COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

POWER DRIVE UNIT ASSEMBLY

PART NUMBER 256A3510–1, –2, –3, –4, –5

PUBLISHED BY BOEING COMMERCIAL AIRPLANES GROUP, SEATTLE, WASHINGTON, USA
A DIVISION OF THE BOEING COMPANY
PAGE DATE: Jul 01/2009

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COMPONENT MAINTENANCE MANUAL

Revision No. 10
Jul 01/2009

To: All holders of POWER DRIVE UNIT ASSEMBLY 27-55-77.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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

For printed manuals, changes are indicated on the List of Effective Pages (LEP). The pages which are revised will be identified on the LEP by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the LEP is identified by Chapter-Section-Subject number, page number and page date.

Pages replaced or made obsolete by this revision should be removed and destroyed.

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Location of Change	Description of Change
	NO HIGHLIGHTS

COMPONENT MAINTENANCE MANUAL

A = Added, R = Revised, D = Deleted, O = Overflow

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TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 38323	JUL 01/02

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

Revision		Filed		Revision		Filed	
Number	Date	Date	Initials	Number	Date	Date	Initials

Revision		Filed		Revision		Filed	
Number	Date	Date	Initials	Number	Date	Date	Initials

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All temporary revisions to this manual will be accompanied by a cover sheet bearing the temporary revision number. Enter the temporary revision number in numerical order, together with the temporary revision date, the date the temporary revision is inserted and the initials of the person filing.
When the temporary revision is incorporated or cancelled, and the pages are removed, enter the date the pages are removed and the initials of the person who removed the temporary revision.

Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

Temporary Revision		Inserted		Removed	
Number	Date	Date	Initials	Date	Initials

Temporary Revision		Inserted		Removed	
Date	Initials	Number	Date	Date	Initials

INTRODUCTION

1. General

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

B. This manual is divided into different parts:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) List of Effective Pages

(5) Table of Contents

(6) Temporary Revision & Service Bulletin Record

(7) Record of Revisions

(8) Record of Temporary Revisions

(9) Introduction

(10) Procedures & IPL Sections

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

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

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

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

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

FLAP ACTUATION POWER DRIVE UNIT ASSEMBLY - DESCRIPTION AND OPERATION

1. **Description**

   A. The power drive unit (PDU) assembly has a gearbox assembly, an electric motor, and a hydraulic motor.

2. **Operation**

   A. The PDU assembly is operated hydraulically to operate the flaps of the airplane. As an alternative, the PDU assembly is electrically operated.

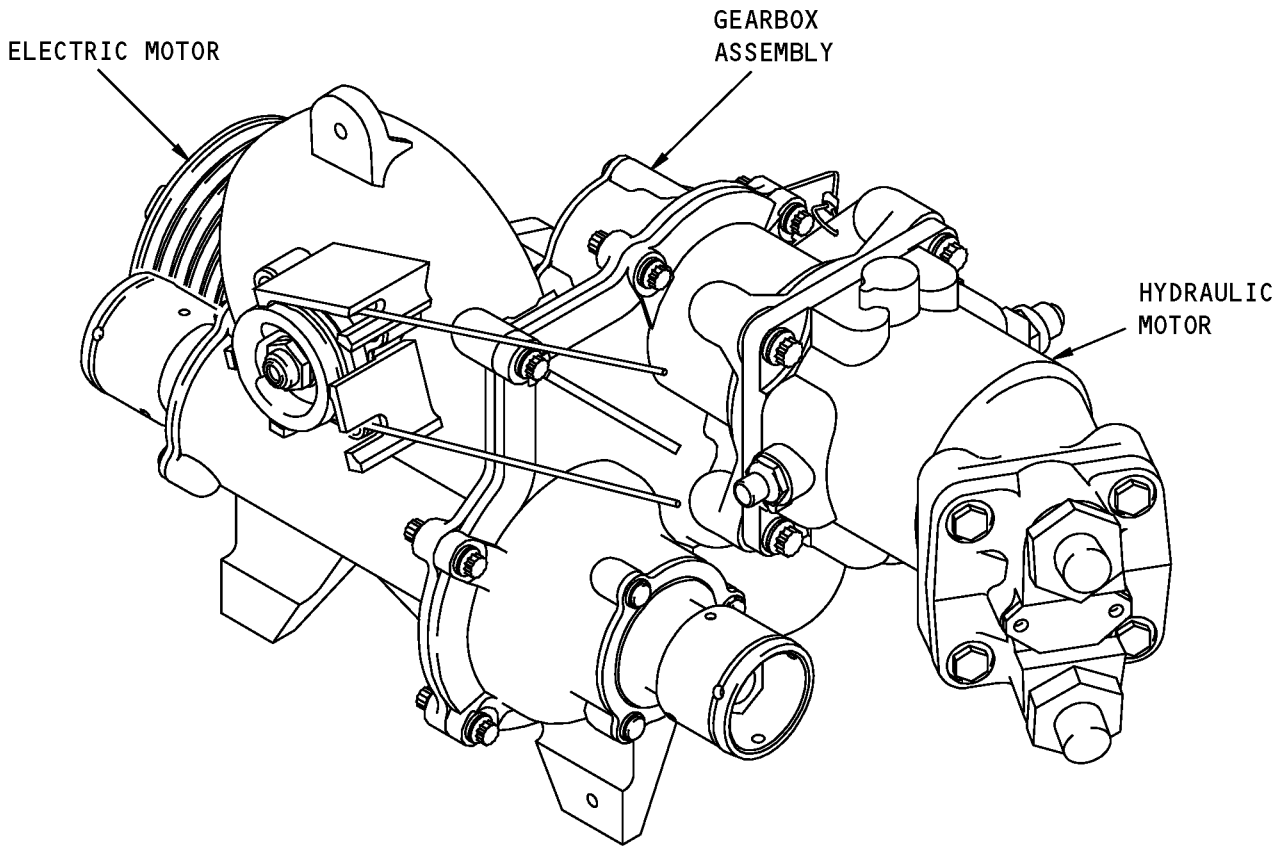
3. **Leading Particulars (Approximate)**

   A. Length – 24 inches

   B. Width – 15 inches

   C. Height – 15 inches

   D. Weight – 53 pounds



Flap Actuation Power Drive Unit Assembly
Figure 1

COMPONENT MAINTENANCE MANUAL

TESTING AND FAULT ISOLATION

(NOT APPLICABLE)

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the power drive unit (PDU) assembly.

B. Disassemble this component sufficiently to isolate the defects, do the necessary repairs, and put the component back to a serviceable condition.

C. Refer to IPL Figure 1 for item numbers.

2. Power Drive Unit (PDU) Disassembly

A. References

Reference	Title
CMM 27-55-87	FLAP ACTUATION GEARBOX ASSEMBLY

B. Part Replacement

NOTE: These parts are recommended for replacement. Replacement of other parts can be by in-service experience.

(1) Packings (40, 50, 60A)

C. Procedure

(1) Remove the bolts (5A), the washers (10), and the electric motor (30B) from the gearbox assembly (65).

(2) Remove the bolts (20), the washers (25), and the hydraulic motor (15A) from the gearbox assembly (65).

(3) Remove the reducer (35), the plug (45), the valve (55), and the packings (40, 50, 60A) from the hydraulic motor (15A).

(4) Refer to the vendor's instructions for overhaul of the motors. Refer to CMM 27-55-87 for overhaul of the gearbox.

(NOT APPLICABLE)

(NOT APPLICABLE)

(NOT APPLICABLE)

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the power drive unit assembly.

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

C. Refer to IPL Figure 1 for item numbers.

2. PDU Assembly

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00913	Compound - Corrosion Inhibiting Material, Nondrying Resin Mix	BMS 3-27
D00633	Grease - Aircraft General Purpose	BMS3-33
G01505	Lockwire - Safety And Lock	NASM20995
G50136	Paste - Corrosion Inhibiting, Non-drying	BMS 3-38

B. References

Reference	Title
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-50-02	INSTALLATION OF SAFETYING DEVICES
SOPM 20-50-06	INSTALLATION OF O-RINGS AND TEFLON SEALS
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure (ASSEMBLY, Figure 701)

NOTE: For finishing materials, refer to SOPM 20-60-02. For lubricants, refer to SOPM 20-60-03. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Apply grease, D00633 to the splines of the gearbox assembly (65) and the electric motor (30B), as shown.

(2) Apply grease, D00633 to the splines of the gearbox assembly (65) and the hydraulic motor (15A), as shown.

WARNING: BMS 3-27 CORROSION INHIBITING COMPOUND CONTAINS SOLVENTS, CHROMATES, AND A SMALL AMOUNT OF BOUND ASBESTOS. CONSULT THE APPLICABLE SAFETY STANDARDS FOR APPROVED HANDLING PROCEDURES.

CAUTION: BMS 3-27 COMPOUND IS USED ONLY IN STATIC JOINTS WHERE GREASE CANNOT BE APPLIED. BMS 3-27 COMPOUND IN DYNAMIC JOINTS WILL NOT LET THEM MOVE FREELY.

(3) Install the electric motor (30B) on the gearbox assembly (65).

(a) For gearbox assembly (65), apply compound, C00913 (optional corrosion inhibiting non-drying paste, G50136) to the electric motor (30B) surface as shown.

(b) Apply compound, C00913 (optional corrosion inhibiting non-drying paste, G50136) to bolts (5A) as shown.

(c) Fill the seal cavity of the gearbox assembly (65) and the electric motor (15A) with grease, D00633 as shown.

(d) Install the electric motor (30B) on the gearbox assembly (65) with the bolts (5A) and washers (10). Tighten bolt (5A) to 50-60 inch-pounds above the run-on torque (SOPM 20-50-01).

WARNING: BMS 3-27 CORROSION INHIBITING COMPOUND CONTAINS SOLVENTS, CHROMATES, AND A SMALL AMOUNT OF BOUND ASBESTOS. CONSULT THE APPLICABLE SAFETY STANDARDS FOR APPROVED HANDLING PROCEDURES.

CAUTION: BMS 3-27 COMPOUND IS USED ONLY IN STATIC JOINTS WHERE GREASE CANNOT BE APPLIED. BMS 3-27 COMPOUND IN DYNAMIC JOINTS WILL NOT LET THEM MOVE FREELY.

(4) Install the hydraulic motor (15A) on the gearbox assembly (65).

(a) For gearbox assembly (65), apply a thin layer of compound, C00913 (optional corrosion inhibiting non-drying paste, G50136) to the hydraulic motor (15A) surface as shown.

(b) Apply compound, C00913 (corrosion inhibiting non-drying paste, G50136) to bolts (20) as shown.

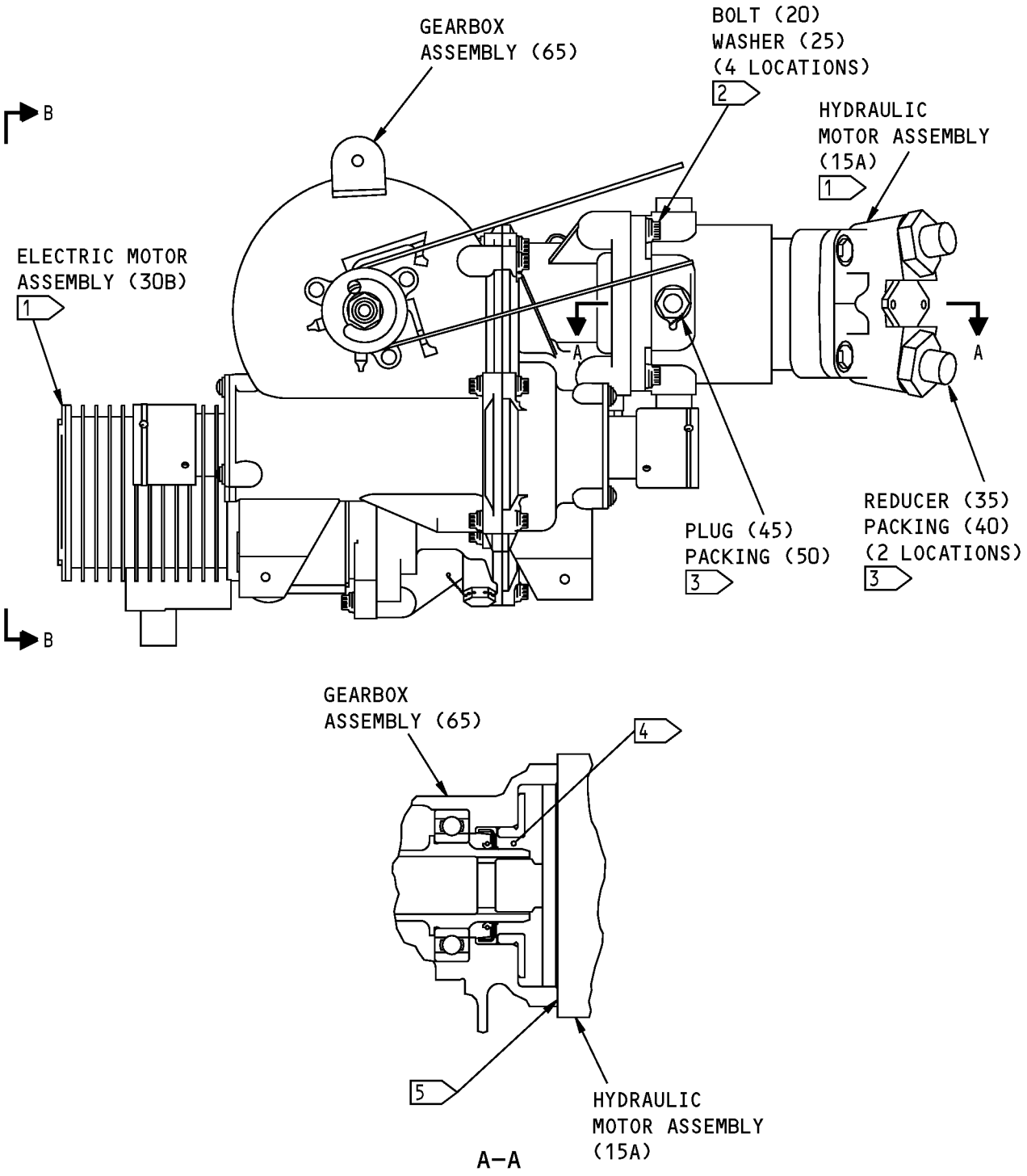
(c) Fill the seal cavity of the gearbox assembly (65) and the hydraulic motor (15A) with grease, D00633.

(d) Install the hydraulic motor (15A) on the gearbox assembly (65) with bolts (20) and washers (25). Tighten the bolts (20) to 95-115 pound-inches (SOPM 20-50-01).

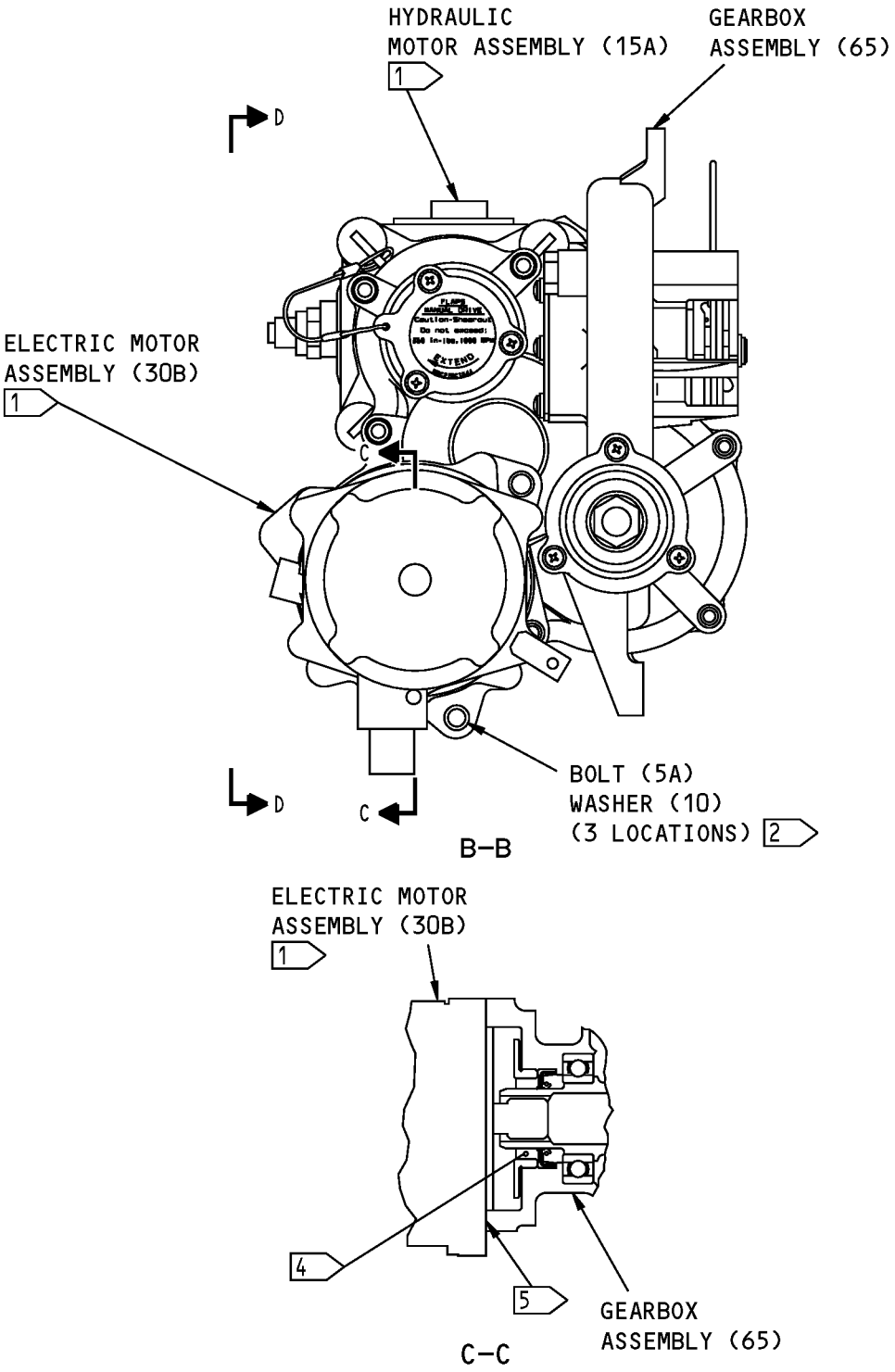
(5) Install plug (45), and valve (55) with packings (50, 60A) on the hydraulic motor (15A) (SOPM 20-50-06).

(6) Install reducers (35) with packings (40) on the hydraulic motor (15A) (SOPM 20-50-06).

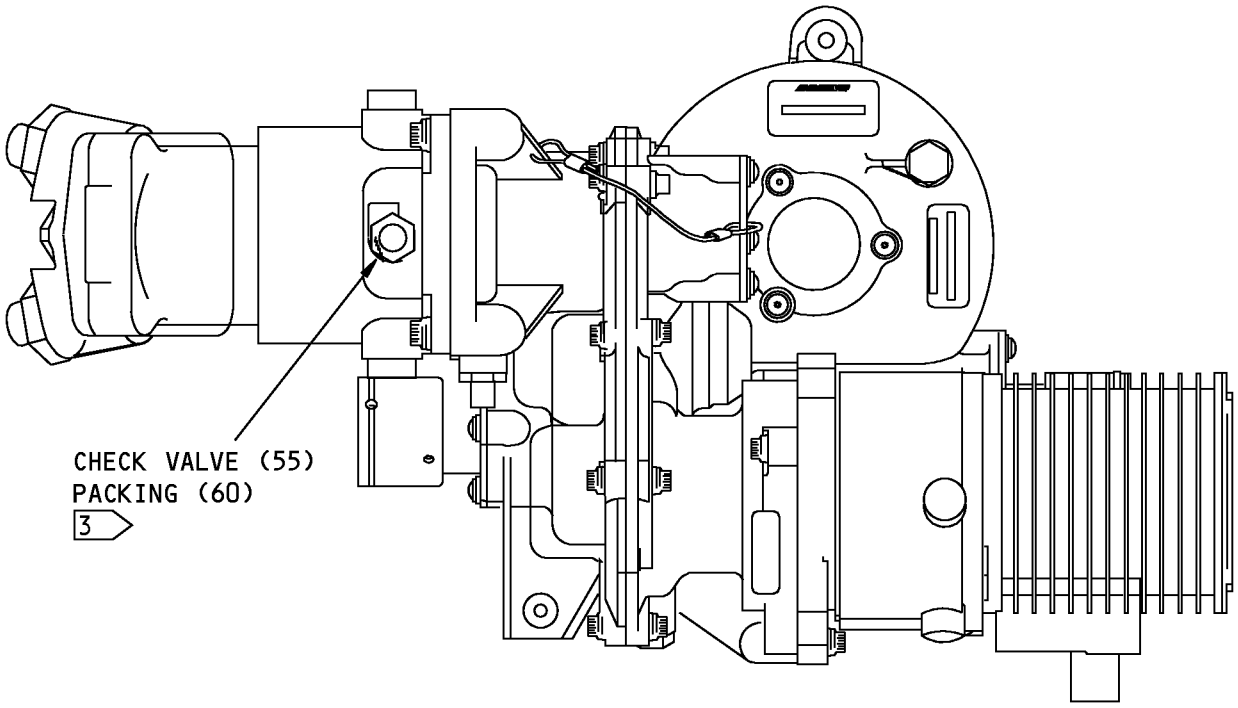
(7) Install lockwire, G01505 on bolts (5A, 20) as shown in ASSEMBLY, Figure 701 and SOPM 20-50-02.



Assembly Details
Figure 701 (Sheet 1 of 3)



Assembly Details
Figure 701 (Sheet 2 of 3)



ITEM NUMBERS REFER TO IPL FIG. 1

1 APPLY BMS 3-33 GREASE TO THE MOTOR OUTPUT SHAFT SPLINES AND ON THE MATING SPLINES ON THE GEARBOX ASSEMBLY

2 APPLY BMS 3-27 CORROSION PREVENTIVE COMPOUND OR BMS 3-38 CORROSION INHIBITING NON-DRYING PASTE TO THE FULL SHANK AND THREADS OF THE FASTENER BUT NOT THE POINT BEFORE INSTALLATION

3 INSTALL AS SHOWN IN SOPM 20-50-00

4 PACK SEAL CAVITY WITH BMS 3-33 GREASE

5 APPLY A THIN LAYER OF BMS 3-27 CORROSION PREVENTIVE COMPOUND OR BMS 3-38 CORROSION INHIBITING NON-DRYING PASTE TO THE MATING SURFACE OF THE MOTOR FLANGE. APPLY IT BETWEEN THE OUTER CONTOUR AND APPROXIMATELY 0.05 INCH FROM THE FILLET RADIUS

Assembly Details
Figure 701 (Sheet 3 of 3)

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COMPONENT MAINTENANCE MANUAL

FITS AND CLEARANCES

(NOT APPLICABLE)

(NOT APPLICABLE)

ILLUSTRATED PARTS LIST

1. Introduction

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

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

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

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

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

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

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

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

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

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

H. Interchangeable Parts

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

VENDOR CODES

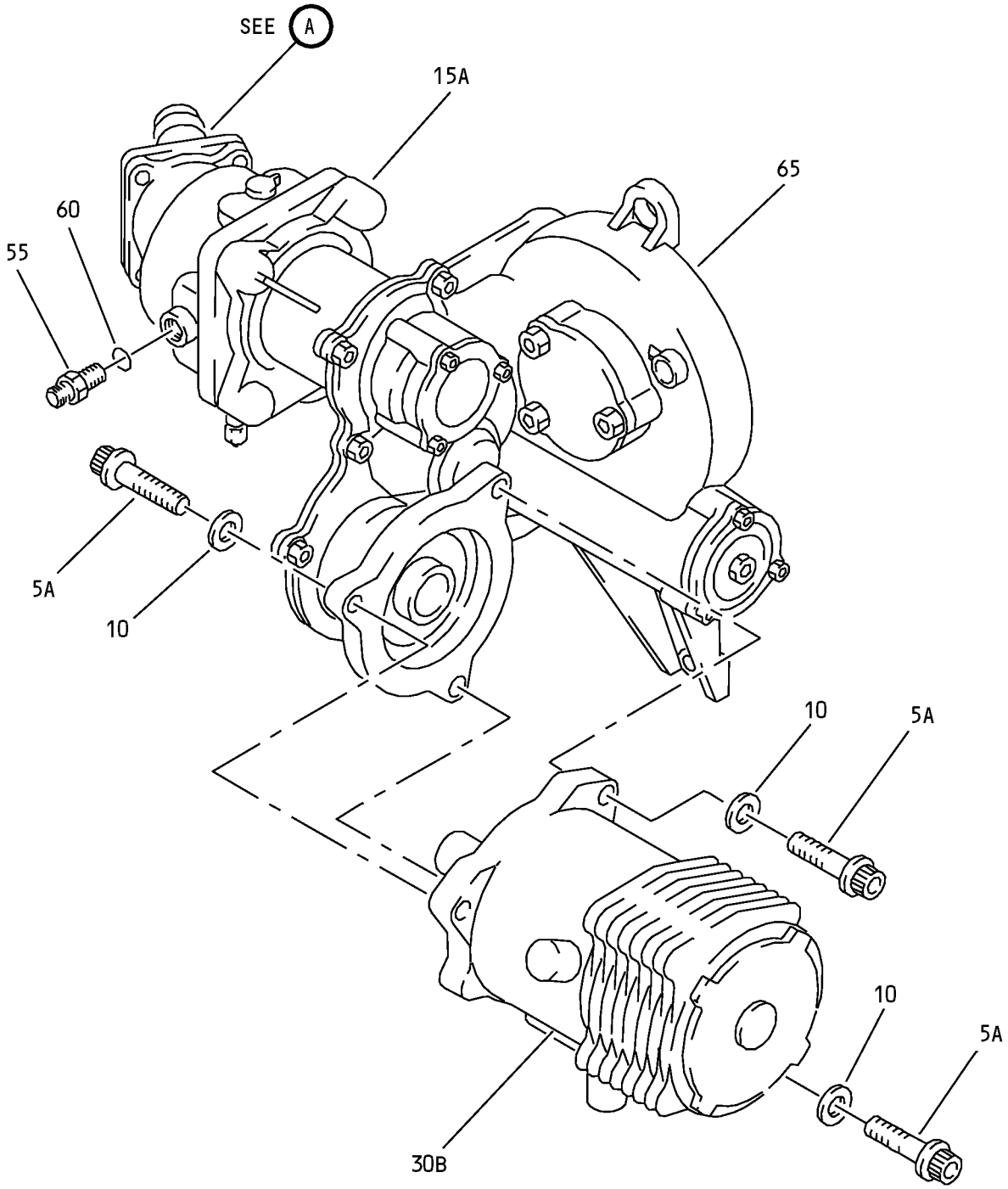
Code	Name
01673	AIRDROME PRECISION COMPONENTS 3251 E AIRPORT WAY LONG BEACH, CALIFORNIA 90806-2407 FORMERLY AIRDROME PARTS CO
11328	Replaced: [V11328] AEROQUIP SEE EATON AEROQUIP V00624 LINAIR ENG A TELEDYNE CO SEE TELEDYNE LINAIR ENGINEERING TELEDYNE INC SEE LINAIR ENGINEERING TELEDYNE LINAIR ENG SEE AEROQUIP CORP LINAIR DIV by Code: Name and Address below 00624: EATON AEROQUIP INC ENGINEERED SYSTEMS DIV 300 S EAST AVE JACKSON, MICHIGAN 49203-1972 FORMERLY AEROQUIP ELBEE PLANT V99879 OR WESTERN PLANT V70128; FORMERLY AEROQUIP AEROSP DIV JACKSON PLANT; FORMERLY V11328 AEROQUIP LINAIR DIV
14397	FABER ENTERPRISES, INCORPORATED 6606 VARIEL AVE CANOGA PARK, CALIFORNIA 91303-2808
14798	DEUTSCH CO METAL COMPONENTS DIV 14800 SOUTH FIGUEROA STREET GARDEN, CALIFORNIA 90248-1795 FORMERLY WEATHERHEAD V79470 FOR AEROSPACE PROD V 61498 DEUSCH CO THE DEUTSCH AEROSPACE FITTINGS CO DIV
30974	AEROFIT PRODUCTS INC 6460 DALE STREET BUENA PARK, CALIFORNIA 90621-3115

Code	Name
50808	UNITED SUPPLY CO INC 3676 S BROADWAY PLACE LOS ANGELES, CALIFORNIA 90007-4432
50948	PARKER-HANNIFIN CORP HUNTSVILLE AIRCRAFT FACILITY 9400 SOUTH MEMORIAL PARKWAY HUNTSVILLE, ALABAMA 35802 FORMERLY PARKER-HANNIFIN CORP TUBE FITTINGS DIV
62983	EATON AEROSPACE VICKERS FLUID POWER 5353 HIGHLAND DRIVE JACKSON, MISSISSIPPI 39206-3449 FORMERLY V63977; FORMERLY VICKERS INC AEROSP
73197	HI-SHEAR TECHNOLOGY CORP 2600 SKYPARK DRIVE TORRANCE, CALIFORNIA 90509
83533	ESSEX IND INC ESSEX MFG. DIV 6 SUNNEN DR SAINT LOUIS, MISSOURI 63143-3903 FORMERLY FILM-SOL CORP V27340 FORMERLY ESSEX CRYOGENICS IND INC
88334	DANA CORP WAREHOUSE OPERATIONS WESTERN REGION WAREHOUSE 8140 WEBB AVE PO BOX 9657 NORTH HOLLYWOOD, CALIFORNIA 91605-1507
98889	TELAIR INTERNATIONAL 1950 WILLIAMS DRIVE OXNARD, CALIFORNIA 93030 FORMERLY TELEFLEX CONTROL SYSTEMS
99240	CRISSAIR, INCORPORATED 38905 10TH STREET EAST PALMDALE, CALIFORNIA 93550-4000 FORMERLY IN EL SEGUNDO, CALIFORNIA

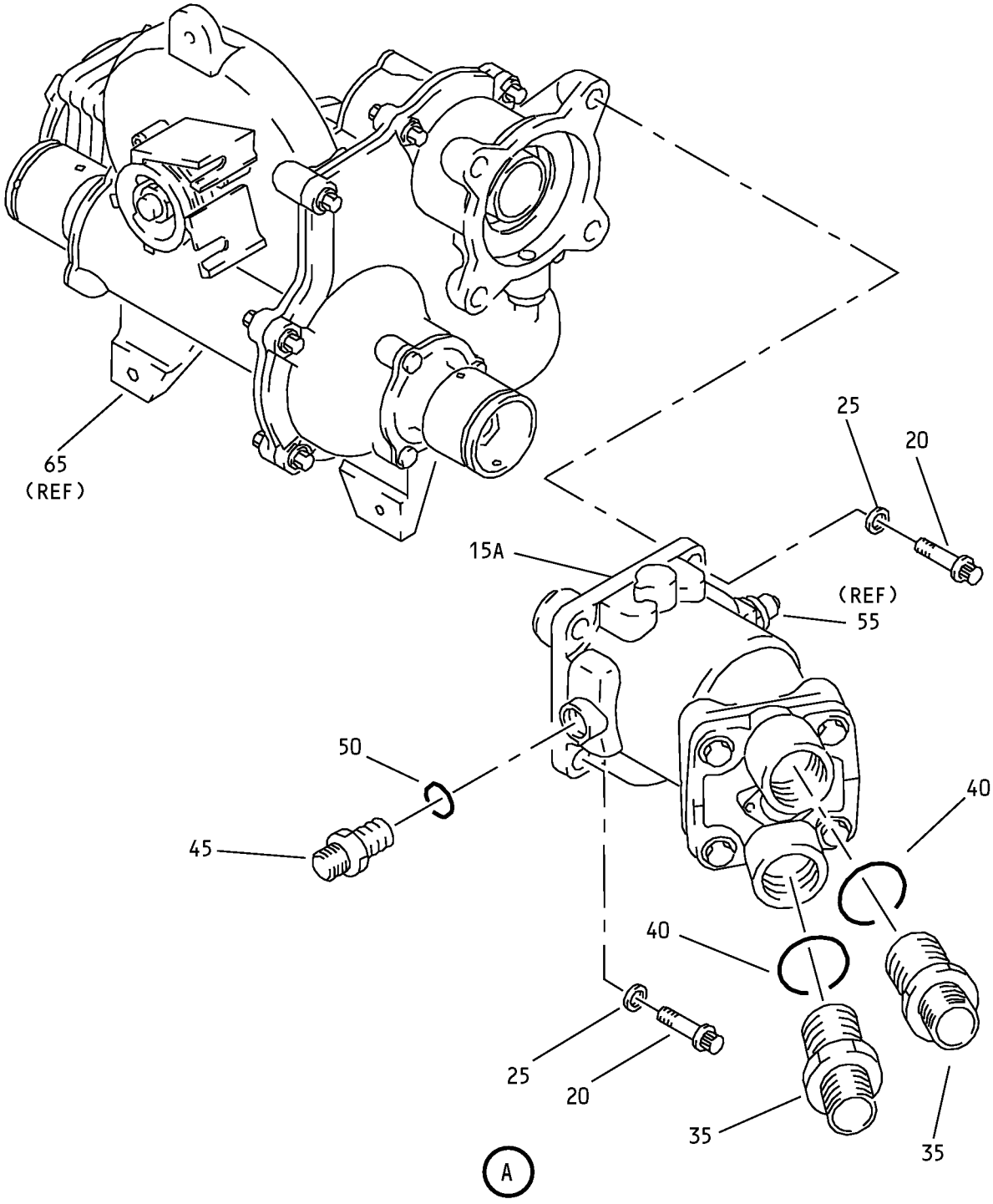
NUMERICAL INDEX

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
0121520600-12		1	55	1
1C3608		1	55	1
2-01075T12-8		1	35	1
256A3510-1		1	1A	RF
256A3510-2		1	1B	RF
256A3510-3		1	1C	RF
256A3510-4		1	1D	RF
256A3510-5		1	1E	RF
256A3515-1		1	65	1
256A3515-2		1	65A	1
256A3515-3		1	65B	1
		1	65C	1
256A3515-4		1	65E	1
31778-12-8		1	35	1
4221T100-3		1	30B	1
4221T100-5		1	30C	1
973600		1	15A	1
AFP23212-8		1	35	1
AN814-4DL		1	45	1
AP102712-8		1	35	1
AS5169D04L		1	45A	1
BACB30MR4HK8		1	5A	3
BACB30MR5K5		1	20	4
BACR17E12-8		1	35	1
BACV10CE12		1	55	1
BACW10BN4AC		1	10	3
BACW10BN5AC		1	25	4
BC916T12-8		1	35	1
DB0R17E12-8		1	35	1
ER21916T12-8		1	35	1
ER31916-12-8		1	35	1
F23-12-8		1	35	1
NAS1612-12		1	40	2
NAS1612-12A		1	40A	2

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
NAS1612-4		1	50	1
NAS1612-4A		1	50A	1
NAS1612-6		1	60B	1
NAS1612-6A		1	60A	1
S250N212-6		1	15A	1
S256T011-8		1	30B	1
S256T011-9		1	30C	1
US2114-12-8		1	35	1



Flap Actuation Power Drive Unit Assembly
IPL Figure 1 (Sheet 1 of 2)



Flap Actuation Power Drive Unit Assembly
IPL Figure 1 (Sheet 2 of 2)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	256A3510-1		POWER DRIVE UNIT ASSY-FLAP ACTUATION	A	RF
–1B	256A3510-2		POWER DRIVE UNIT ASSY-FLAP ACTUATION	B	RF
–1C	256A3510-3		POWER DRIVE UNIT ASSY-FLAP ACTUATION	C	RF
–1D	256A3510-4		POWER DRIVE UNIT ASSY-FLAP ACTUATION	D	RF
–1E	256A3510-5		POWER DRIVE UNIT ASSY-FLAP ACTUATION	E	RF
5	BACB30MR4K8		DELETED		
5A	BACB30MR4HK8		. BOLT		3
10	BACW10BN4AC		. WASHER		3
15	4221T100-1		DELETED		
15A	973600		. MOTOR ASSY-HYD (V62983) (SPEC S250N212-6)		1
20	BACB30MR5K5		. BOLT		4
25	BACW10BN5AC		. WASHER		4
30	973600		DELETED		
30A	S256T011-8		DELETED		
30B	4221T100-3		. MOTOR ASSY-ELECT (V98889) (SPEC S256T011-8)	A, B, D, E	1
–30C	4221T100-5		. MOTOR ASSY-ELECT (V98889) (SPEC S256T011-9)	C	1
–30D	4221T100-3		DELETED		
–30E	4221T100-5		DELETED		

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
35	AFP23212-8		. REDUCER (V30974) (SPEC BACR17E12-8) (OPT AP102712-8 (V01673)) (OPT BC916T12-8 (V50948)) (OPT DB0R17E12-8 (V14798)) (OPT ER21916T12-8 (V88334)) (OPT ER31916-12-8 (V88334)) (OPT F23-12-8 (V73197)) (OPT 2-01075T12-8 (V11328)) (OPT 31778-12-8 (V14397)) (OPT US2114-12-8 (V50808))		1
40	NAS1612-12		. PACKING	A	2
–40A	NAS1612-12A		. PACKING	B-E	2
45	AN814-4DL		. PLUG AND BLEEDER	A, B, D	1
–45A	AS5169D04L		. PLUG AND BLEEDER	C, E	1
50	NAS1612-4		. PACKING	A	1
–50A	NAS1612-4A		. PACKING	B-E	1
55	1C3608		. VALVE (V99240) (SPEC BACV10CE12) (OPT 0121520600-12 (V83533))		1
60	NAS1612-12		DELETED		
60A	NAS1612-6A		. PACKING	C	1
–60B	NAS1612-6		. PACKING	A, B, D, E	1
65	256A3515-1		. GEARBOX ASSY (REF CMM 27-55-87)	A	1
–65A	256A3515-2		. GEARBOX ASSY (REF CMM 27-55-87)	B, C	1
–65B	256A3515-3		. GEARBOX ASSY (REF CMM 27-55-87)	B, C	1
–65C	256A3515-3		. GEARBOX ASSY (REF CMM 27-55-87)	D	1
–65D	256A3515-5		DELETED		
–65E	256A3515-4		. GEARBOX ASSY (REF CMM 27-55-87)	E	1
			DELETED		

–Item not Illustrated