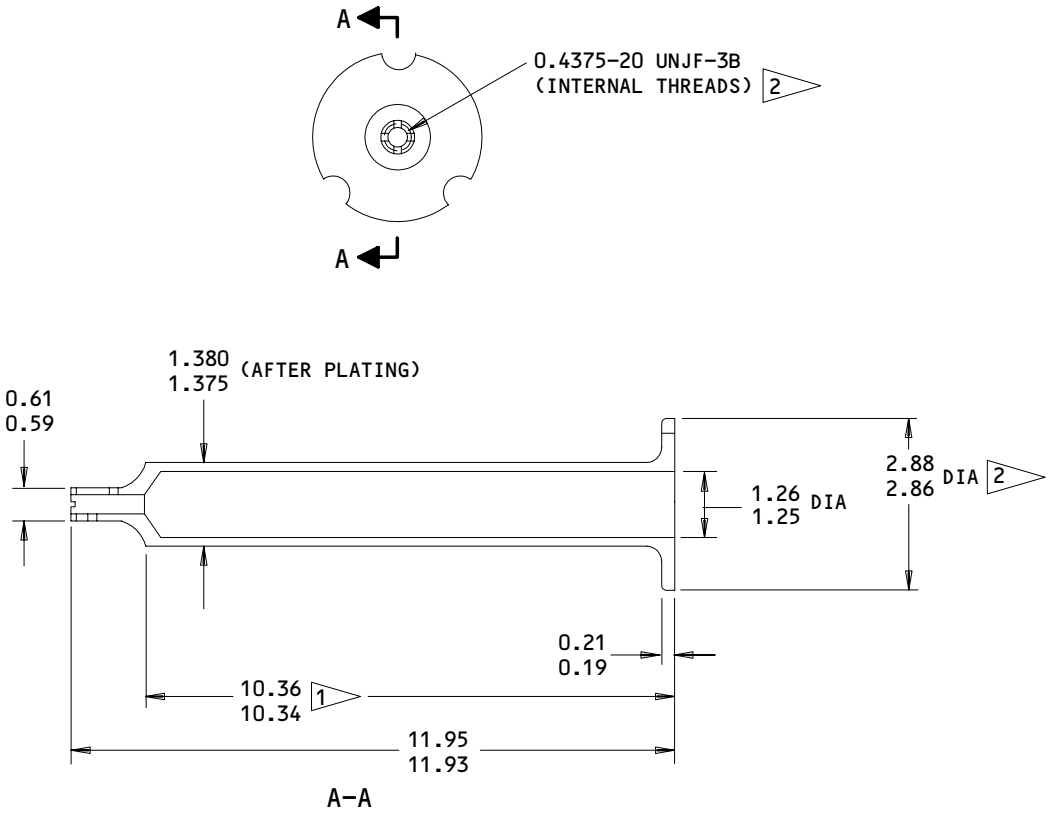
10503

ROD, INNER - REPAIR 3-1

257T4328-1

1. Plating Repair

NOTE: Repair consists of restoration of original finish. Refer to Refinish instructions, Fig. 601 and to REPAIR-GEN for list of applicable standard practices.



A-A

REFINISH

PASSIVATE (F-17.09) EXCEPT AS NOTED 1 2

MATERIAL: 15-5PH CRES, 150-170 KSI

ALL DIMENSIONS ARE IN INCHES.

1 CHROME PLATE (F-15.03) (0.0005-0.0010 THICK) EXTERIOR

2 CADMIUM PLATE (F-15.06)

257T4328-1

Inner Rod - Refinish
Figure 601

10539

MISCELLANEOUS PARTS REFINISH - REPAIR 4-1

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

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Retainer (45)	15-5PH CRES 150-170 ksi	Passivate (F-17.09), plus apply one coat primer, BMS 10-11, type 1 (F-20.02), except omit primer on 1.385-1.390 inch diameter hole.
Spring (50)	17-7PH CRES	Passivate (F-17.09).

Refinish Details
Figure 601

ASSEMBLY

1. Materials

NOTE: Equivalent substitutes may be used.

A. Sealant -- BMS 5-95 (Ref 20-60-04)

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

2. Equipment

NOTE: Equivalent substitutes may be used.

A. A32071-1 -- Buildup/Testing Fixture

3. Assembly (IPL Fig. 1)

A. Coat spring (50), sliding surface of inner rod (60), inner face of retainer (45) and inside of cylinder (55) with grease at assembly.

B. Mount retainer (45) in fixture A32071-1. Slide inner rod (60) thru spring (50) and retainer.

WARNING: USE EXTREME CARE WHEN COMPRESSING SPRING (50) AND INSTALLING CYLINDER (55) TO PREVENT INJURY TO PERSONNEL OR DAMAGE TO PARTS. SPRING (50) IS HEAVILY LOADED WHEN COMPRESSED.

C. Engage threads of fixture A32071-1 with threaded end of inner rod (60) and compress spring (50).

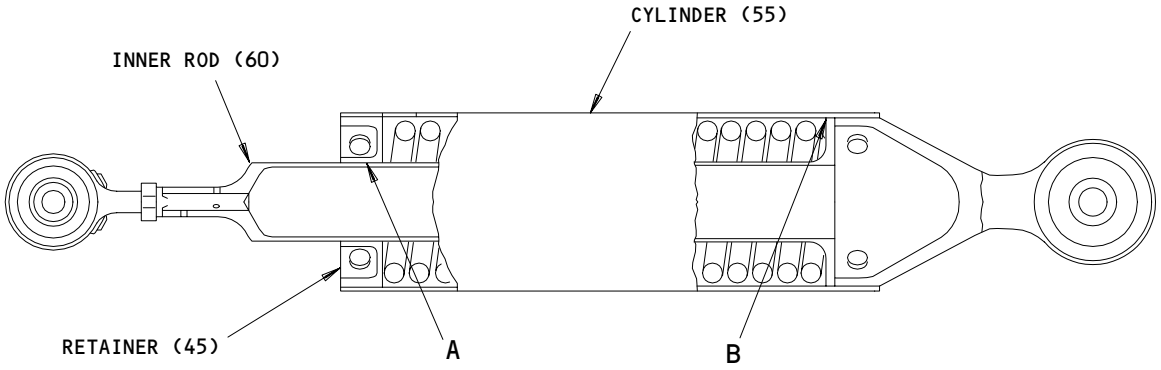
D. Slide cylinder (55) with end cap assembly (30) over inner rod (60). Seal surface between cylinder and retainer (45) with sealant.

E. Install bolts (20) and collars (25).

F. Remove unit from fixture and install nut (5) on rod end (15).

G. Install rod end (15) and lock washer (10) on inner rod (60) with BMS 3-24 grease (F-19.16). Make sure bearings centerlines are parallel and tighten nut (5).

FITS AND CLEARANCES



Ref Letter Fig.801	Mating Item No. IPL Fig.	Design Dimension				Service Wear Limit		
		Dimension		Assembly Clearance		Dimension		Maximum Clearance
		Min	Max	Min	Max	Min	Max	
A	ID 45 OD 60	1.385 1.375	1.390 1.380	0.0005	0.0015			
B	ID 55 OD 60	2.885 2.860	2.890 2.880	0.005	0.030			

ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801

70279

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

NOTE: Equivalent substitutes may be used.

1. A32071-1 -- Buildup/Testing Fixture

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.

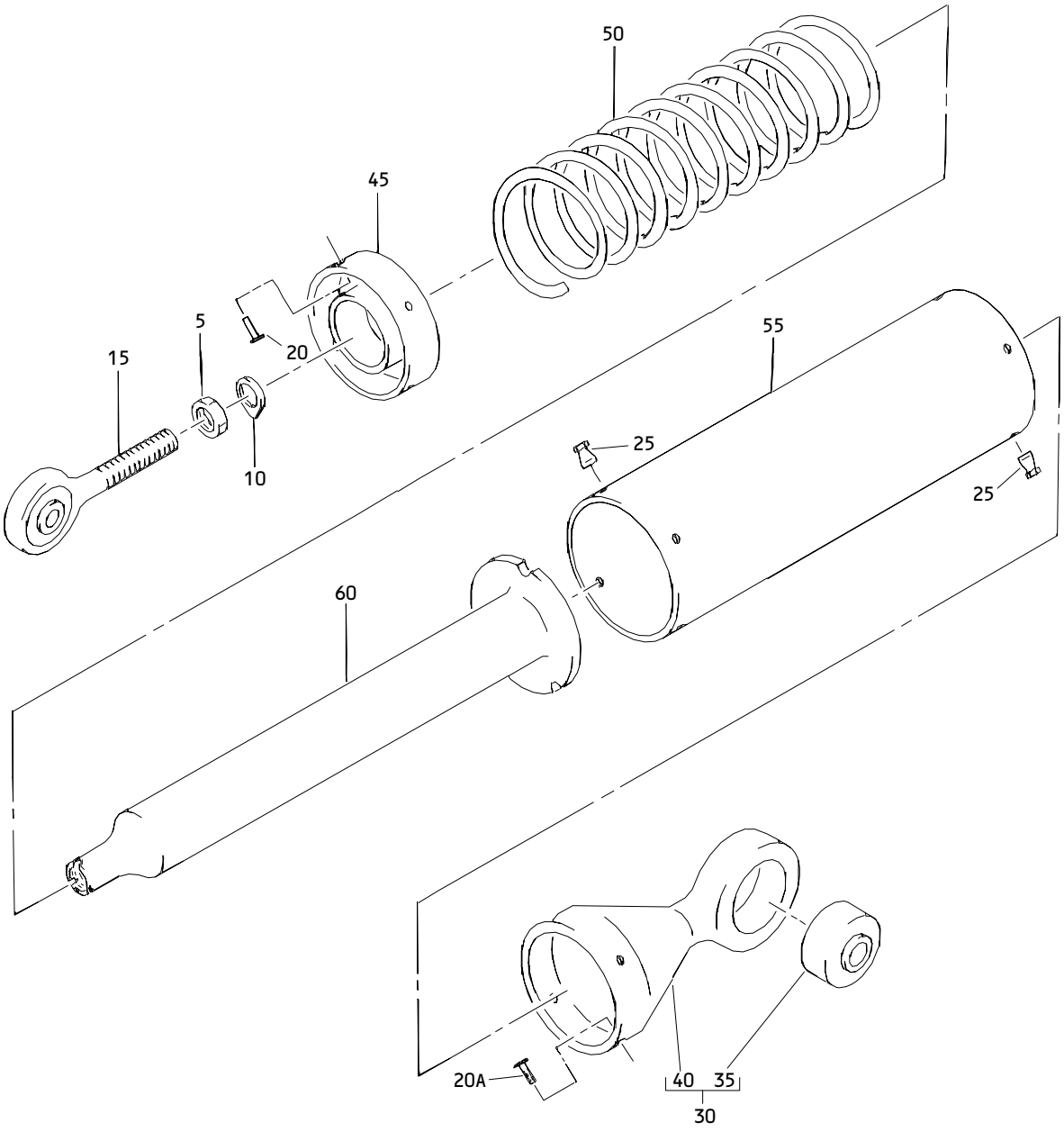
VENDORS

5F130 STEWART WARNER ALEMITE SALES CO INC
12604 1/2 INTERURBAN AVE S
SEATTLE, WASHINGTON 98168-3314

73197 HISHEAR CORPORATION
2600 SKYPARK DRIVE
TORRANCE, CALIFORNIA 90509

77896 REXNORD INC. BEARING DIVISION
2400 CURTIS STREET
DOWNERS GROVE, ILLINOIS 60515

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



Nose Wheel Steering Spring Cartridge Assembly
Figure 1

T55315

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	257T4311-1		CARTRIDGE ASSY-NOSE WHL STEERING SPR		RF
5	NAS509-7		.NUT		1
10	NAS513-7		.WASHER-ROD END LOCK		1
15	BACB10DE6-07		.ROD END		1
20	BACB30FM6A3		.BOLT-		4
20A	BACB30FM6A5		.BOLT		4
25	HL82-6APBW		.COLLAR- (V73197) (SPEC BACC30AG6) (OPT HL82-6APBW (V92215))		8
30	257T4308-1		.CAP ASSY-END (OPT)		1
-30A	257T4308-3		.CAP ASSY-END		1
35	SA8-26A4		..BEARING- (V77896) (SPEC BACB10CK8)		1
40	257T4308-2		..CAP-END (USED ON ITEM 30)		1
-40A	257T4308-4		..CAP-END (USED ON ITEM 30A)		1
-42	1728B		..FITTING-LUBRICATION (V5F130)(USED ON ITEM 30A)		1 1
45	257T4326-1		.RETAINER-SPR		1
50	257T4312-1		.SPRING		1
55	257T4327-1		.CYLINDER-OUTER		1
60	257T4328-1		.ROD-INNER		1