TO: ALL HOLDERS OF LARGE CARGO DOOR MANUAL DRIVE GEARBOX ASSEMBLY COMPONENT MAINTENANCE MANUAL 52-34-45

REVISION NO. 5 DATED DEC 01/95

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
101	Changed the name of the Large Cargo Door Manual Drive Backlash Check Fixture to the Large Cargo Door Manual Drive Backlash Check Equipment.
901	

LARGE CARGO DOOR MANUAL DRIVE GEARBOX ASSEMBLY

PART NUMBER 258T5001-1

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

COMPONENT
MAINTENANCE MANUAL

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
52-34-45		
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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	DEC 01/95	01
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1	OCT 01/88	01.1
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ASSEMBLY		
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902	BLANK	
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*1001	DEC 01/95	01.101
*1002	DEC 01/95	01.101
*1003	DEC 01/95	01.101
*1004	DEC 01/95	01.101
1005	JUL 10/83	01.1
1006	JUL 10/83	01.1

* = REVISED, ADDED OR DELETED

TABLE OF CONTENTS

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	FEB 23/83
Assembly	FEB 23/83

LARGE CARGO DOOR MANUAL DRIVE GEARBOX ASSEMBLY

DESCRIPTION AND OPERATION

1. Description

   A. The large cargo door manual drive gearbox assembly consists of two cartridge assemblies containing a bevel gear, bearings, sleeves, a housing assembly, and a nut mounted in a housing.

2. Operation

   A. The gearbox assembly is part of the mechanism for manually opening or closing the large cargo door in case of electrical failure.

3. Leading Particulars (Approximate)

   Width -- 4 inches
   Length -- 8 inches
   Height -- 3 inches
   Weight -- 3 pounds

TESTING AND TROUBLE SHOOTING

1. Equipment and Materials

NOTE: Equivalent substitutes may be used.

A. Large Cargo Door Manual Drive Backlash Check Equipment -- A52023-1

2. Bearing Check

A. Rotate gears in each direction and check that gears mesh smoothly.

B. If binding or roughness is experienced, replace bearing(s) as follows:

(1) Completely disassemble unit per DISASSEMBLY.

(2) Replace defective bearing(s) as required.

(3) Assemble unit per ASSEMBLY.

(4) Check unit per backlash check below.

3. Backlash Check (Ref IPL Fig. 1)

A. Check 0.002-0.004 inch backlash between gear mesh using backlash check equipment.

B. If backlash is out of range, remove parts (5 thru 20, 30, 85) and adjust shims (25) to provide required backlash by peeling equal number of laminations from both shims.

C. Reinstall shims (25) and cartridge assemblies (30, 85) and secure with parts (5 thru 20).

D. Check backlash. If still out of range, replace gears.

DISASSEMBLY

NOTE: See Testing and Trouble Shooting to establish the condition of the component or most probable cause of its malfunction. This is to determine the extent of disassembly required without completely tearing down and rebuilding the component.

1. Disassembly (Ref IPL Fig. 1)

   A. Remove screws (5), washers (10), nuts (15) and retainers (20).

   B. Remove cartridge assembly (30, 85) and shims (25) from housing (140).

   C. Remove nut (35, 90) and sleeve (40, 95) from cartridge assembly (30, 85).

   D. Remove housing assembly (45, 100) from bevel gear (80, 135).

   E. Remove bearing (75, 130) and sleeve (70, 125) from bevel gear (80, 135).

   F. Remove rivets (55, 110), housing (60, 115) and bearing (50, 105) from housing (65, 120).

CLEANING

1. Clean all parts except teflon-sealed bearings (50, 75, 105, 130, IPL Fig. 1) using standard industry practices (Ref 20-30-03).

2. Clean teflon-sealed bearings (50, 75, 105, 130 IPL Fig. 1) per manufacturer's instruction.

CHECK

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

2. Refer to FITS AND CLEARANCES for design dimensions and wear limits.

3. Magnetic particle check the following parts (Ref IPL FIG. 1) per 20-20-01.

   A. Bevel gears (80, 135)

4. Penetrant check the following parts (Ref IPL Fig. 1) per 20-20-02.

   A. Bearing housings (60, 65, 115, 120)

   B. Housing (140)

5. Check gear teeth for pitting or uneven wear; check on gear that bearing pattern is centered in area of pitch diameter.

REPAIR - GENERAL

1. Contents

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

P/N	NAME	REPAIR
----	MISC PARTS REFINISH	1-1
258T5013	GEAR	2-1

2. Standard Practices

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

20-10-01 Repair and Refinish of High Strength Steel Parts
20-10-03 Shot Peening
20-10-04 Grinding of Chrome Plated Parts
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
20-43-01 Chromic Acid Anodizing
20-50-10 Application of Stencils, Insignia, Silk Screen, Part Numbering and Identification Markings
20-50-12 Application of Adhesives

3. Materials

NOTE: Equivalent substitutes may be used.

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

MISCELLANEOUS PARTS REFINISH - REPAIR

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

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1 Bearing housing (60, 65, 115, 120)	Al alloy	Chromic acid anodize (F-17.04) all over.
Bevel gear (80, 135)		See REPAIR 2-1.
Housing (140)	Al alloy	Chromic acid or sulfuric acid anodize (F-17.05) all over. Apply one coat primer BMS 10-11, type 1 (F-20.02) all over except omit primer on large machined bores.
Sleeve (40, 70, 95, 125)	Al alloy	Chromic acid anodize and apply one coat primer, BMS 10-11, type 1 all over (F-18.13).

Refinish Details
Figure 601

BEVEL GEAR - REPAIR 2-1

258T5013-4,-5

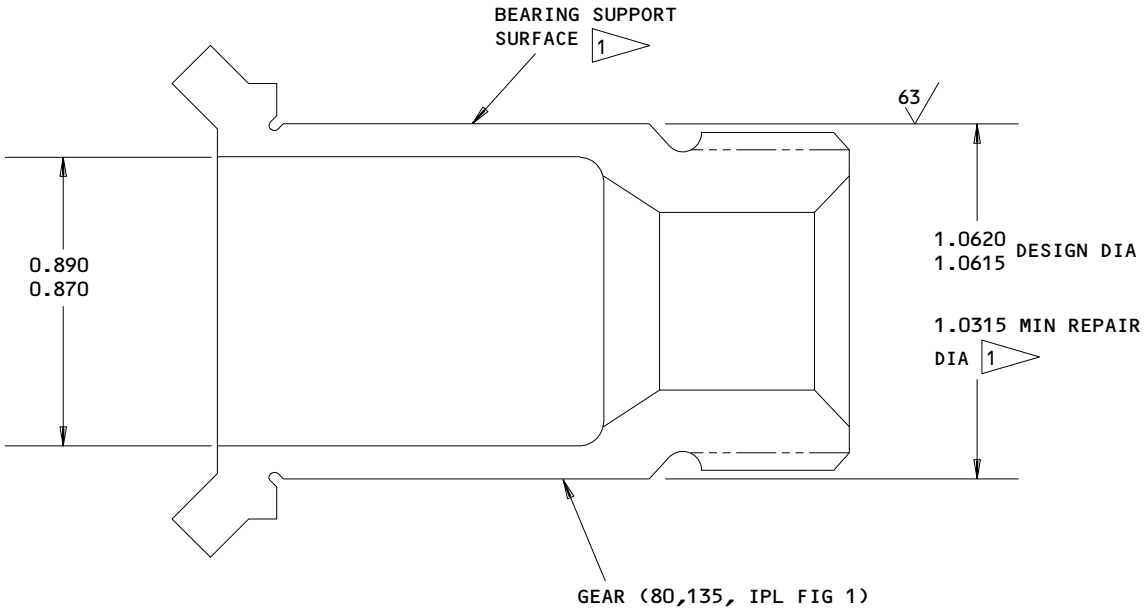
NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may only require stripping and restoration of original finish, refer to REFINISH instruction, Fig. 601.

1. Bearing Seat Repair (Fig. 601)

A. Machine bearing seat as required, within repair limit shown, to remove defects.

B. Shot peen repaired surface as indicated.

C. Build up repaired surface with chrome plate and grind to design dimension and finish shown.



REFINISH

CADMIUM PLATE PER 20-42-05, TYPE 2, CLASS 3 (0.0002 TO 0.0004 INCH) (F-15.23) ALL OVER. COAT BORES WITH TWO COATS BMS 10-11, TYPE 1 PRIMER (F-20.03)

1 BUILD UP WITH CHROME PLATE (F-15.03) AND GRIND TO DESIGN DIMENSION AND FINISH SHOWN. CHROME PLATE RUNOUT 0.00-0.08. NO CHROME PLATE ON FILLET RADIUS OR EDGE

REPAIR

REF 1

SHOT PEEN: (REF 20-10-03)
0.017-0.046 SHOT SIZE
0.006A INTENSITY
2.0 COVERAGE

125 ALL MACHINED SURFACES EXCEPT AS NOTED

BREAK ALL SHARP EDGES
0.008 R

MATERIAL: 4340 STEEL
180-200 KSI

ALL DIMENSIONS ARE IN INCHES

285T5013-4,-5
Gear Repair
Figure 601

1993359

ASSEMBLY

1. Materials and Equipment

NOTE: Equivalent substitutes may be used.

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

B. Deleted

2. Lubrication

A. Apply light coating of grease to bearings at assembly.

3. Assembly (Ref IPL Fig. 1)

A. Preassemble Housing Assemblies (45, 100).

(1) Install bearings (50, 105) with grease in bearing housings (65, 120).

(2) Install bearing housings (60, 115) with rivets (55, 110).

B. Preassemble Cartridge Assemblies (30, 85)

(1) Install bearings (75, 130) with grease on bevel gears (80, 135) then install sleeves (70, 125).

(2) Install housing assemblies (45, 100), sleeves (40, 95) and nuts (35, 90) on bevel gears (80, 135). Tighten nuts (35, 90) to 80-100 lb-in. above self-locking torque.

C. Install cartridge assemblies (30, 85) in housing (140) with shims (25), washers (10), screws (5), nuts (15) and retainers (20).

D. Do a check of the gearbox assembly (1) as shown in Testing and Trouble Shooting.

E. Deleted

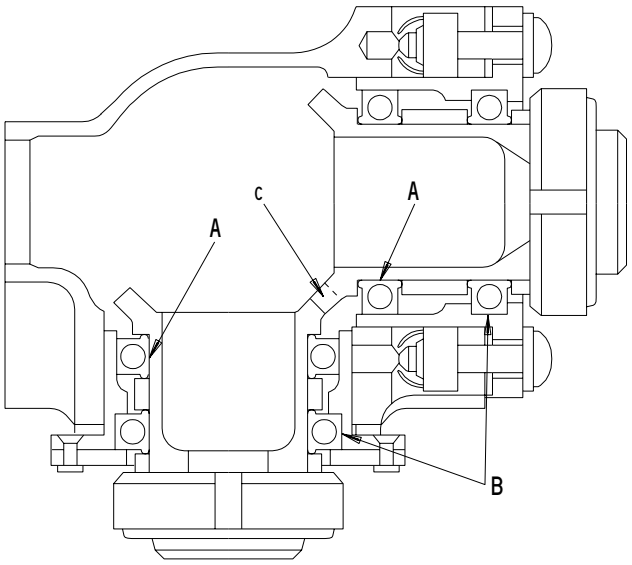
F. Deleted

G. Deleted

4. Storage

A. Use standard industry practices and information contained in 20-44-02 to store this component.

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 50,75 105,130 OD 80,135	1.0620 1.0615	1.0625 1.0620	0.0000	0.0010	1.0600	1.0640	0.0020
B	ID 65,120 OD 50,75 105,130	1.500 1.4995	1.501 1.5000	0.0000	0.0015	1.4970	1.5030	0.0030
C	80 135			0.002 *[1] 0.004 *[1]				0.006 *[1]

*[1] BACKLASH AT PITCH DIAMETER

ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801

FOR TORQUE VALUES OF STANDARD FASTENERS, REFER TO 20-50-01			
ITEM NO. IPL FIG. 1	NAME	TORQUE	
		POUND-INCHES	POUND-FEET
35, 90	Nut	80-100 *[1]	

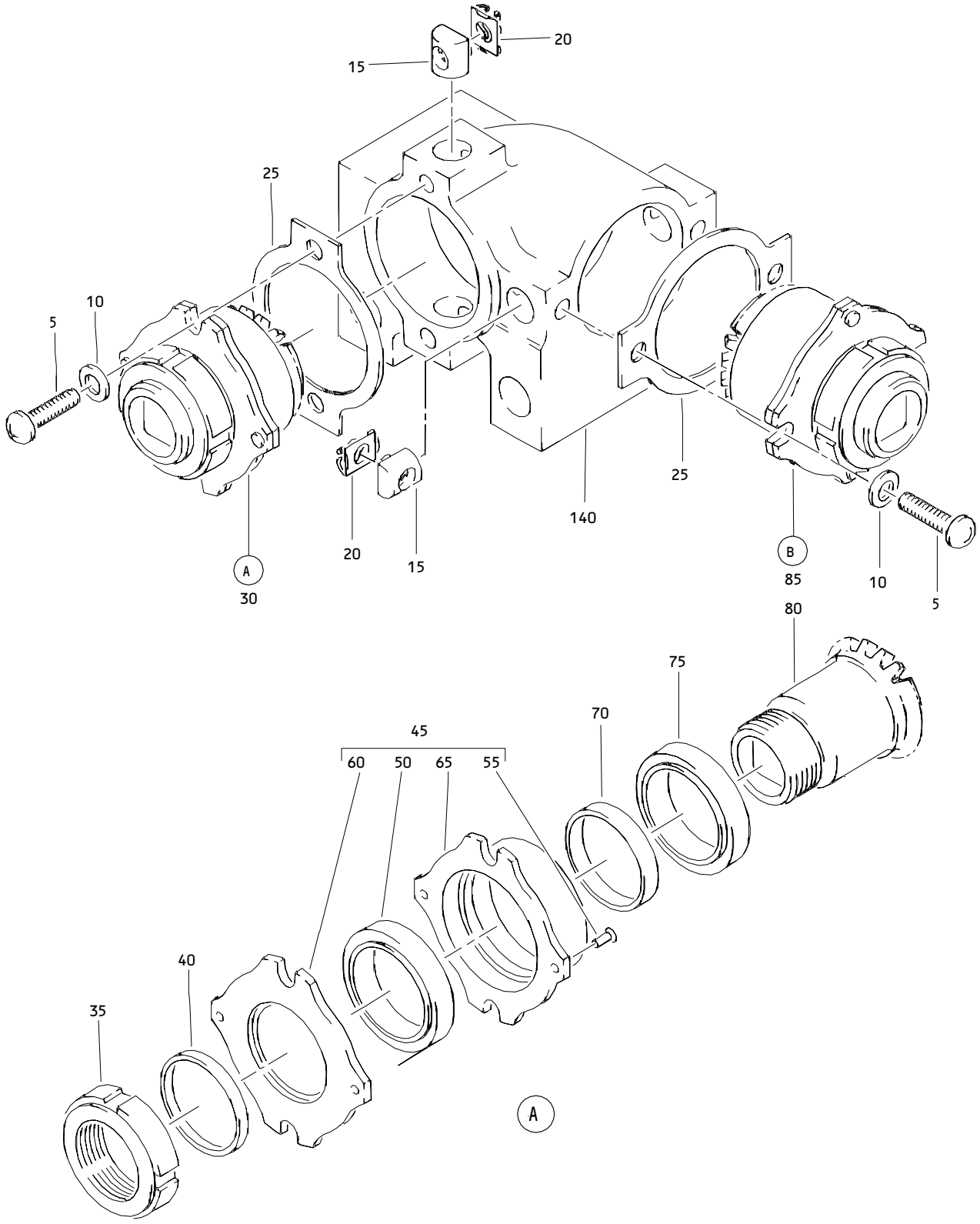
*[1] Above self-locking torque

Torque Table
Figure 802

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

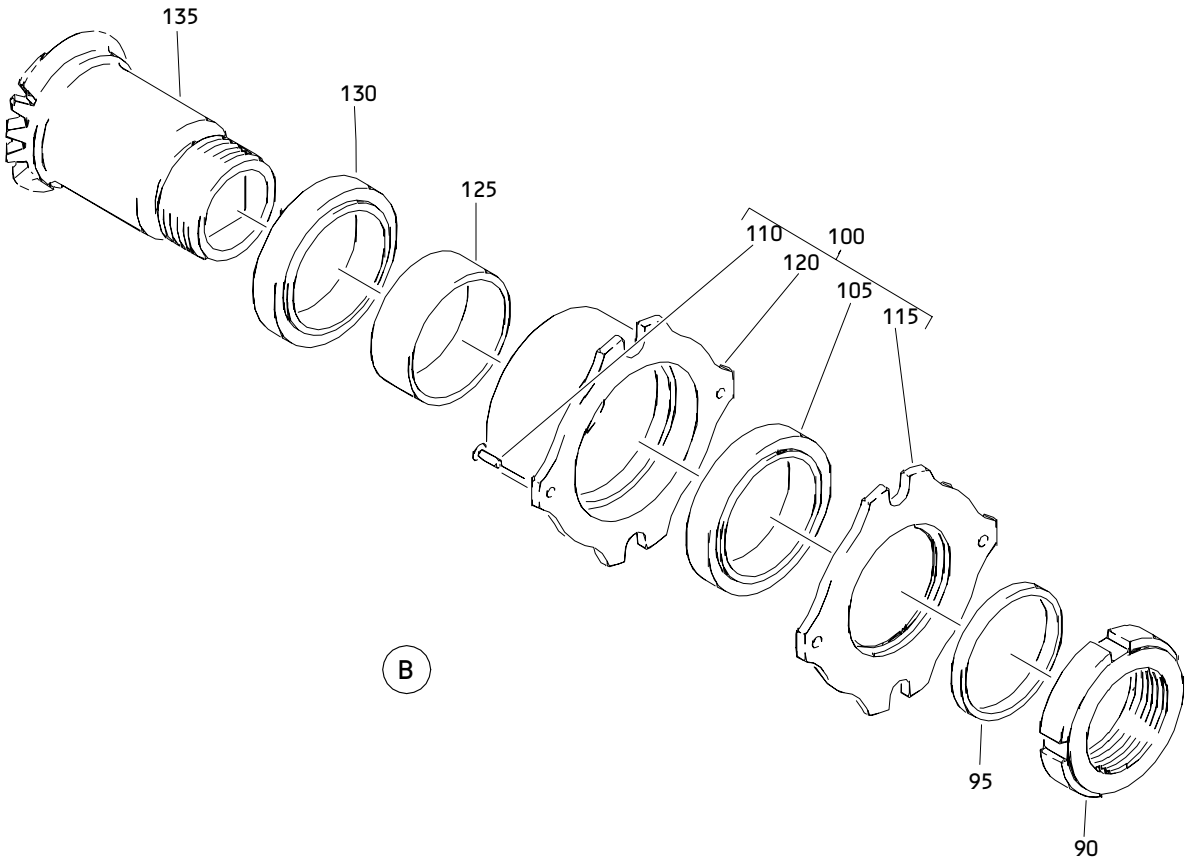
NOTE: Equivalent substitutes may be used.

1. A52023-1 -- Large Cargo Door Manual Drive Backlash Check Equipment



Large Cargo Door Manual Drive Gearbox Assembly
Figure 1 (Sheet 1)

T64514



Large Cargo Door Manual Drive Gearbox Assembly
Figure 1 (Sheet 2)

T64515

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

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

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

43991 FAG BEARING INCORPORATED
HAMILTON AVENUE
STAMFORD, CONNECTICUT 06904

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

97393 SHUR-LOK CORPORATION
2541 WHITE ROAD
IRVINE, CALIFORNIA 92713

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
-1	258T5001-1		GEARBOX ASSY-LARGE CARGO DOOR MANUAL DRIVE		RF
5	NAS603-14P		.SCREW		4
10	AN960PD10		.WASHER		4
15	LH8065-02		.NUT- (V72962) (SPEC BACN10HC3) (OPT SL414-3 (V97393))		4
20	8065-02RET		.RETAINER- (V72962) (SPEC BACR10V3R)		4
25	258T5014-1		.SHIM		2
30	258T5001-2		.CARTRIDGE ASSY		1
35	SL2822-16		..NUT- (V97393) (SPEC BACN10RF16) (OPT BR9080-16 (V72962))		1
40	258T5015-4		..SLEEVE		1
45	258T5001-4		..HOUSING ASSY		1
50	MB541DD		...BEARING- (V38443) (SPEC BACB10AS17) (OPT LLMB541 (V38443)) (OPT MB541-2TS (V43991)) (OPT MB541DDFS428 (V21335)) (OPT MB541TT (V43991))		1
55	BACR15BA3AD		...RIVET		2
60	258T5012-3		...HOUSING-BRG		1
65	258T5012-4		...HOUSING-BRG		1
70	258T5015-2		..SLEEVE		1

FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
75	MB541DD		..BEARING- (V38443) (SPEC BACB10AS17) (REFER TO ITEM 50 FOR OPTIONAL PARTS)		1
80	258T5013-4		..GEAR-BEVEL		1
85	258T5001-3		.CARTRIDGE ASSY		1
90	SL2822-16		..NUT- (V97393) (SPEC BACN10RF16) (OPT BR9080-16 (V72962))		1
95	258T5015-4		..SLEEVE		1
100	258T5001-5		..HOUSING ASSY		1
105	MB541DD		...BEARING- (V38443) (SPEC BACB10AS17) (REFER TO ITEM 50 FOR OPTIONAL PARTS)		1
110	BACR15BA3AD		...RIVET		2
115	258T5012-3		...HOUSING-BRG		1
120	258T5012-5		...HOUSING-BRG		1
125	258T5015-1		..SLEEVE		1
130	MB541DD		..BEARING- (V38443) (SPEC BACB10AS17) (REFER TO ITEM 50 FOR OPTIONAL PARTS)		1
135	258T5013-5		..GEAR-BEVEL		1
140	258T5011-3		.HOUSING		1