TO: ALL HOLDERS OF AUTOTHROTTLE BRAKE PACK ASSEMBLY COMPONENT MAINTENANCE MANUAL 22-32-43.

REVISION NO. 10 DATED NOV 01/05

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	Updated the Autothrottle Clutch Test Equipment to G22003-134 and -135, which replace -132 and -133, which supersede -107 and -108, respectively
901	

BOEING

COMPONENT
MAINTENANCE MANUAL

AUTOTHROTTLE BRAKE PACK ASSEMBLY

PART NUMBERS 253T7500-1 THRU -4

COMPONENT MAINTENANCE MANUAL
WITH
ILLUSTRATED PARTS LIST

BOEING
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

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR B12009 PRR B12155	APR 01/90 JAN 01/93

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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.

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:

Testing and Trouble Shooting: May 10/90
Assembly: May 10/90

AUTOTHROTTLE BRAKE PACK ASSEMBLY

DESCRIPTION AND OPERATION

1. Description and Operation

   A. The brake pack assembly consists of two brake assemblies and two support bracket assemblies mounted on a splined shaft.

   B. The brake pack assembly is a component of the autothrottle installation. The brake pack provides feel friction for the thrust levers and permits the pilots to manually override the Thrust Management System.

2. Leading Particulars (approximate)

   Diameter -- 7.0 inches
   Width -- 7.5 inches
   Weight -- 9 pounds

TESTING AND TROUBLE SHOOTING

1. Test Equipment and Materials

NOTE: Equivalent substitutes may be used.

A. Autothrottle Clutch Test Equipment -- G22003-134 or -135

NOTE: G22003-134 replaces G22003-132. G22003-132 supersedes G22003-107, -92, -83, -50, -1.

G22003-135 replaces G22003-133. G22003-133 supersedes G22003-108, -93, -84, -51, -2.

G22003-134 is used with a 60 Hz power source. G22003-135 is used with a 50 Hz power source.

B. 0-50 pound-inch Torque Indicator

2. Brake Assembly Run-In

A. Place brake assembly (55, 125, IPL Fig. 1), (45, 50, IPL Fig. 2) in a holding fixture, that rigidly retains housing (110, 180, IPL Fig. 1), (120, 125, IPL Fig. 2) in a stationary position.

B. Rotate the rotor and verify that the torque is 35-50 pound-inches for the brake assembly (55, 125, IPL Fig. 1), or 31-50 pound-inches (45, 50, IPL Fig. 2), in each direction. If the torque does not fall within the acceptable range, reshim per Shimming Instructions and repeat the test.

C. Place brake assembly (55, 125, IPL Fig. 1), (45, 50, IPL Fig. 2) in the run-in fixture (part of the G22003-134 or -135 autothrottle clutch test equipment), so that it rigidly retains housing (110, 180, IPL Fig. 1), (120, 125, IPL Fig. 2) in a stationary position.

D. Rotate the rotor at 50 to 100 rpm with housing (120, 190, IPL Fig. 1) (135, 140, IPL Fig. 2) held stationary. Make sure the rotor does not chatter. If chatter does occur, adjust the rpm as needed to prevent chatter. One run-in cycle shall consist of 15 minutes of running continuously in one direction, then 15 minutes of running continuously in the other direction. Total run-in time shall be 90 minutes (three cycles).

NOTE: The housing temperature must not exceed 200 degrees F during run-in.

E. Disassemble, clean and degrease the brake assembly, then relubricate and reassemble per ASSEMBLY. Shim as required to get a torque of 42-48 pound-inches for the brake assembly (55, 125, IPL Fig. 1), 31-35 pound-inches (45, 50, IPL Fig. 2), or 40-44 pound-inches (45A, 45B, 50A, 50B, IPL Fig. 2), when turning the rotor.

NOTE: Parts must be reassembled in the same order and orientation to maintain run-in integrity.

3. Acceptance Test

A. After run-in has been completed, each unit shall be acceptance tested per the following procedure.

B. Place unit in fixture to retain housing (110, 180, IPL Fig. 1), (120, 125, IPL Fig. 2) in stationary position.

C. Ensure that rotor rotates smoothly and continuously without restrictions, irregularities, chattering or sticking.

D. Rotate the rotor at 2.0-3.0 rpm and note the direction of rotation. Let the unit run until the running torque stabilizes. Do not let the unit run for more than 5 minutes. Read the torque value for 30 seconds. Check that the running torque is 42-48 pound-inches for the brake assembly (55, 125, IPL Fig. 1), 31-35 pound-inches (45, 50, IPL Fig. 2), or 40-44 pound-inches (45A, 45B, 50A, 50B, IPL Fig. 2). Repeat this step in the opposite direction of rotation. If the torque does not fall within the acceptable range, reshim per the Shimming Instructions, and retest.

NOTE: No further run-in is required after final adjustment and test.

E. Upon satisfactory completion of this test, check that torque on nut (60, 130, IPL Fig. 1), (55, IPL Fig. 2) is 100-120 pound-inches, then secure nut with lockwire per 20-50-02.

4. Shimming Instructions

A. Remove nut (60, 130, IPL Fig. 1) (55, IPL Fig. 2) and replace shim (80, 150, IPL Fig. 1), (75, 80, 85, 90, IPL Fig. 2)) as required per Fig. 101. An increase of 0.005 inch shim thickness results in an increase of approximately 3 pound-inches torque. Likewise, a decrease in shim thickness results in a decrease in torque.

IPL (FIG. 1) ITEM NO.	254N1159 DASH NO.	SHIM THICKNESS
8O, 15O	-5	0.105 0.095
8OA, 15OA	-14	0.092 0.088
8OB, 15OB	-15	0.109 0.105
8OC, 15OC	-16	0.114 0.110
8OD, 15OD	-17	0.119 0.115
8OE, 15OE	-9	0.067 0.063
8OF, 15OF	-10	0.072 0.068
8OG, 15OG	-11	0.077 0.073
8OH, 15OH	-12	0.082 0.078
8OJ, 15OJ	-13	0.087 0.083

Shim Selection
Figure 101

IPL (FIG. 2) ITEM NO.	253T7530	SHIM THICKNESS
75	-1	0.017 0.013
80	-2	0.023 0.017
85	-3	0.028 0.022
90	-4	0.054 0.044

Shim Selection
Figure 102

DISASSEMBLY

NOTE: See Testing and Troubleshooting 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. Standard industry practices are sufficient for disassembly of this component.

CLEANING

1. Clean all parts except bearings using standard industry practices per 20-30-03.

2. Clean all sealed bearings (10, 40, 70, 115, 140, 185, IPL Fig. 1) (33, 65, 130, IPL Fig. 2) per manufacturer's instructions.

CHECK

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

2. Magnetic particle check per 20-20-01 -- shaft (200, IPL FIg. 1) (150, IPL Fig. 2), spacer (50, IPL Fig. 1), (40, IPL Fig. 2), shim (80, 150, IPL Fig. 1) (75, 80, 85, 90, IPL Fig. 2), rotor (105, 175, IPL Fig. 1), (115, IPL Fig. 2), disk (100, 170, IPL Fig. 1) (110, IPL Fig. 2), stator (90, 160, IPL Fig. 1) (100, 102, IPL Fig. 2).

3. Penetrant check per 20-20-02 -- housing (120, 190, IPL Fig. 1) (135, 140, IPL Fig. 2), support bracket (25, 45, IPL Fig. 1), (35, IPL Fig. 2), end cap (75, 145, IPL Fig. 1), (70, 72, IPL Fig. 2), spacer (195, IPL Fig. 1), (145, IPL Fig. 2).

4. Check springs (85, 155, IPL Fig. 1), (95, IPL Fig. 2).

   A. Check that spring heights are within table values:

SPRING HEIGHTS (INCHES)	LOAD (LBS)
0.113 (ref)	0.0
0.103	85-128
0.093	153-229

IPL Fig. 1

   B.

SPRING HEIGHTS (INCHES)	LOAD (LBS)
0.115 (ref)	0.0
0.100	116-174
0.070	217-326

IPL Fig. 2

REPAIR - GENERAL

1. Content

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

P/N	NAME	REPAIR
253T7500	PACK, BRAKE	1-1
253T7502	HOUSING	2-1
253T7504	BRACKET, SUPPORT	3-1
254N1162	CAP, END	4-1
--	MISC, PARTS REFINISH	5-1

2. Standard Practices

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

   20-30-02 Stripping of Protective Finishes
   20-30-03 General Cleaning Procedure
   20-41-01 Decoding Table for Boeing Finish Codes
   20-41-02 Application of Chemical and Solvent Resistant Finishes
   20-42-05 Bright Cadmium Plating
   20-43-01 Chromic Acid Anodizing
   20-50-03 Bearing Installation and Retention

3. Materials

   NOTE: Equivalent substitutes may be used.

   A. Grease -- MIL-G-23827 (Ref 20-60-03)

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

BRAKE PACK ASSEMBLY - REPAIR 1-1

253T7500-1, -2, -3, -4

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may require only restoration of original finish, refer to Refinish instructions.

1. Bearing Replacement (IPL Fig. 1)

   A. Remove bearing (10) from support bracket (15).

   B. Install replacement bearing using grease per 20-50-03.

HOUSING ASSEMBLY - REPAIR 2-1

253T7502-1, -2

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may require only restoration of original finish, refer to Refinish instructions (Fig. 601).

1. Bearing Replacement (IPL Fig. 1)

   A. Remove bearing (115, 185) from housing (120, 190).

   B. Install replacement bearing using wet BMS 10-11, type 1 primer (F-20.06).

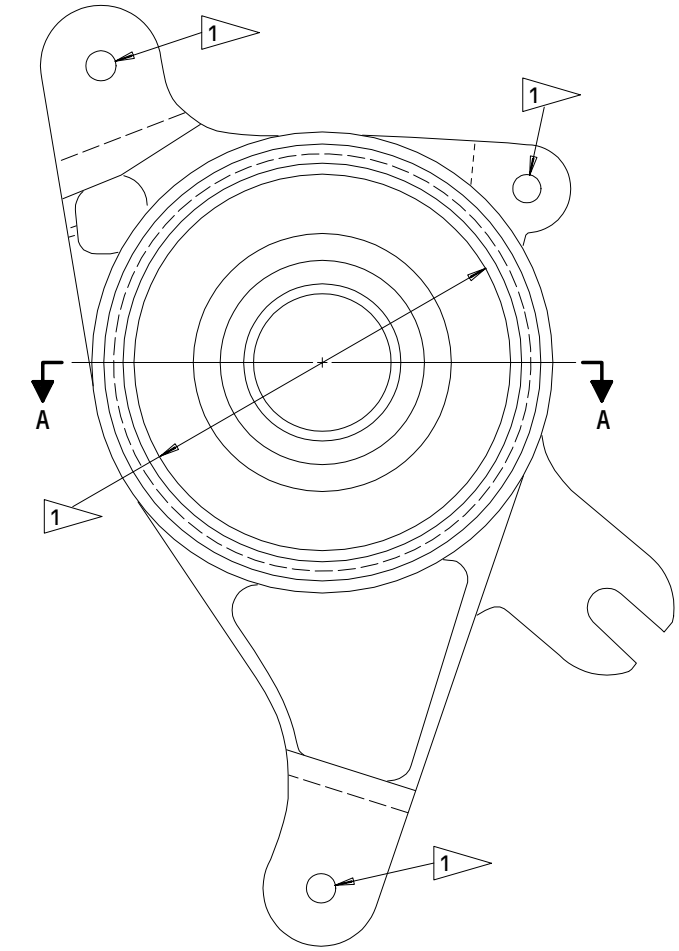
   C. Roller swage in place per 20-50-03.

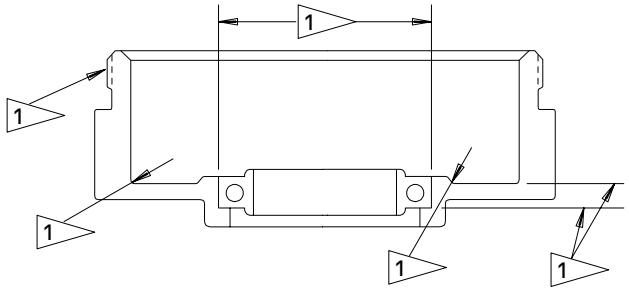
2. Bearing Replacement (IPL Fig. 2)

   A. Remove bearing (130) from housing (120, 125).

   B. Install replacement bearing using wet BMS 10-11, type 1 primer (F-20.06).

   C. Roller swage in place per 20-50-03.





A-A

REFINISH

CHROMIC ACID ANODIZE AND APPLY ONE COAT BMS 10-11, TYPE 1, PRIMER (F-18.13) EXCEPT AS NOTED

MATERIAL: AL ALLOY

1 OMIT PRIMER THIS SURFACE

253T7502-1,-2
Housing Assembly Repair
Figure 601

323486

SUPPORT BRACKET ASSEMBLY - REPAIR 3-1

253T7504-1, -2
253T7538-1

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may require only restoration of original finish, refer to Refinish instructions.

1. Bearing Replacement (IPL Fig. 1)

   A. Remove bearing (40, IPL Fig. 1; 30, IPL Fig. 2) from bracket (45, IPL Fig. 1) or support (35, IPL Fig. 2).

   B. Install replacement bearing using wet BMS 10-11, type 1 primer (F-20.06).

   C. Roller swage in place per 20-50-03.

2. Refinish

   A. Support brackets (25, 45, IPL Fig. 1) Support (35, IPL Fig. 2) -- Chromic acid anodize and apply one coat BMS 10-11, type 1 primer (F-18.13). Material: Al alloy

END CAP ASSEMBLY - REPAIR 4-1

254N1162-5
254N7539-1, -3

NOTE: Refer to REPAIR-GEN for list of applicable standard practices. For repair of surfaces which may require only restoration of original finish, refer to Refinish instructions.

1. Bearing Replacement

   A. Remove bearing (70, 140, IPL Fig. 1; 65, IPL Fig. 2) from cap (75, 145, IPL Fig. 1; 60 IPL Fig. 2).

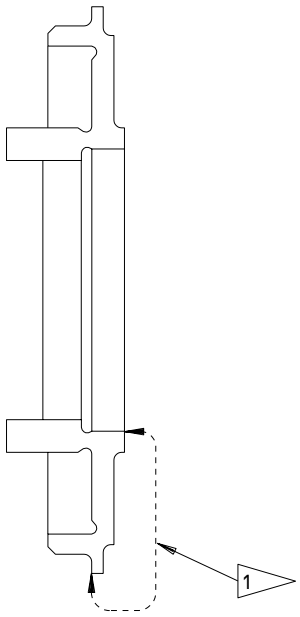
   B. Install and roller swage replacement bearing per 20-50-03.

2. Refinish (IPL Fig. 1)

   A. Cap (75, 145) -- Chromic acid anodize and apply one coat BMS 10-11, type 1 primer (F-18.13). Material: Al alloy.

3. Refinish (IPL Fig. 2)

   A. Refer to Fig. 601 for refinish instrucitons. Cap (60) -- Chromic acid anodize and apply BMS 10-11, type 1 primer (F-18.13).



REFINISH

CHROMIC ACID ANODIZE AND APPLY ONE COAT
BMS 10-11, TYPE 1 PRIMER (F-18.13) AS NOTED.

1 APPLY BMS 10-11 PRIMER TO THIS AREA ONLY.

254N7539-1,-3
Cap Refinish
Figure 601

MISCELLANEOUS PARTS REFINISH - REPAIR 5-1

1. Repair of parts listed in Fig. 601 consists of restoration of original finish (Ref IPL Fig. 1).

IPL FIG. & ITEM	MATERIAL	FINISH
IPL FIG. 1		
Spacer (50)	15-5PH CRES 150-170 ksi	Cadmium plate and apply BMS 10-11, type 1 primer (F-16.01).
Spring (85,155)	AISI 302 or 301 or 17-7PH CRES	Passivate (F-17.09).
Rotor (105,175)	15-5PH CRES 150-170 ksi	Passivate (F-17.09).
Spacer (190)	Al alloy	Sulfuric acid anodize (F-17.03) and apply BMS 10-11, type 1 primer (F-20.02).
Shaft (200)	15-5PH CRES 180-200 ksi	Passivate (F-17.09).
IPL Fig. 2		
Spacer (40,145), shaft (155,160)	15-5PH CRES 180-200 ksi	Passivate (F-17.09).
Spring (95)	AISI 302 or 301 or 17-7PH CRES	Passivate (F-17.09).
Rotor (115)	9310 Steel 150-190 ksi core	Cadmium plate (F-15.06), except on surfaces outside 2.36-inch diameter (bearing surfaces for skewed roller assemblies and the outer edge).
Rotor (115A)	5160H Steel 150-170 ksi core	Cadmium plate (F-15.06), except post-plate bake at 250-300 deg F. Do not plate the surfaces outside 2.36-inch diameter (bearing surfaces for skewed roller assemblies and the outer edge).

Refinish Details
Figure 601

ASSEMBLY

1. Materials

NOTE: Equivalent substitutes may be used.

A. Grease -- MIL-G-23827 (Ref 20-60-03)

B. Adhesive -- BMS 5-127, Type 2, Class 2 (Ref 20-50-12)

C. Primer BMS 10-11, type 1 (F-20.06)

2. Equipment

NOTE: Equivalent substitutes may be used.

A. Rigging Equipment -- A22008-1

3. Assembly (IPL Fig. 1)

A. Assemble the brake assembly.

CAUTION: THIS ASSEMBLY IS OF INSTRUMENT QUALITY. IT MUST BE HANDLED WITH MAXIMUM CARE AND ASSEMBLED IN A CLEAN AREA.

(1) Generously lubricate both sides of skewed roller assemblies (95 , 165), and the sides of each stator (90, 160) and disc (100, 170) which contact the skewed roller assembly with grease.

(2) Coat all mating surfaces of housing assembly (110, 180) with grease.

(3) Insert disc (100, 170) into housing assembly (110, 180) followed by one skewed roller assembly (95, 165).

CAUTION: SKEWED ROLLER ASSEMBLIES, P/N 90650 OR 90653, MUST NOT BE MIXED WITHIN A SINGLE BRAKE ASSEMBLY, OR THE UNIT MAY NOT OPERATE PROPERLY.

(4) Insert stator (90, 160), followed by another skewed roller assembly (95, 165) and stator (90, 160).

NOTE: The rollers of the two skewed roller assemblies (95, 165) must be assembled to spiral in the opposite direction with respect to each other.

(5) Install rotor (105, 175) in center of housing assembly (110, 180).

(6) Place shim (80, 150) in end cap assembly (65, 135) then install springs (85, 155) with convex sides facing each other.

(7) Assemble end cap components and housing components using the A22008-1 rigging equipment. Compress the springs by clamping cap assembly (65, 135) and housing (120, 190) together, ensuring positive contact between cap and housing.

(8) Install nut (60, 130) and tighten nut to 100-120 pound-inches.

(9) Perform run-in procedure and check running torque per TESTING AND TROUBLESHOOTING.

B. Assemble the brake pack assembly.

(1) Prior to assembly, coat all mating surfaces with grease.

(2) Slide spacer (195) onto shaft (200), followed by brake assembly (125) on one side and brake assembly (55) on the other side.

(3) Slide one spacer (50) onto each side of shaft against the brake assemblies.

(4) On the side with brake assembly (125), attach support bracket assembly (30), bearing (40), washer (7) and nut (5).

(5) On the side with brake assembly (55), attach support bracket assembly (15), bearing (10), washer (7) and nut (5).

(6) Tighten nuts (5) to 200-220 pound-inches above run-on torque.

4. Assembly (IPL Fig. 2)

A. Assemble the brake assembly.

CAUTION: THIS ASSEMBLY IS OF INSTRUMENT QUALITY. IT MUST BE HANDLED WITH MAXIMUM CARE AND ASSEMBLED IN A CLEAN AREA.

(1) Generously lubricate both sides of skewed roller assemblies (105), and the sides of each stator (100, 102) and disc (110) which contact the skewed roller assembly with grease.

(2) Coat all mating surfaces of housing assembly (120, 125) with grease.

(3) Insert disc (110) into housing assembly (120, 125) followed by one skewed roller assembly (105).

CAUTION: SKEWED ROLLER ASSEMBLIES, P/N 90656 OR 90650, MUST NOT BE MIXED WITHIN A SINGLE BRAKE ASSEMBLY, OR THE UNIT MAY NOT OPERATE PROPERLY.

(4) Install rotor (115) in center of housing assembly (120, 125), followed by another skewed roller assembly (105) and stator (100, 102).

NOTE: The rollers of the two skewed roller assemblies (105) must be assembled to spiral in the opposite direction with respect to each other.

(5) Place shim (75, 80, 85, 90) in end cap assembly (60) then install spring (95).

(6) Assemble end cap components and housing components using the A22008-1 rigging equipment. Compress the springs by clamping cap assembly (60) and housing (135, 140) together, ensuring positive contact between cap and housing.

(7) Install nut (55) and tighten nut to 100-120 pound-inches.

(8) Perform run-in procedure and check running torque per TESTING AND TROUBLE SHOOTING.

B. Assemble the brake pack assembly.

(1) Prior to assembly, coat all mating surfaces with grease.

(2) Assemble shaft assembly (150) by sliding inner shaft (155) into outer shaft (160) and bond with BMS 5-127.

(3) Install pin (165) with wet BMS 10-11 primer (F-20.06).

(4) Slide spacer (145) onto shaft assembly (150), followed by brake assembly (50) and brake assembly (45).

(5) Slide spacer (40) on the shaft against the brake assemblies.

(6) On the side with brake assembly (45), attach support bracket assembly (15), washer (10) and nut (5).

(7) Tighten nut (5) to 200-220 pound-inches above run-on torque.

5. Prepare and store this component according to standard industry practices.

FITS AND CLEARANCES

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	5	NUT	200-220 1	
1	60,130	NUT	100-200	
2	5	NUT	200-220 1	
2	55	NUT	100-200	

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

1 ABOVE RUN-ON TORQUE

Torque Table
Figure 801

323484

SPECIAL TOOLS, FIXTURES, EQUIPMENT

NOTE: Equivalent substitutes may be used.

1. Autothrottle Clutch Test Equipment -- G22003-134 or -135

   NOTE: G22003-134 replaces G22003-132. G22003-132 supersedes G22003-107, -92, -83, -50, -1.

   G22003-135 replaces G22003-133. G22003-133 supersedes G22003-108, -93, -84, -51, -2.

   G22003-134 is used with a 60 Hz power source. G22003-135 is used with a 50 Hz power source.

2. 0-50 pound-inch Torque Indicator

3. Rigging Equipment -- A22008-1

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

K8455 RHP BEARINGS PLC RHP AEROSPACE
OLDENDS LANE
STONEHOUSE GL10 3RM UK

0PTK6 SPS TECHNOLOGIES INC AEROSPACE PRODUCTS DIV
5195 W 4700 SPO BOX 18459
KEARNS, UTAH 84118

00462 LUCAS WESTERN INC ELECTRO SYSTEM DIV
610 NEPTUNE AVENUE
BREA, CALIFORNIA 92621

06144 INDUSTRIAL TECTONICS BEARING CORP
18301 SOUTH SANTA FE AVENUE
RANCO DOMINQUEZ, CALIFORNIA 90221

06725 AIR INDUSTRIES CORPORATION
12570 KNOTT STREET
GARDEN GROVE, CALIFORNIA 92641-3932

15653 KAYNAR TECHNOLOGY KAYNAR DIV
800 SOUTH STATE COLLEGE BLVD PO BOX 3001
FULLERTON, CALIFORNIA 92634-3001

21335 TORRINGTON CO FAFNIR BEARING DIV
59 FIELD STREET
TORRINGTON, CONNECTICUT 06790-4942

38443 MRC BEARINGS
402 CHANDLER STREET
JAMESTOWN, NEW YORK 14701-3802

40920 MPB MINIATURE PRECISION BEARING DIV
PRECISION PARK PO BOX 547
KEENE, NEW HAMPSHIRE 03431

VENDORS

43991 FAG BEARING INCORPORATED
118 HAMILTON AVENUE
STAMFORD, CONNECTICUT 06904

5M902 FAIRCHILD IND INC FAIRCHILD AEROSPACE FASTENER DIV
3016 W LOMITA BLVD
TORRANCE, CALIFORNIA 90505-5103

56878 SPS TECHNOLOGIES INC AEROSPACE AND INDUSTRIAL PRODUCTS DIV
HIGHLAND AVENUE
JENKINTOWN, PENNSYLVANIA 19046

72962 HARVARD INDUSTRIES INC
3 WERNER WAY SUITE 210
LEBANON, NEW JERSEY 08833

73197 HI-SHEAR TECHNOLOGY CORP
2600 SKYPARK DRIVE
TORRANCE, CALIFORNIA 90509

82402 GEAR SYSTEMS
6125 SILVER CREEK DR P.O. BOX 680910
PARK CITY, UTAH 84068-0910

83086 NEW HAMPSHIRE BALL BEARINGS, INCORPORATED
ROUTE 202
PETERBOROUGH, NEW HAMPSHIRE 03458

85495 BRILES MFG CO SEE OMARK INDUSTRIES
PRECISION FASTENING SUB OF OMARK IND INC SEE DEUTSCH
FASTENER CORP V08524
OMARK INDUSTRIES SEE PRECISION FASTENING

VENDORS

92215 FAIRCHILD IND INC FAIRCHILD AEROSPACE FASTENER DIV
3010 W LOMITA BLVD
TORRANCE, CALIFORNIA 90505-5102

97393 SHUR-LOK CORPORATION
2541 WHITE ROAD PO BOX 19584
IRVINE, CALIFORNIA 92713

97928 DEUTSCH FASTENER CORP
3969 PARAMONT BOULEVARD
LAKEWOOD, CALIFORNIA 90712-4193

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
AN960C1416		2	10	1
BACB10AS14		1	10	1
		1	40	1
BACB10AS21		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
BACB10AW16		2	33	1
BACB30VT5K8		2	20	3
BACC30BL5		2	25	3
BACN10JC14		2	5	1
BACW10P275C		1	7	2
BMN4122AD3-14		2	5	1
BMN4122A14		2	5	1
HST10AG5-8		2	20	3
HST79-5		2	25	3
HST79CY5		2	25	3
H10-14BAC		2	5	1
LLMB540		1	10	1
		1	40	1
LLMB542		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
LLMKP16BS		2	33	1
MB540-2TS		1	10	1
		1	40	1
MB540DD		1	10	1
		1	40	1
MB540DDFS428		1	10	1
		1	40	1
MB540DDG20		1	10	1
		1	40	1
MB540DDLY196		1	10	1
		1	40	1

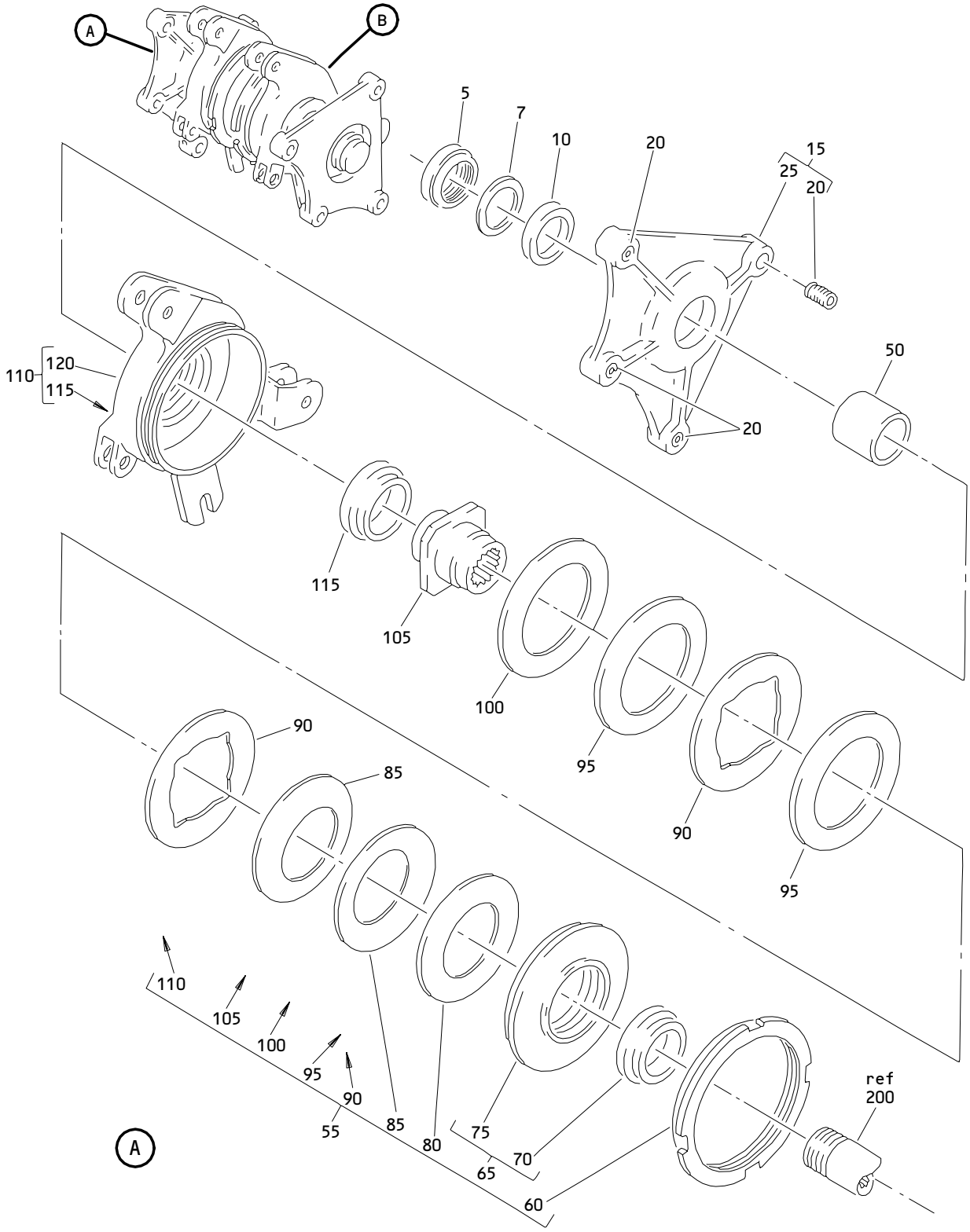
PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
MB540DDSD610		1	10	1
MB540DDSD610		1	40	1
MB540TT		1	10	1
		1	40	1
MB542-2TS		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542DD		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542DDFS428		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542DDG20		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542DDLY196		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542DDSD610		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
MB542TT		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
MKP16BS		2	33	1
MS21209F4-15		1	20	4
		1	35	4
MT340E		1	10	1
		1	40	1
MT342E		1	70	1
		1	115	1
		1	140	1
		1	185	1
		2	65	2
		2	130	2
RMLH9074-14		2	5	1
SL7165C14C		1	5	2
253T7500-1		1	1	RF
253T7500-2		1	1A	RF
253T7500-3		1	1B	RF
		2	1	RF
253T7500-4		1	1C	RF
		2	1A	RF
253T7501-1		1	125	1
253T7501-2		1	55	1
253T7501-3		1	125A	1
253T7501-4		1	55A	1
253T7502-1		1	180	1
		2	120	1
253T7502-2		1	110	1
		2	125	1
253T7502-3		1	190	1
		2	135	1
253T7502-4		1	120	1
		2	140	1
253T7503-1		1	200	1

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
253T7504-1		1	30	1
253T7504-2		1	15	1
253T7504-3		1	45	1
253T7504-4		1	25	1
253T7505-1		1	50	2
253T7522-1		2	45	1
253T7522-2		2	50	1
253T7522-3		2	45A	1
253T7522-4		2	50A	1
253T7522-5		2	45B	1
253T7522-6		2	50B	1
253T7523-1		2	150	1
253T7524-1		2	155	1
253T7525-1		2	160	1
253T7526-1		2	30	2
253T7527-1		2	40	1
253T7528-1		2	165	1
253T7529-1		2	145	1
253T7530-1		2	75	2
253T7530-2		2	80	2
253T7530-3		2	85	2
253T7530-4		2	90	2
253T7535-1		2	115	2
		2	115B	2
253T7535-2		2	115A	2
253T7536-1		2	100	2
253T7536-2		2	102	2
		2	102B	2
253T7536-3		2	102A	2
253T7537-1		2	95	6
253T7538-1		2	15	1
253T7538-2		2	35	1

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
253T7539-1		2	60	2
253T7539-2		2	70	2
253T7539-3		2	60A	2
253T7539-4		2	72	2
254N1159-10		1	80F	1
		1	150F	1
254N1159-11		1	80G	1
		1	150G	1
254N1159-12		1	80H	1
		1	150H	1
254N1159-13		1	80J	1
		1	150J	1
254N1159-14		1	80A	1
		1	150A	1
254N1159-15		1	80B	1
		1	150B	1
254N1159-16		1	80C	1
		1	150C	1
254N1159-17		1	80D	1
		1	150D	1
254N1159-5		1	80	1
254N1159-5		1	150	1
254N1159-9		1	80E	1
		1	150E	1
254N1161-1		1	85	2
		1	155	2
		2	95A	6
254N1162-5		1	65	1
		1	135	1
254N1162-6		1	75	1
		1	145	1
254N1165-2		1	105	1
		1	175	1
254N1166-1		1	100	1
		1	170	1
		2	110	2
		2	110B	2
254N1166-2		2	110A	2

PART NUMBER	AIRLINE PART NO.	FIG.	ITEM	TTL REQ
254N1167-2		1	90	2
		1	160	2
254N1169-3		1	195	1
254N1183-1		1	60	1
		1	130	1
		2	55	2
		2	110A	2
48FT1414		2	5	1
90650		1	95	2
		1	165	2
		2	105A	4
90653		1	95A	2
		1	165A	2
90656		2	105B	4



Autothrottle Brake Pack Assembly
Figure 1 (Sheet 1)

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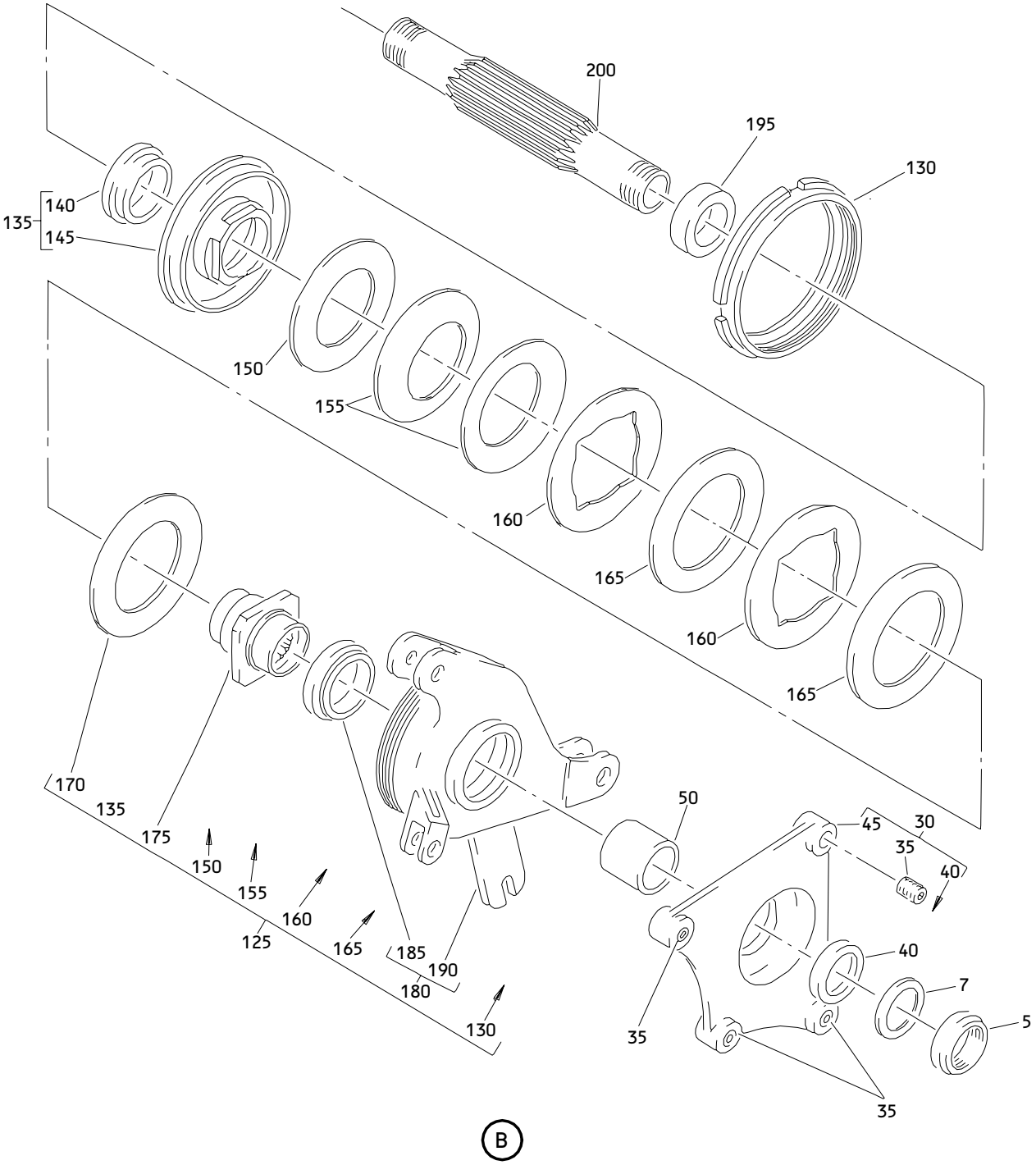


Autothrottle Brake Pack Assembly
Figure 1 (Sheet 2)

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	-1	253T7500-1		PACK ASSY-AUTO THROTTLE BRAKE	A	RF
R	-1A	253T7500-2		PACK ASSY-AUTO THROTTLE BRAKE	B	RF
R	-1B	253T7500-3		PACK ASSY-AUTO THROTTLE BRAKE (FOR DETAILS SEE FIG. 2)	C	RF
R	-1C	253T7500-4		PACK ASSY-AUTO THROTTLE BRAKE (FOR DETAILS SEE FIG. 2)	D	RF
R	5	SL7165C14C		.NUT-BRG LOCK (V97393)	A,B	2
R	7	BACW10P275C		.WASHER	B	2
	10	MB540DDSD610		.BEARING- (V83086) (SPEC BACB10AS14) (OPT LLMB540 (V38443)) (OPT MB540-2TS (V43991)) (OPT MB540DDFS428 (V21335)) (OPT MB540TT (V43991)) (OPT MB540DDG20 (V38443)) (OPT MT340E (VK8455)) (OPT MB540DDLY196 (V40920)) (OPT MB540DD (V06144))	A,B	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	15	253T7504-2		.BRACKET ASSY-SPRT	A,B	1
	20	MS21209F4-15		..INSERT	A,B	4
	25	253T7504-4		..BRACKET	A,B	1
	30	253T7504-1		.BRACKET ASSY-SPRT	A,B	1
	35	MS21209F4-15		..INSERT	A,B	4
	40	MB540DDSD610		..BEARING- (V83086) (SPEC BACB10AS14) (OPT LLMB540 (V38443)) (OPT MB540-2TS (V43991)) (OPT MB540DDFS428 (V21335)) (OPT MB540TT (V43991)) (OPT MB540DDG20 (V38443)) (OPT MT340E (VK8455)) (OPT MB540DDLY196 (V40920)) (OPT MB540DD (V06144))	A,B	1
	45	253T7504-3		..BRACKET	A,B	1
	50	253T7505-1		.SPACER	A,B	2
R	55	253T7501-2		.BRAKE ASSY	A	1
R	-55A	253T7501-4		.BRAKE ASSY	B	1
	60	254N1183-1		..NUT	A,B	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	65	254N1162-5		..CAP ASSY-END	A,B	1
	70	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (V06144))	A,B	1
	75	254N1162-6		...CAP	A,B	1
	80	254N1159-5		..SHIM- (SELECT FROM)	A,B	AR
	-80A	254N1159-14		..SHIM- (SELECT FROM)	A,B	AR
	-80B	254N1159-15		..SHIM- (SELECT FROM)	A,B	AR
	-80C	254N1159-16		..SHIM- (SELECT FROM)	A,B	AR
	-80D	254N1159-17		..SHIM- (SELECT FROM)	A,B	AR
R	-80E	254N1159-9		..SHIM- (SELECT FROM)	A,B	AR
R	-80F	254N1159-10		..SHIM- (SELECT FROM)	A,B	AR
R	-80G	254N1159-11		..SHIM- (SELECT FROM)	A,B	AR
R	-80H	254N1159-12		..SHIM- (SELECT FROM)	A,B	AR
R	-80J	254N1159-13		..SHIM- (SELECT FROM)	A,B	AR

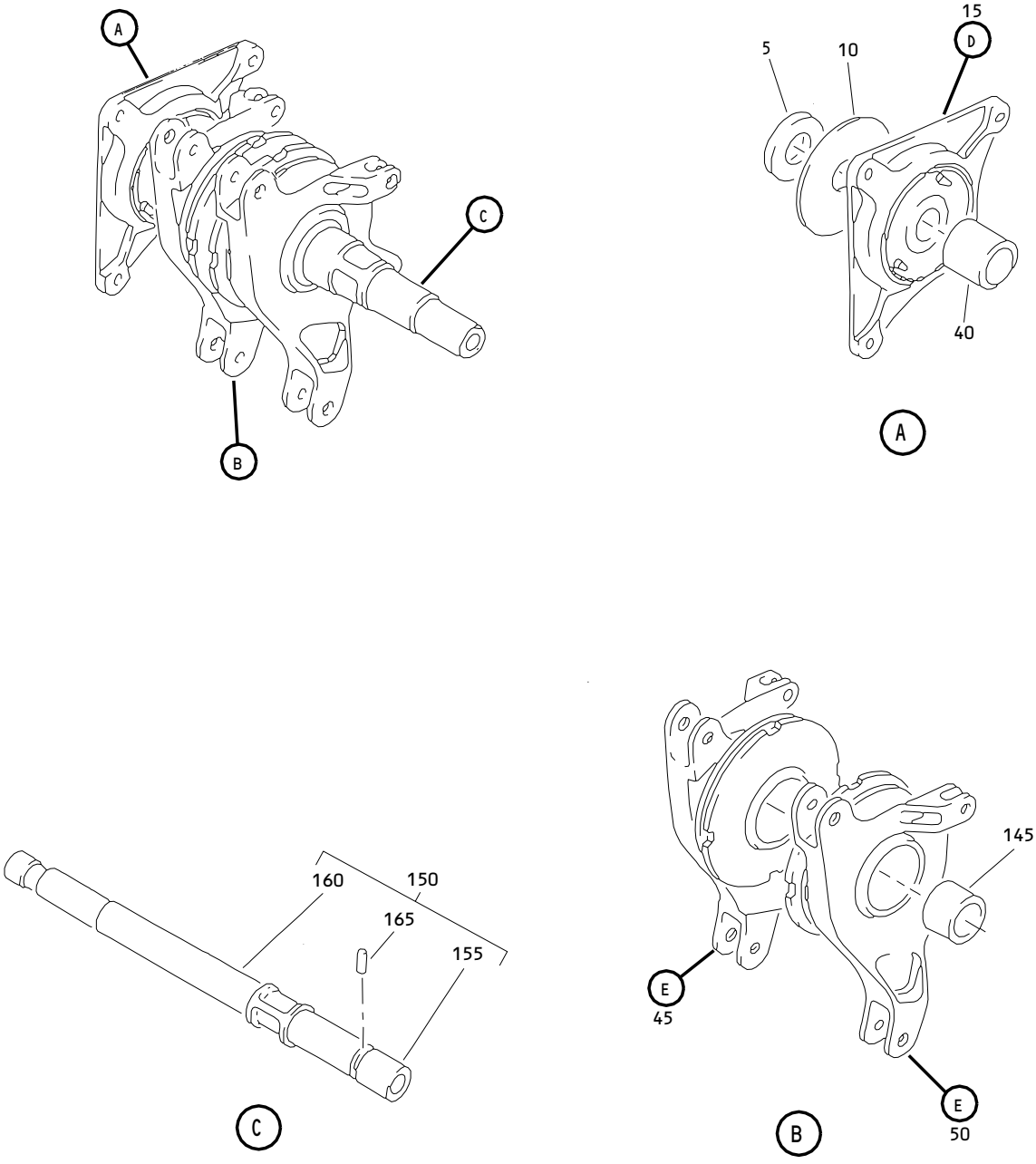
	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	85	254N1161-1		..SPRING	A,B	2
	90	254N1167-2		..STATOR	A,B	2
	95	90650		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90653 IN SHIPSETS OF 2 ONLY) (V82402) (OPT ITEM 95A)	A	2
R	-95A	90653		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90653 IN SHIPSETS OF 2 ONLY) (V82402) (OPT ITEM 95)	A	2
R	-95B	90650		..ROLLER ASSY- (V82402)	B	2
	100	254N1166-1		..DISC	A,B	1
	105	254N1165-2		..ROTOR	A,B	1
	110	253T7502-2		..HOUSING ASSY-R	A,B	1
	115	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (V06144))	A,B	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	120	253T7502-4		...HOUSING	A,B	1
R	125	253T7501-1		.BRAKE ASSY	A	1
R	-125A	253T7501-3		.BRAKE ASSY	B	1
	130	254N1183-1		..NUT	A,B	1
	135	254N1162-5		..CAP ASSY-END	A,B	1
	140	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (V06144))	A,B	1
	145	254N1162-6		...CAP	A,B	1
	150	254N1159-5		..SHIM- (SELECT FROM)	A,B	AR
	-150A	254N1159-14		..SHIM- (SELECT FROM)	A,B	AR
	-150B	254N1159-15		..SHIM- (SELECT FROM)	A,B	AR
	-150C	254N1159-16		..SHIM- (SELECT FROM)	A,B	AR
	-150D	254N1159-17		..SHIM- (SELECT FROM)	A,B	AR
R	-150E	254N1159-9		..SHIM- (SELECT FROM)	A,B	AR
R	-150F	254N1159-10		..SHIM- (SELECT FROM)	A,B	AR
R	-150G	254N1159-11		..SHIM- (SELECT FROM)	A,B	AR
R	-150H	254N1159-12		..SHIM- (SELECT FROM)	A,B	AR
R	-150J	254N1159-13		..SHIM- (SELECT FROM)	A,B	AR

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	01-					
	155	254N1161-1		..SPRING	A,B	2
	160	254N1167-2		..STATOR	A,B	2
	165	90650		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90653 IN SHIPSETS OF 2 ONLY) (V82402) (OPT ITEM 165A)	A	2
R	-165A	90653		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90653 IN SHIPSETS OF 2 ONLY) (V82402) (OPT ITEM 165)	A	2
R	-165B	90650		..ROLLER ASSY- (V82402)	B	2
	170	254N1166-1		..DISC	A,B	1
	175	254N1165-2		..ROTOR	A,B	1
	180	253T7502-1		..HOUSING ASSY-L	A,B	1
	185	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (V06144))	A,B	1

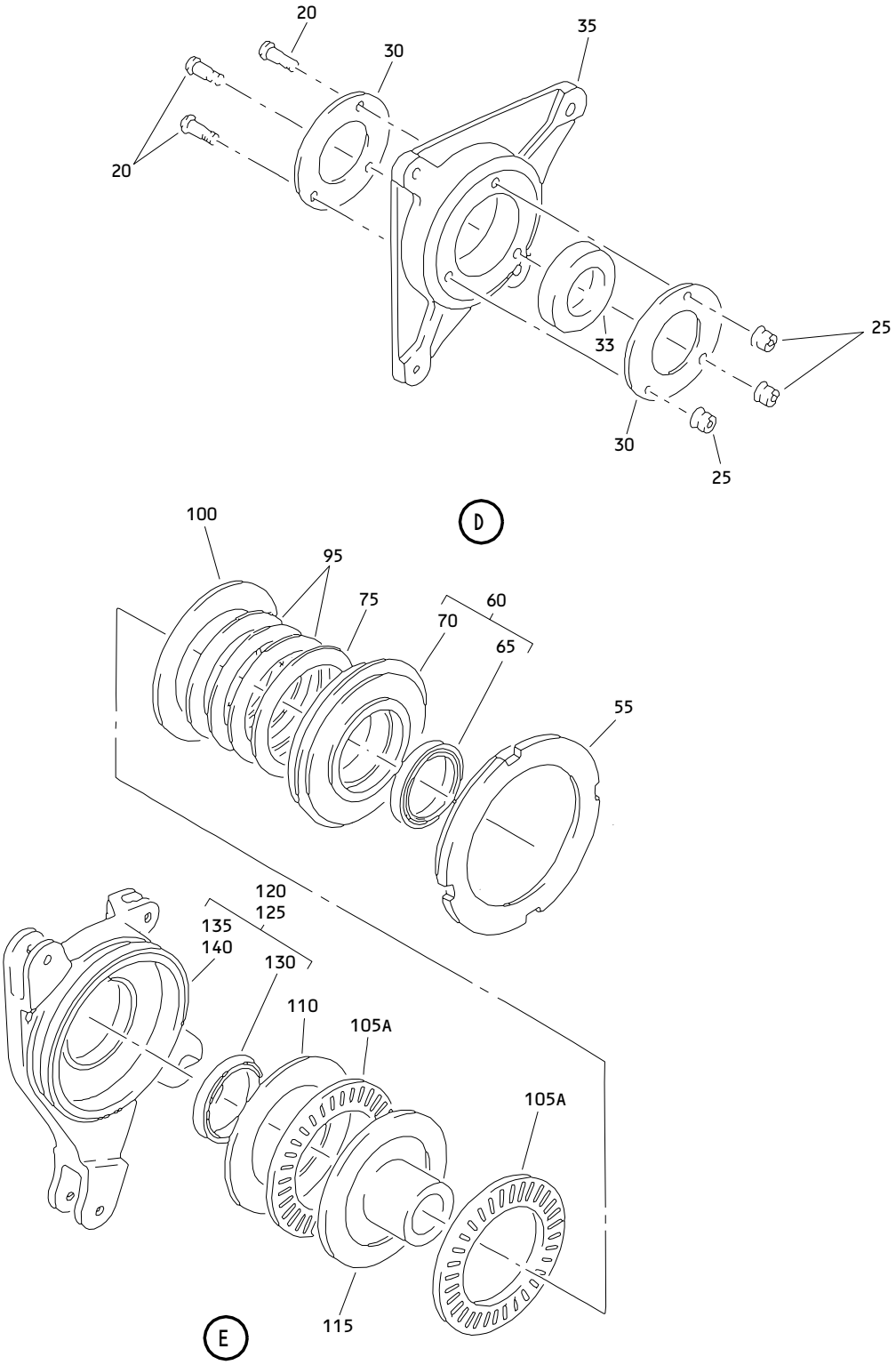
FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
01-					
190	253T7502-3		...HOUSING	A,B	1
195	254N1169-3		.SPACER	A,B	1
200	253T7503-1		.SHAFT	A,B	1

- Item Not Illustrated



Autothrottle Brake Pack Assembly
Figure 2 (Sheet 1)

B26784



Autothrottle Brake Pack Assembly
Figure 2 (Sheet 2)

B26786

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	-1	253T7500-3		PACK ASSY-AUTOTHROTTLE BRAKE	C	RF
R	-1A	253T7500-4		PACK ASSY-AUTOTHROTTLE BRAKE	D	RF
R	5	H10-14BAC		.NUT- (V15653) (SPEC BACN10JC14) (OPT BMN4122A14 (V85495)) (OPT RMLH9074-14 (V72962)) (OPT 48FT1414 (V56878)) (OPT BMN4122AD3-14 (V97928))	C,D	1
R	10	AN960C1416		.WASHER	C,D	1
R	15	253T7538-1		.SUPPORT ASSY	C,D	1
R	20	HST10AG5-8		..BOLT- (V0PTK6) (SPEC BACB30VT5K8) (OPT HST10AG5-8 (V06725)) (OPT HST10AG5-8 (V56878)) (OPT HST10AG5-8 (V73197))	C,D	3
R	25	HST79CY5		..COLLAR- (V73197) (SPEC BACC30BL5) (OPT HST79-5 (V92215)) (OPT HST79-5 (V56878)) (OPT HST79-5 (V5M902))	C,D	3

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	30	253T7526-1		..RETAINER-BEARING	C,D	2
R	33	MKP16BSFS428		..BEARING- (V21335) (SPEC BACB10AW16) (OPT MKP16BSE9273 (V21335)) (OPT MKP16BSTT (V43991)) (OPT MKP16BS2TS (V43991)) (OPT LLMKP16BS (V38443)) (OPT MKP16BS (V06144)) (OPT MKP16BSG20 (V38443)) (OPT MKP16BSSD610 (V83086)) (OPT MKP16BS007M (V40920))	C,D	1
R	35	253T7538-2		..SUPPORT	C,D	1
R	40	253T7527-1		.SPACER	C,D	1
R	45	253T7522-1		.BRAKE ASSY	C	1
R	-45A	253T7522-3		.BRAKE ASSY- (OPT ITEM 45B)	D	1
R	-45B	253T7522-5		.BRAKE ASSY- (OPT ITEM 45A)	D	1
R	50	253T7522-2		.BRAKE ASSY	C	1
R	-50A	253T7522-4		.BRAKE ASSY- (OPT ITEM 50B)	D	1
R	-50B	253T7522-6		.BRAKE ASSY- (OPT ITEM 50A)	D	1
R	55	254N1183-1		..NUT	C,D	1
R	60	253T7539-1		..CAP ASSY	C	1
R	-60A	253T7539-3		..CAP ASSY	D	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	65	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (VO6144))	C,D	1
R	70	253T7539-2		...CAP	C	1
R	72	253T7539-4		...CAP	D	1
R	75	253T7530-1		..SHIM	C,D	AR
R	80	253T7530-2		..SHIM	C,D	AR
R	85	253T7530-3		..SHIM	C,D	AR
R	90	253T7530-4		..SHIM	C,D	AR
R	95	253T7537-1		..SPRING- (253T7537-1 MAY REPLACE OR BE REPLACED BY 254N1161-1 IN SHIPSETS OF 3 ONLY) (OPT ITEM 95A)	C,D	3
R	-95A	254N1161-1		..SPRING- (253T7537-1 MAY REPLACE OR BE REPLACED BY 254N1161-1 IN SHIPSETS OF 3 ONLY) (OPT ITEM 95)	C,D	3

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	100	253T7536-1		..STATOR	C	1
R	102	253T7536-2		..STATOR- (USED ON ITEMS 45A, 50A)	D	1
R	-102A	253T7536-3		..STATOR- (USED ON ITEMS 45B, 50B) (OPT ITEM 102B)	D	1
R	-102B	253T7536-2		..STATOR- (USED ON ITEMS 45B, 50B) (OPT ITEM 102A)	D	1
	105	906565		DELETED		
R	105A	90650		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90656 IN SHIPSETS OF 2 ONLY) (V82402) (OPT ITEM 105B)	C,D	2
R	-105B	90656		..ROLLER ASSY-SKEWED (90650 MAY REPLACE OR BE REPLACED BY 90656 IN SHIPSETS OF 2 ONLY) (V00462) (OPT ITEM 105A)	C,D	2
R	110	254N1166-1		..DISC- (USED ON ITEMS 45, 45A, 50, 50A)	C,D	1
R	-110A	254N1166-2		..DISC- (USED ON ITEMS 45B, 50B) (OPT ITEM 110B)	D	1
R	-110B	254N1166-1		..DISC- (USED ON ITEMS 45B, 50B) (OPT ITEM 110A)	D	1
R	115	253T7535-1		..ROTOR- (USED ON ITEMS 45, 45A, 50, 50A)	C,D	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	-115A	253T7535-2		..ROTOR- (USED ON ITEMS 45B, 50B) (OPT ITEM 115B)	D	1
R	-115B	253T7535-1		..ROTOR- (USED ON ITEMS 45B, 50B) (OPT ITEM 115A)	D	1
R	120	253T7502-1		..HOUSING ASSY-LEFT (USED ON ITEM 45)	C,D	1
R	-125	253T7502-2		..HOUSING ASSY-RIGHT (USED ON ITEM 50)	C,D	1
R	130	MB542DDSD610		...BEARING- (V83086) (SPEC BACB10AS21) (OPT LLMB542 (V38443)) (OPT MB542-2TS (V43991)) (OPT MB542DDFS428 (V21335)) (OPT MB542TT (V43991)) (OPT MB542DDG20 (V38443)) (OPT MT342E (VK8455)) (OPT MB542DDLY196 (V40920)) (OPT MB542DD (V06144))	C,D	1

	FIG. & ITEM	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1234567	EFF CODE	QTY PER ASSY
	02-					
R	135	253T7502-3		...HOUSING- (USED ON ITEM 120)	C,D	1
R	140	253T7502-4		...HOUSING- (USED ON ITEM 125)	C,D	1
R	145	253T7529-1		.SPACER	C,D	1
R	150	253T7523-1		.SHAFT ASSY	C,D	1
R	155	253T7524-1		..SHAFT-INNER	C,D	1
R	160	253T7525-1		..SHAFT-OUTER	C,D	1
R	165	253T7528-1		..PIN	C,D	1

- Item Not Illustrated