COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

NOSE LANDING GEAR MANUAL RELEASE RELEASE ASSEMBLY

PART NUMBER 273A4510–1, –2, –3

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COMPONENT MAINTENANCE MANUAL

Revision No. 10
Jul 01/2009

To: All holders of NOSE LANDING GEAR MANUAL RELEASE RELEASE ASSEMBLY 32-35-05.

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

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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
		737-SL-32-151	JUL 01/08

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	
Number	Date	Date	Initials

Revision		Filed	
Number	Date	Date	Initials

Revision		Filed		Revision		Filed	
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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

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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.

NOSE LANDING GEAR MANUAL RELEASE ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The nose gear manual release assembly has a steel housing, a titanium shaft and follower arm, a steel cam and a steel spring.

2. Operation

A. The nose gear manual release assembly has an internal cam to give mechanical advantage for pilot inputs. A spiral spring keeps the cable in tension, and also resets the assembly for each use. During operation, the output arm turns approximately 21 degrees. The output roller pushes a tang on the nose gear lock links and pushes them overcenter to let the gear fall by its own weight.

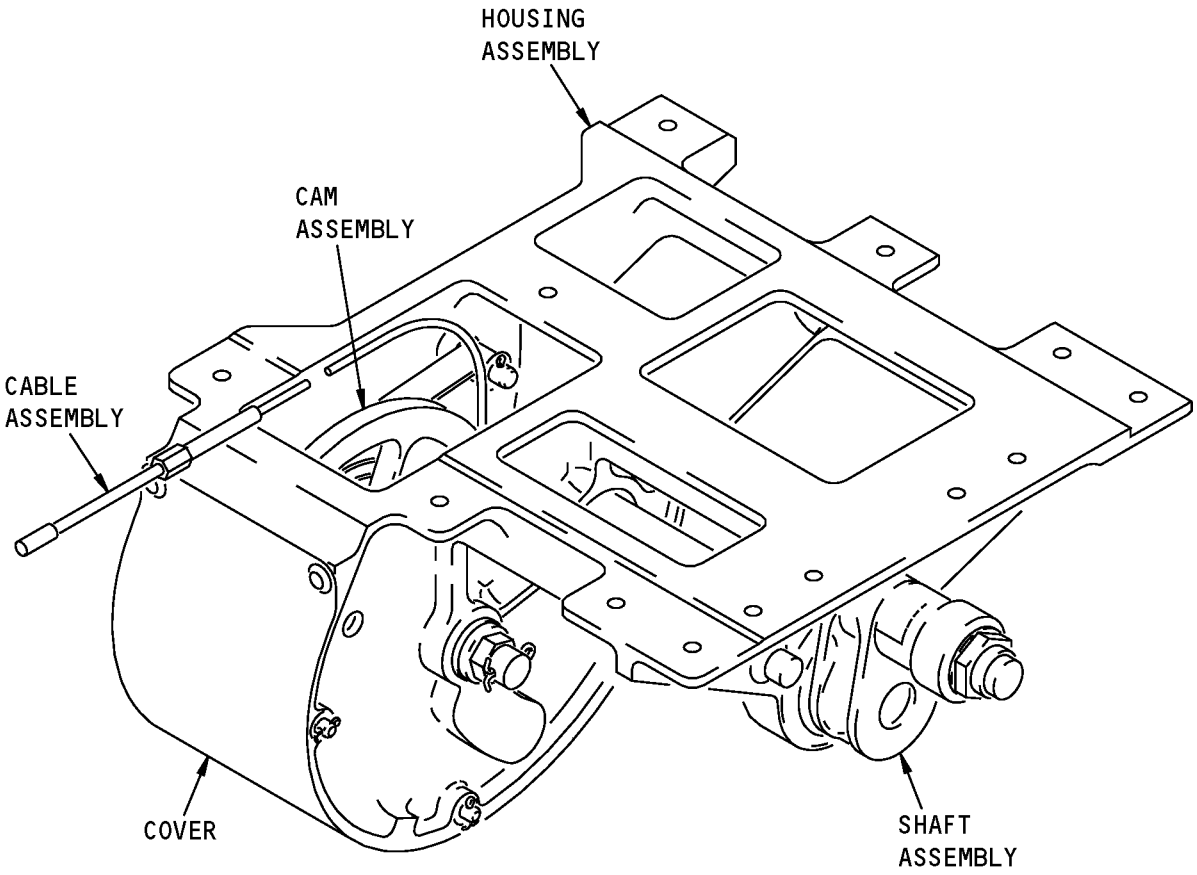
3. Leading Particulars (Approximate)

A. Length – 9 inches

B. Width – 10 inches

C. Height – 5 inches

D. Weight – 6 pounds



Nose Gear Manual Release Assembly
Figure 1

TESTING AND FAULT ISOLATION

1. General

A. This procedure tells how to do a test of the release assembly after an overhaul or for fault isolation.

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. Testing and Fault Isolation

A. Procedure

NOTE: Make sure the parts move freely and do not rub against each other.

(1) Pull cable assembly (180):

(a) Make sure cable assembly (180) and cam assembly (185) moves through a full range of motion between the stop positions.

(b) Make sure spring (175) returns cam assembly (185) to its initial position, and cable assembly (180) stays on cam assembly (185).

(2) Apply the minimum tension on cable assembly (180) to unlock track roller (115):

(a) Turn shaft assembly (60).

(b) Make sure shaft assembly (60) has tension from spring (40), so that track roller (115) and cam assembly (185) do not separate.

(3) Make sure track roller (115) and bearing (90) turn freely.

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the nose gear manual release 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. Disassembly

A. Procedure

(1) Use standard industry procedures and the steps shown below to disassemble this component.

(2) Remove screws (5) and cover (10) from the housing assembly (210).

(3) Remove cotter pins (15), the washers (20), and the guard pins (25) from the housing assembly (210).

(4) Pull follower arm (55) away from the cam assembly (185) to remove the spring (175) preload.

(5) Remove cotter pins (140), the pin (170), the washer (160), and the spacer (165).

(6) Remove the cotter pin (120), the nut (135), the washer (130) and the bolt (125).

(7) Remove the cam assembly (185) with the spring (175).

(8) Remove bolt (45), the washer (50), the follower arm (55) and the shaft assembly (60) from the housing assembly (210).

(NOT APPLICABLE)

CHECK

1. General

A. This procedure tells how to find defects in the specified parts.

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

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

D. Refer to IPL Figure 1 for item numbers.

2. Check

A. References

Reference	Title
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-20-02	PENETRANT METHODS OF INSPECTION

B. Procedure

(1) Visually examine all parts for defects by standard industry practices. Do the penetrant or magnetic particle checks if the visual check shows possible defects on the parts below:

(2) Do a magnetic particle check (SOPM 20-20-01) of these parts:

(a) Washer (50)

(b) Cam (205)

(c) Pin (25)

(d) Stop (155), if 15-5PH CRES

(3) Do a penetrant check (SOPM 20-20-02) of these parts:

(a) Housing (245)

(b) Shaft (70)

(c) Follower Arm (55)

(d) Spring (175)

(e) Guard (145)

(f) Stop (155), if 301 CRES

(4) Refer to 737-SL-32-151 for check of spring (175) and possible replacement with spring (175A).

REPAIR

1. General

A. Instructions for repair, refinish, and replacement of the specified subassembly parts are included in each REPAIR when applicable:

Table 601:

PART NUMBER	NAME	REPAIR
—	REFINISH OF OTHER PARTS	1-1
273A4512	HOUSING	2-1, 2-2

2. Dimensioning Symbols

A. Standard True Position Dimensioning Symbols used in the applicable repair procedures are shown in REPAIR-GENERAL, Figure 601.

—	STRAIGHTNESS
▱	FLATNESS
⊥	PERPENDICULARITY (OR SQUARENESS)
//	PARALLELISM
○	ROUNDNESS
⌭	CYLINDRICITY
⌒	PROFILE OF A LINE
⌓	PROFILE OF A SURFACE
◎	CONCENTRICITY
⌯	SYMMETRY
∠	ANGULARITY
↗	RUNOUT
↗↗	TOTAL RUNOUT
⌴	COUNTERBORE OR SPOTFACE
∨	COUNTERSINK
⌖	THEORETICAL EXACT POSITION OF A FEATURE (TRUE POSITION)
Ø	DIAMETER
S Ø	SPHERICAL DIAMETER
R	RADIUS
SR	SPHERICAL RADIUS
()	REFERENCE
BASIC (BSC) OR [DIM]	A THEORETICALLY EXACT DIMENSION USED TO DESCRIBE SIZE, SHAPE OR LOCATION OF A FEATURE. FROM THIS FEATURE PERMISSIBLE VARIATIONS ARE ESTABLISHED BY TOLERANCES ON OTHER DIMENSIONS OR NOTES.
[-A-]	DATUM
Ⓜ	MAXIMUM MATERIAL CONDITION (MMC)
Ⓛ	LEAST MATERIAL CONDITION (LMC)
Ⓢ	REGARDLESS OF FEATURE SIZE (RFS)
Ⓟ	PROJECTED TOLERANCE ZONE
FIM	FULL INDICATOR MOVEMENT

EXAMPLES

— | 0.002	STRAIGHT WITHIN 0.002
⊥ | 0.002 | B	PERPENDICULAR TO DATUM B WITHIN 0.002
// | 0.002 | A	PARALLEL TO DATUM A WITHIN 0.002
○ | 0.002	ROUND WITHIN 0.002
⌭ | 0.010	CYLINDRICAL SURFACE MUST LIE BETWEEN TWO CONCENTRIC CYLINDERS, ONE OF WHICH HAS A RADIUS 0.010 INCH GREATER THAN THE OTHER
⌒ | 0.006 | A	EACH LINE ELEMENT OF THE SURFACE AT ANY CROSS SECTION MUST LIE BETWEEN TWO PROFILE BOUNDARIES 0.006 INCH APART RELATIVE TO DATUM A
⌓ | 0.020 | A	SURFACES MUST LIE WITHIN PARALLEL BOUNDARIES 0.020 INCH APART AND EQUALLY DISPOSED ABOUT TRUE PROFILE
◎ | Ø 0.0005 | C	CONCENTRIC TO DATUM C WITHIN 0.0005 DIAMETER
⌯ | 0.010 | A	SYMMETRICAL WITH DATUM A WITHIN 0.010
∠ | 0.005 | A	ANGULAR TOLERANCE 0.005 WITH DATUM A
⌖ | Ø 0.002 Ⓢ | B	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
⊥ | Ø 0.010 Ⓜ | A 0.510 Ⓟ	AXIS IS TOTALLY WITHIN A CYLINDER OF 0.010 INCH DIAMETER, PERPENDICULAR TO DATUM A, AND EXTENDING 0.510 INCH ABOVE DATUM A, MAXIMUM MATERIAL CONDITION
[2.000] OR 2.000 BSC	THEORETICALLY EXACT DIMENSION IS 2.000

True Position Dimensioning Symbols
Figure 601

REFINISH OF OTHER PARTS - REPAIR 1-1

1. General

A. This procedure refinishes the parts which are not in the other repairs.

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. Refinish of Other Parts

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I
C00802	Coating - Nylon	BAC5710, Type 49
D00113	Lubricant - Liquid Dispersed Solid Film Lubricant	BMS3-8, BAC 5811, TYPE VIII

B. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-30-03	GENERAL CLEANING PROCEDURES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For general cleaning procedures, refer to SOPM 20-30-03. For the decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Instructions for the repair of the parts in REPAIR 1-1, Table 601 are for replacement of the original finish.

(2) Refer to REPAIR 1-1, Table 601 for refinish details.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
Cover (10)	Al alloy	Chemical treat (F-17.07) and apply primer, C00259 (F-20.03).
Pin (25)	302 CRES; or 15-5PH CRES, 150-170 ksi	Cadmium plate (F-15.06).

Table 601: Refinish Details (Continued)

IPL FIG. & ITEM	MATERIAL	FINISH
Washer (50)	301 CRES, 1/2, 3/4 or full hard	Passivate (F-17.25).
Guard (145)	301 CRES, 1/4 hard	Passivate (F-17.25).
Stop (155)	301 CRES, 1/2, 3/4 or full hard; or 15-5PH CRES, 150-170 ksi or 180-200 ksi	Passivate (F-17.25).
Spring (175)	17-7PH CRES, CH900	Passivate (F-17.25) and apply lubricant, D00113 (F-19.10).
Spring (175A)	17-7PH CRES, CH900	Passivate (F-17.25) and apply gray coating, C00802 (F-21.14).
Cam (205)	15-5PH CRES, 180-200 ksi	Passivate (F-17.25).

HOUSING ASSEMBLY - REPAIR 2-1

273A4512–1

1. General

A. This procedure has the data to replace the parts of the housing assy (210).

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. Repair Procedures

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
C00259	Primer - Chemical And Solvent Resistant Finish, Epoxy Resin	BMS10-11, Type I

B. References

Reference	Title
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-50-22	HOW TO INSTALL THREADED INSERTS
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Bushing and Insert Replacement

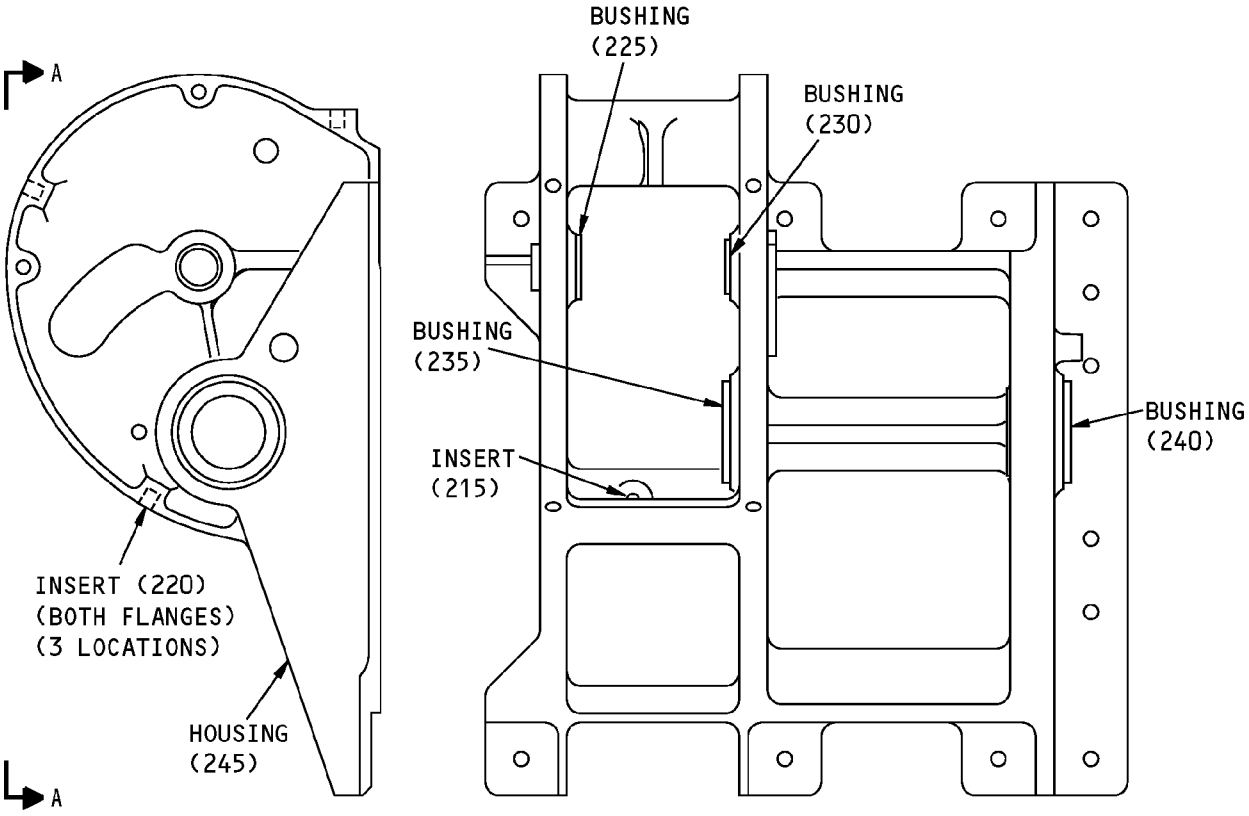
NOTE: For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Remove the old bushings (230, 235, 240, 225) (SOPM 20-50-03) and inserts (215, 220) (SOPM 20-50-22) from the housing assy (210).

(2) If you find defects on the housing surfaces, refer to REPAIR 2-2 for repair instructions.

(3) Install replacement bushings by the shrink-fit method with sealant, A00247 (SOPM 20-50-03).

(4) Install replacement inserts (215, 220) with primer, C00259 (SOPM 20-50-22).



ITEM NUMBERS REFER TO IPL FIG. 1

273A4512-1 Housing Assembly Repair
Figure 601

HOUSING - REPAIR 2-2

273A4512–2

1. General

A. This procedure has the data necessary to repair and refinish the housing (245).

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

C. Refer to REPAIR-GENERAL, Figure 601 for the True Position Dimensioning Symbols used in the repair.

D. Refer to IPL Figure 1 for item numbers.

E. General repair details:

(1) Material: Aluminum alloy

2. Repair Procedures

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95

B. References

Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Lug Faces and Holes (REPAIR 2-2, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For miscellaneous materials, refer to SOPM 20-60-04.

NOTE: Because the bushings are Teflon lined, oversize equivalents cannot be locally made. But you can get oversize equivalents of bushings (230, 235, 240) with the OD oversize at 0.10 inch increments. Bushing (225) does not have an available oversize equivalent, but you can repair the hole with a plain or flanged repair bushing to let you install a standard bushing (225).

(1) Machine as required, within repair limits, to remove defects.

(2) Refinish as indicated in REPAIR 2-2, Paragraph 2.D..

(3) Get the necessary standard or oversize bushings, and make a repair sleeve (REPAIR 2-2, Figure 602) as necessary.

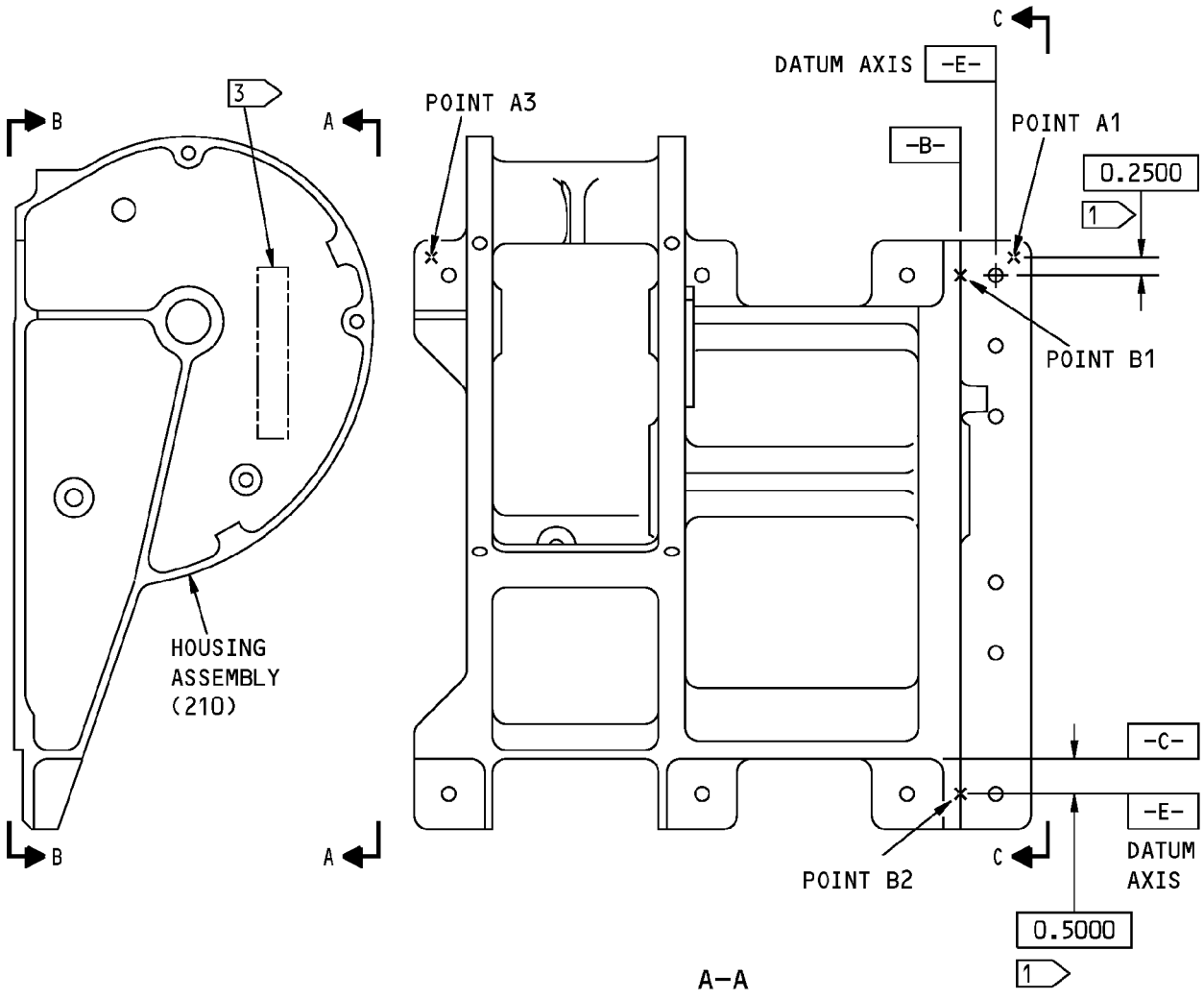
(4) Install the repair sleeve by the shrink fit procedure (SOPM 20-50-03) with sealant, A00247. Machine the bore to design dimensions and finish, to let you install bushing (225).

(5) Install replacement bushings as shown in REPAIR 2-1.

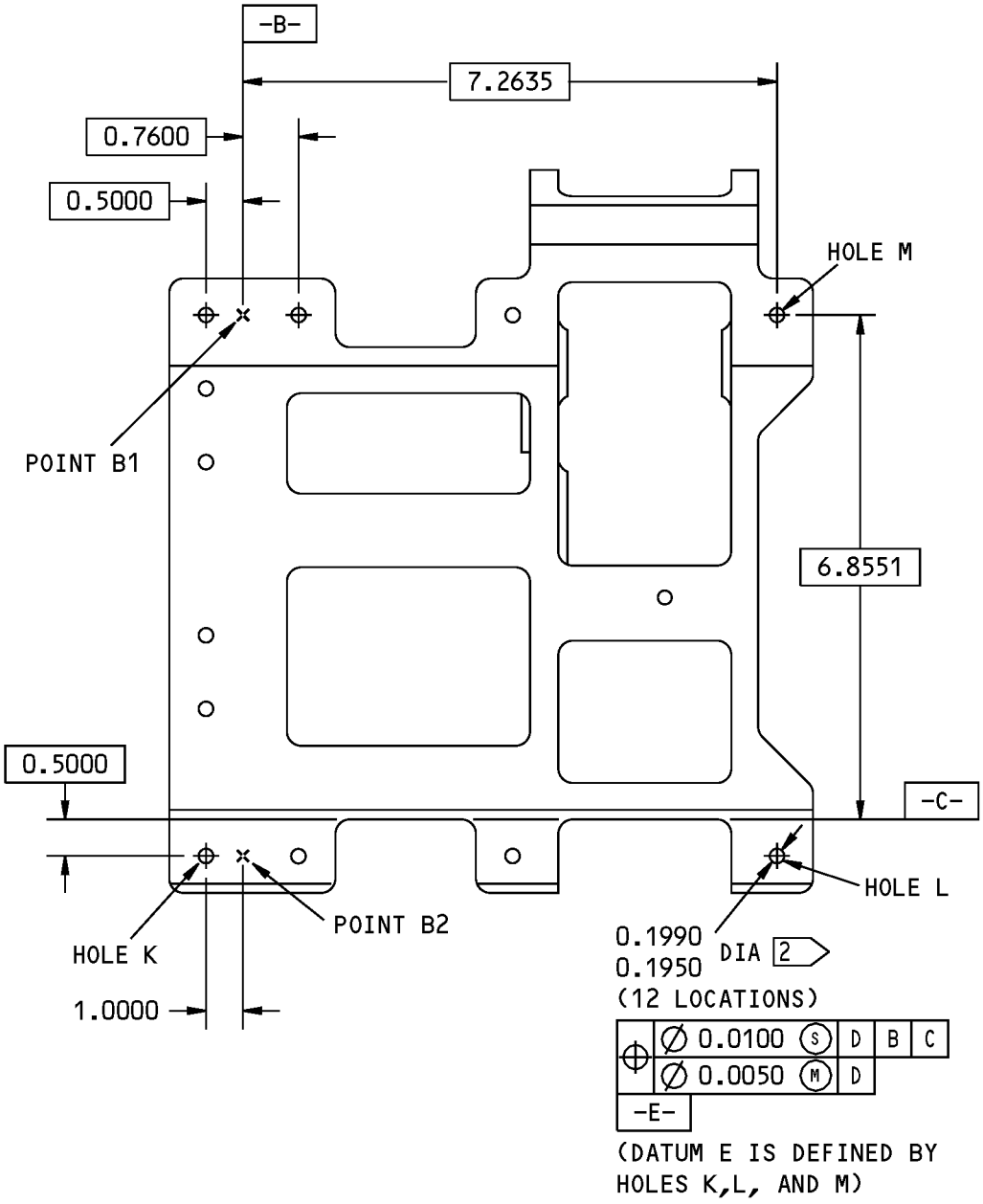
D. Housing Refinish (REPAIR 2-2, Figure 601)

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. For decoding table for Boeing finish codes, refer to SOPM 20-41-01. For finishing materials, refer to SOPM 20-60-02.

(1) Boric acid-sulfuric acid anodize or chromic acid anodize (F-17.31) all over, but not the surfaces noted by flagnote 2.

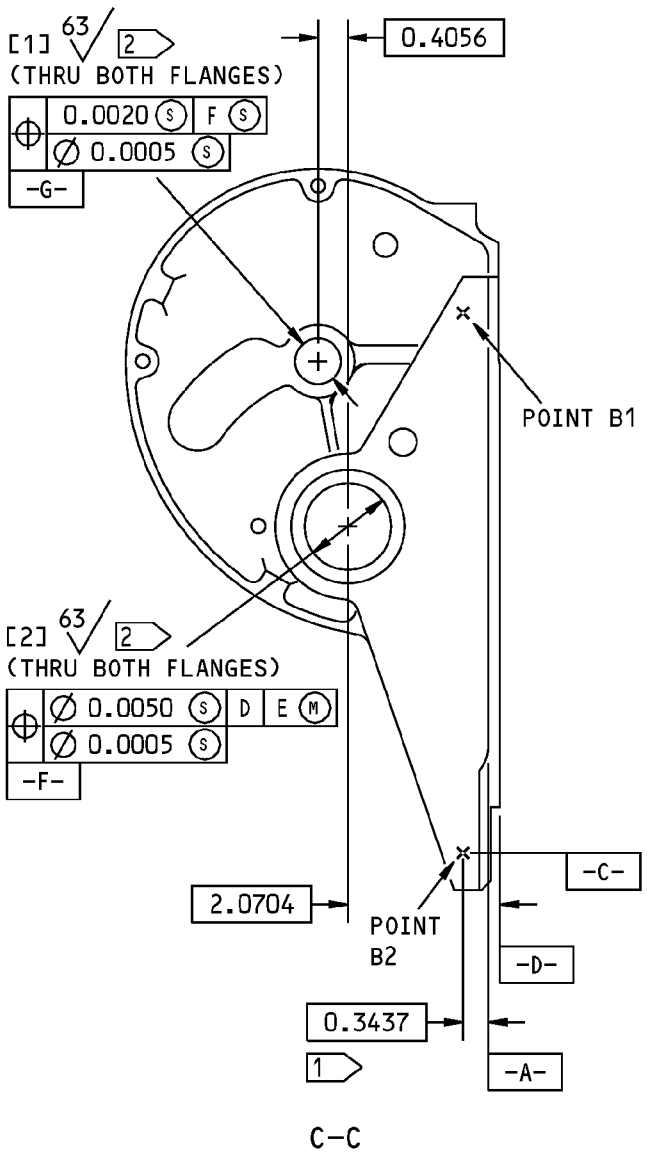


273A4512-2 Housing Repair
Figure 601 (Sheet 1 of 5)



B–B

273A4512-2 Housing Repair
Figure 601 (Sheet 2 of 5)



C–C

REFERENCE NUMBER	[1]	[2]
DESIGN DIMENSION	0.6256 0.6250	1.1882 1.1875
REPAIR LIMIT 4	SEE TABLE B	SEE TABLE C

TABLE A

273A4512-2 Housing Repair
Figure 601 (Sheet 3 of 5)

	[1]		
OVERSIZE INCREMENT	REPAIR DIA RANGE [4]	OVERSIZE BUSHING	
		(225)	(230)
0.010	0.6356 0.6350	-	BACB28AZ08B060AT
0.020	0.6456 0.6450	-	BACB28AZ08B060AU
0.030	0.6556 0.6550	-	BACB28AZ08B060AV
0.040	0.6656 0.6650	-	BACB28AZ08B060AW
0.050	0.6756 0.6750	-	BACB28AZ08B060AX
0.060	0.6853 0.6847	[5]	BACB28AZ08B060AY

TABLE B

	[2]		
OVERSIZE INCREMENT	REPAIR DIA RANGE [4]	OVERSIZE BUSHING	
		(235)	(240)
0.010	1.1982 1.1975	BACB28AZ16B050AT	BACB28AZ16B075AT
0.020	1.2082 1.2075	BACB28AZ16B050AU	BACB28AZ16B075AU
0.030	1.2182 1.2175	BACB28AZ16B050AV	BACB28AZ16B075AV
0.040	1.2282 1.2275	BACB28AZ16B050AW	BACB28AZ16B075AW
0.050	1.2382 1.2375	BACB28AZ16B050AX	BACB28AZ16B075AX
0.060	1.2478 1.2471	BACB28AZ16B050AY	BACB28AZ16B075AY

TABLE C

273A4512-2 Housing Repair
Figure 601 (Sheet 4 of 5)

1 DATUM TARGET DIMENSION

2 DO NOT APPLY PRIMER ON THIS SURFACE

3 PART NUMBER LOCATION

4 RANGE FOR INSTALLATION OF OVERSIZE BUSHING OR REPAIR SLEEVE AND STANDARD BUSHING

5 OVERSIZE EQUIVALENTS OF BUSHING (225) ARE NOT AVAILABLE, SO USE REPAIR SLEEVE METHOD (FIG. 602)

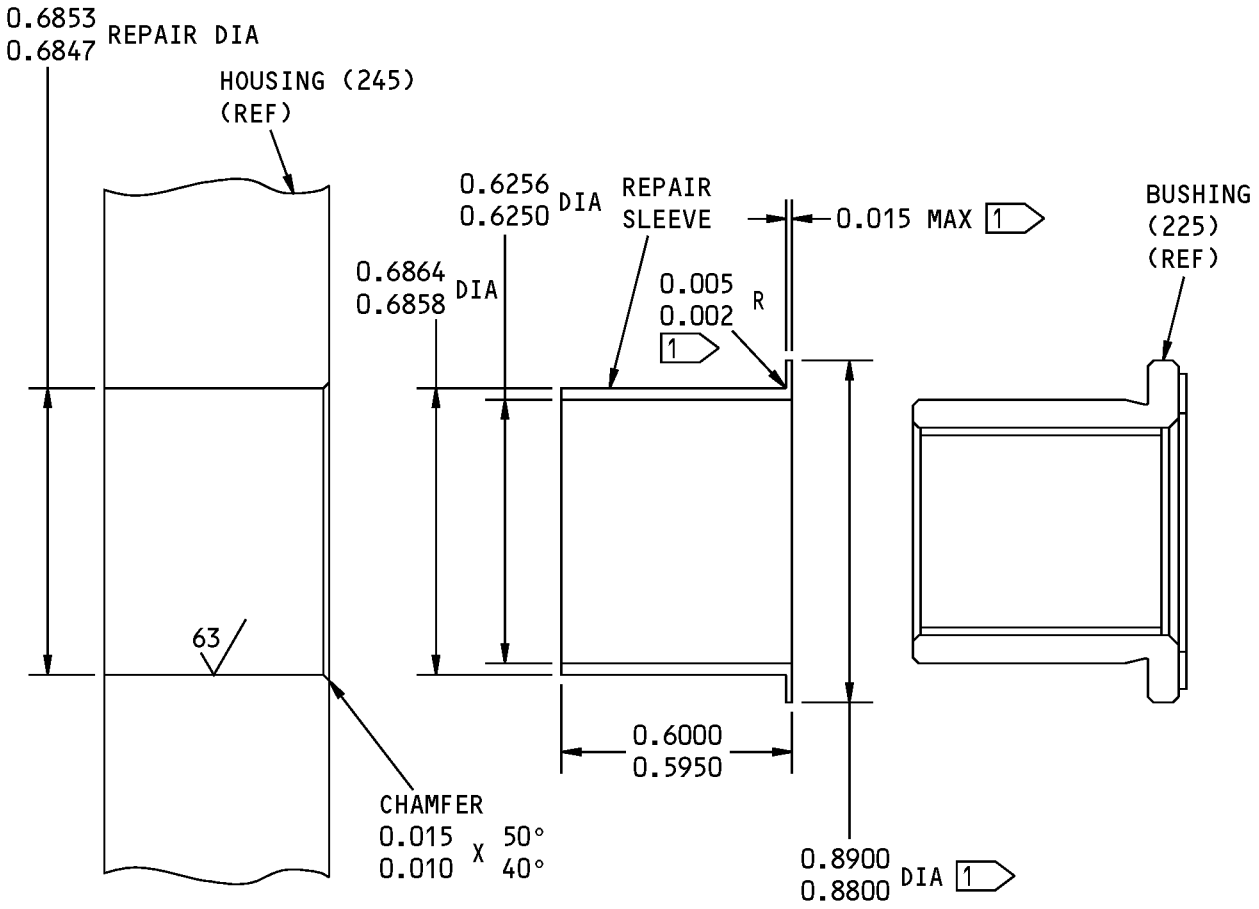
125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

273A4512-2 Housing Repair
Figure 601 (Sheet 5 of 5)



1 MAKE THE FLANGE ONLY IF MATERIAL WAS REMOVED FROM THE MATING LUG FACE

63 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

MATERIAL:
7075-T6 AL ALLOY (QQ-A-225/9) OR
2024-T8 AL ALLOY (QQ-A-225/6)
FINISH: CHROMIC ACID ANODIZE
(MIL-A-8625 TYPE 1)

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Bushing Sleeve Repair Details
Figure 602

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the nose gear manual release 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. Assembly

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
D00633	Grease - Aircraft General Purpose	BMS3-33

B. References

Reference	Title
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure ASSEMBLY, Figure 701

NOTE: For bolt and nut installation, refer to SOPM 20-50-01. For lubricants, refer to SOPM 20-60-03. For miscellaneous materials, refer to SOPM 20-60-04.

(1) Use standard industry procedures and these steps.

(2) Coil and attach the cable to the unit as necessary for storage and shipping.

(3) Apply grease, D00633 to the splines before assembly.

(4) Install shaft assembly (60), the follower arm (55), the washer (50), and the bolt (45) into the housing assembly (210).

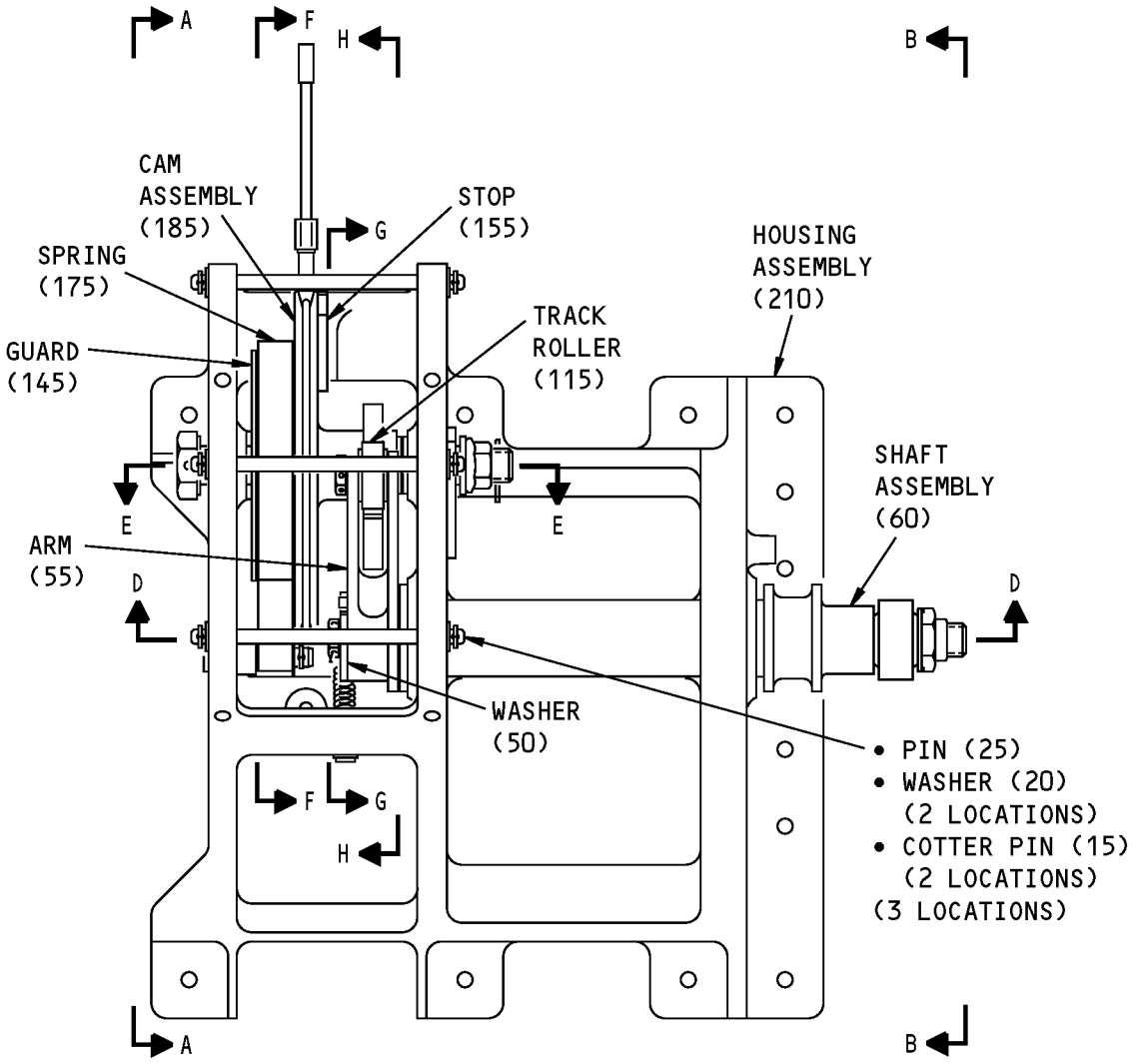
(5) Install the cam assembly (185) with the spring (175) into the housing assembly (210).

(6) Install the bolt (125), the washer (130), the nut (135) and the cotter pin (120).

(7) Install one end of spring (175) onto the housing assembly (210) with the pin (170), the spacer (165), the washer (160) and the cotter pin (140).

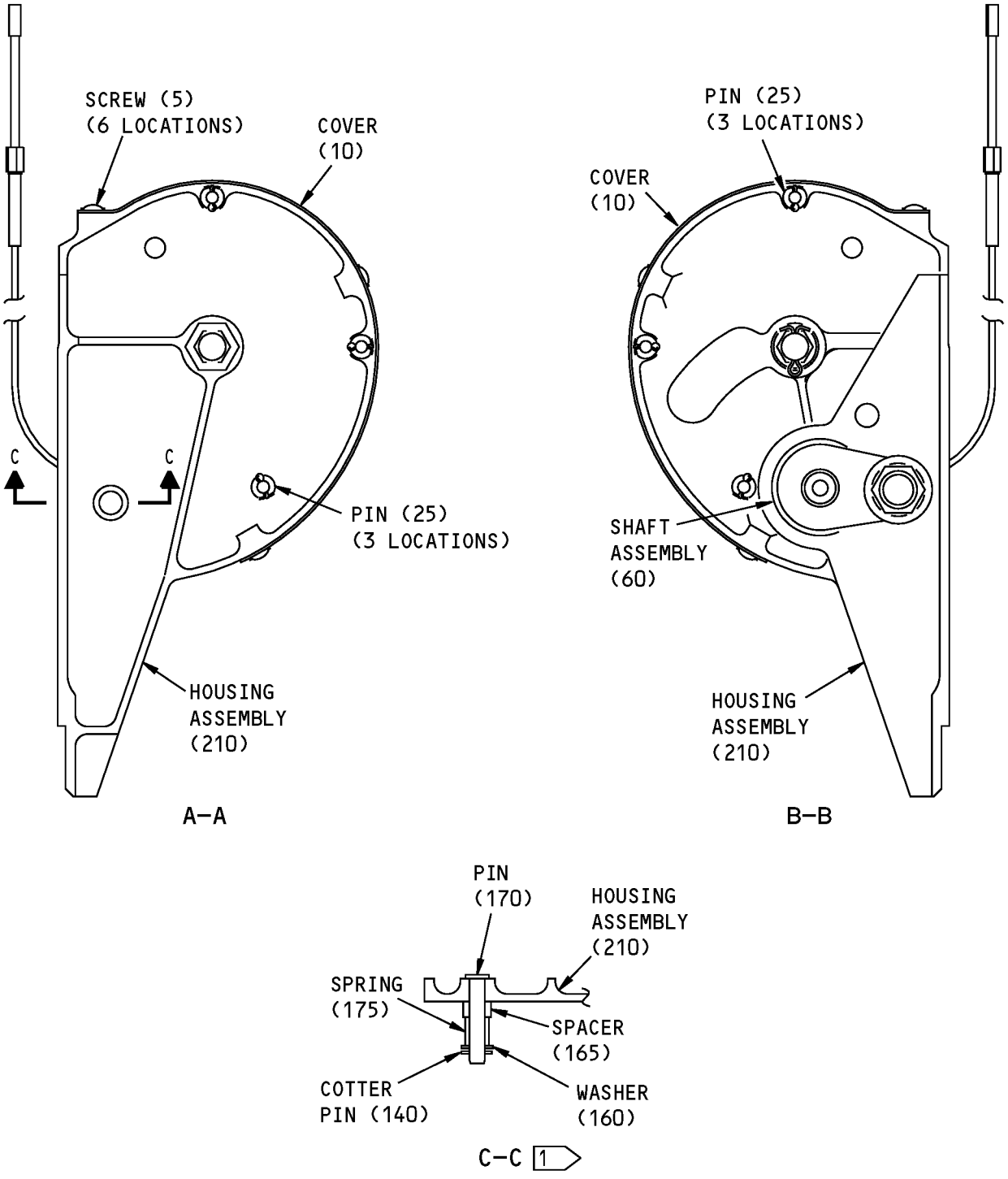
(8) Install the guard pins (25), the washers (20), and the cotter pins (15) onto the housing assembly (210).

(9) Install the cover (10) with the screws (5) onto the housing assembly (210).

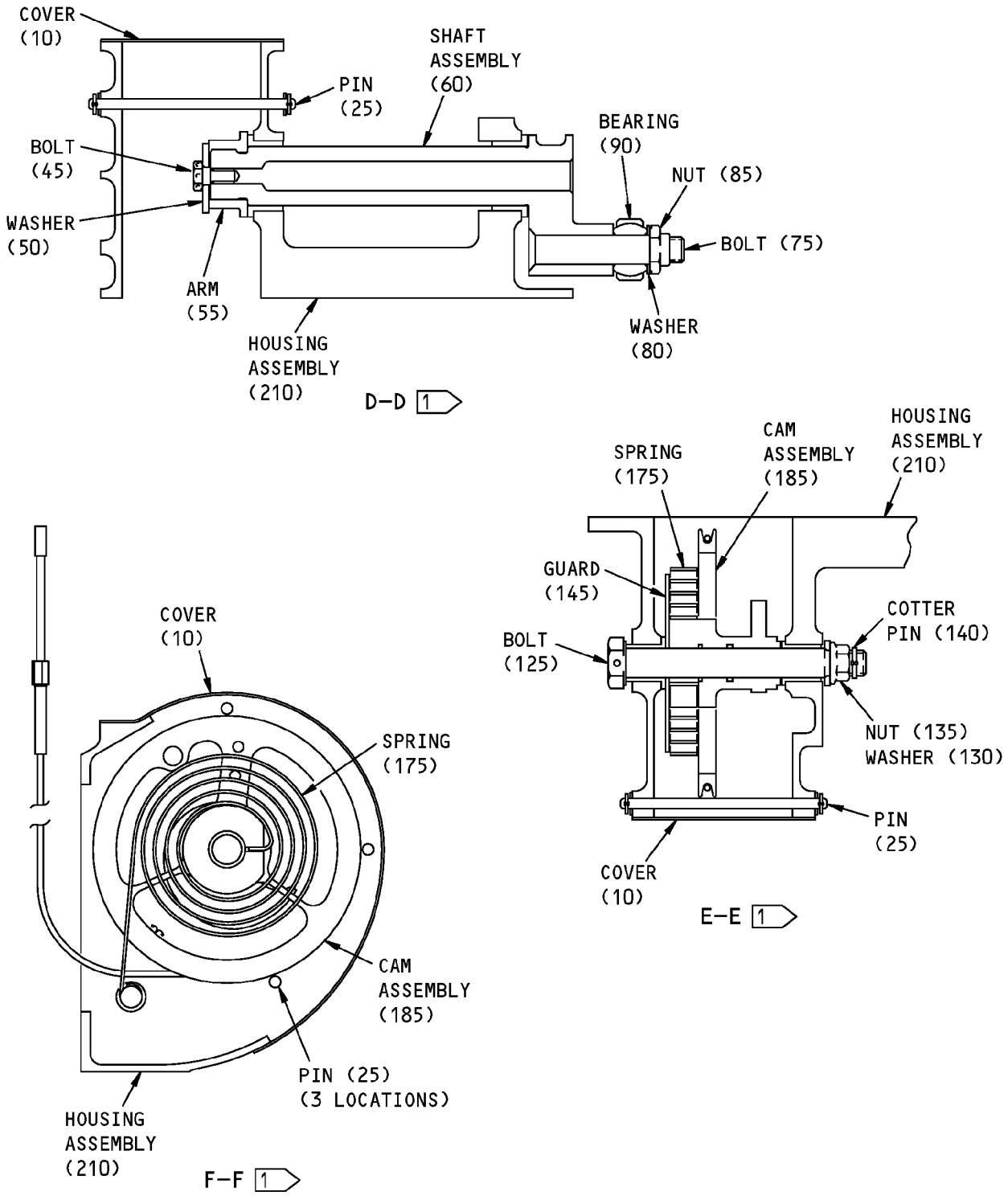


(COVER NOT SHOWN SO OTHER PARTS CAN BE SEEN)

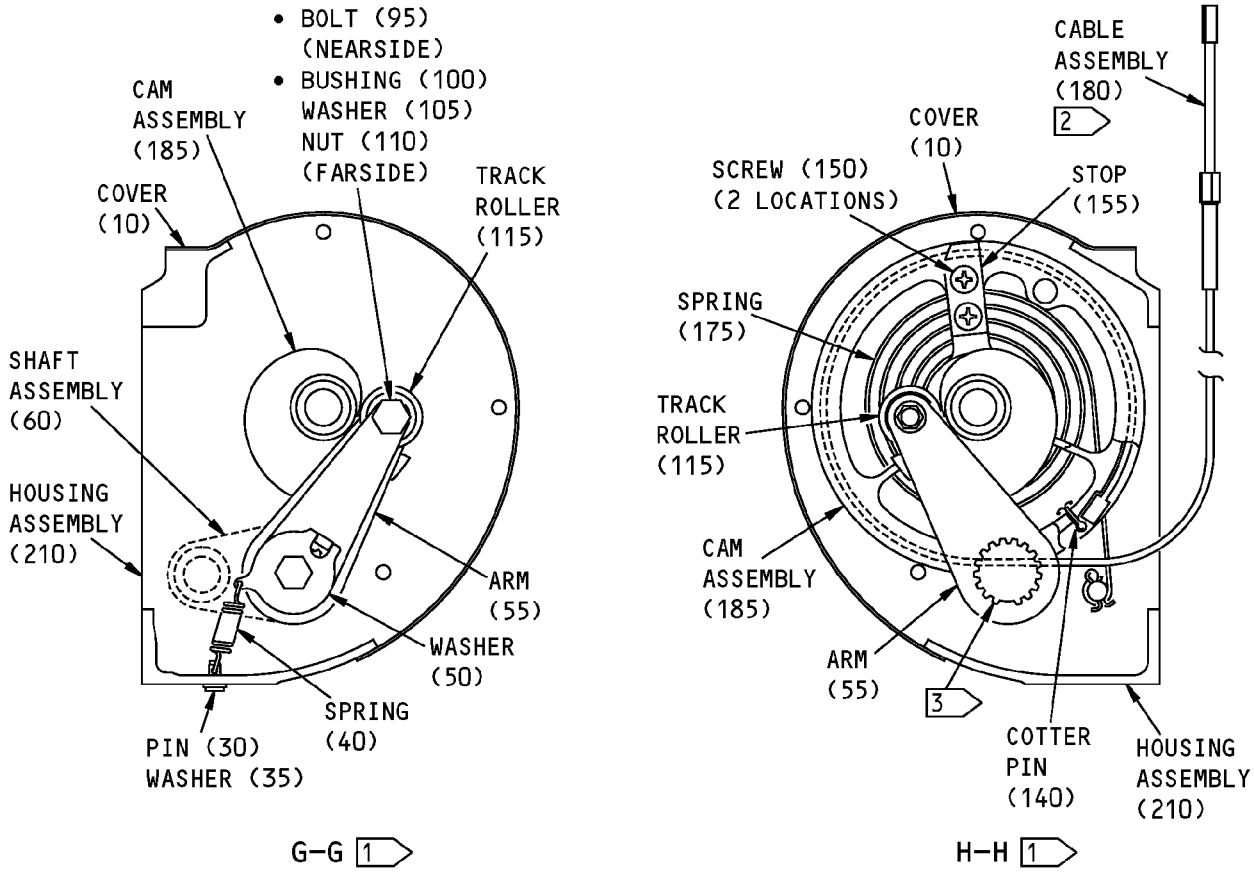
Nose Gear Manual Release Assembly
Figure 701 (Sheet 1 of 4)



Nose Gear Manual Release Assembly
Figure 701 (Sheet 2 of 4)



Nose Gear Manual Release Assembly
Figure 701 (Sheet 3 of 4)



1 SOME OF THE PARTS ARE NOT SHOWN IN THIS VIEW SO OTHER PARTS CAN BE SEEN.

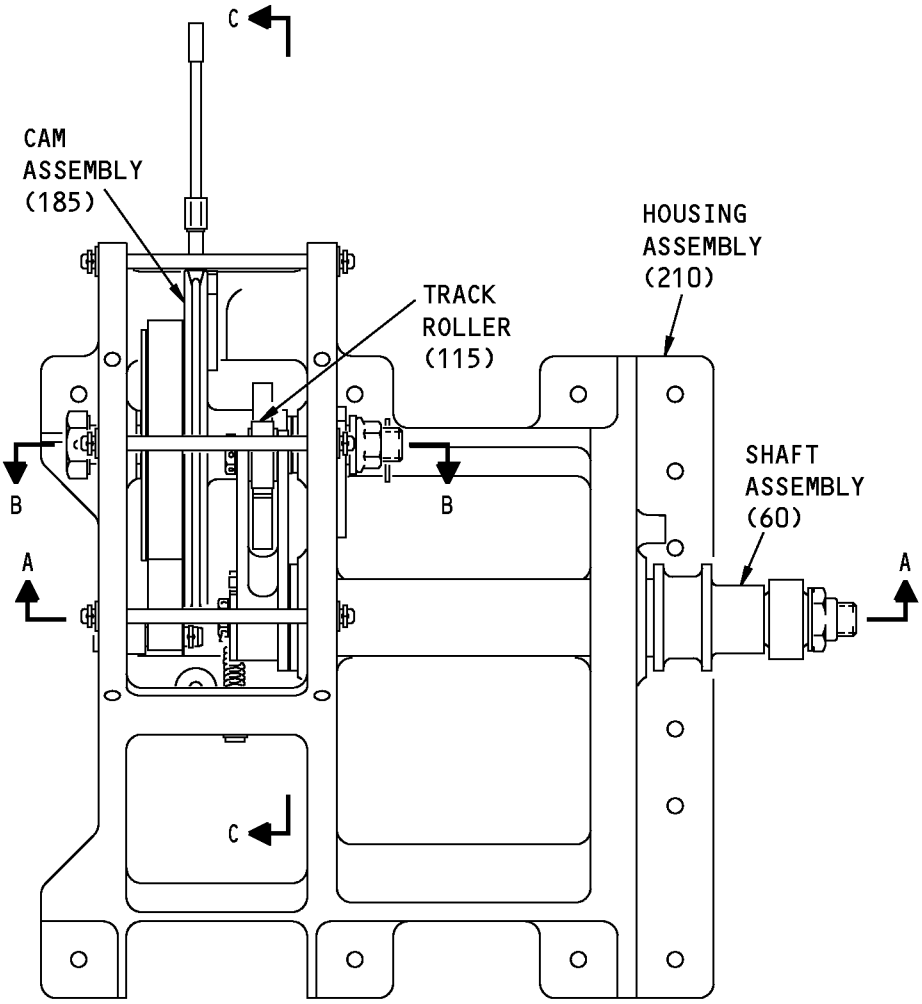
2 COIL AND SECURE THE CABLE FOR SHIPPING AND STORAGE.

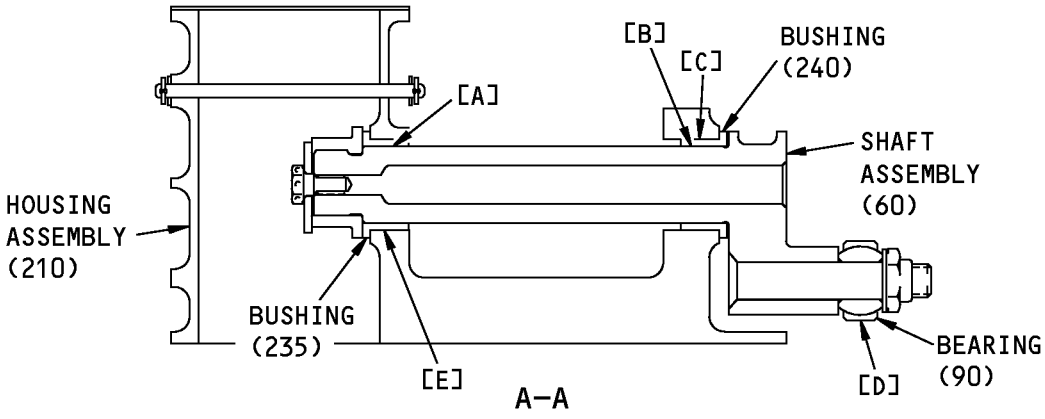
3 APPLY BMS 3-33 GREASE TO THE SPLINES BEFORE ASSEMBLY.

ITEM NUMBERS REFER TO IPL FIG. 1

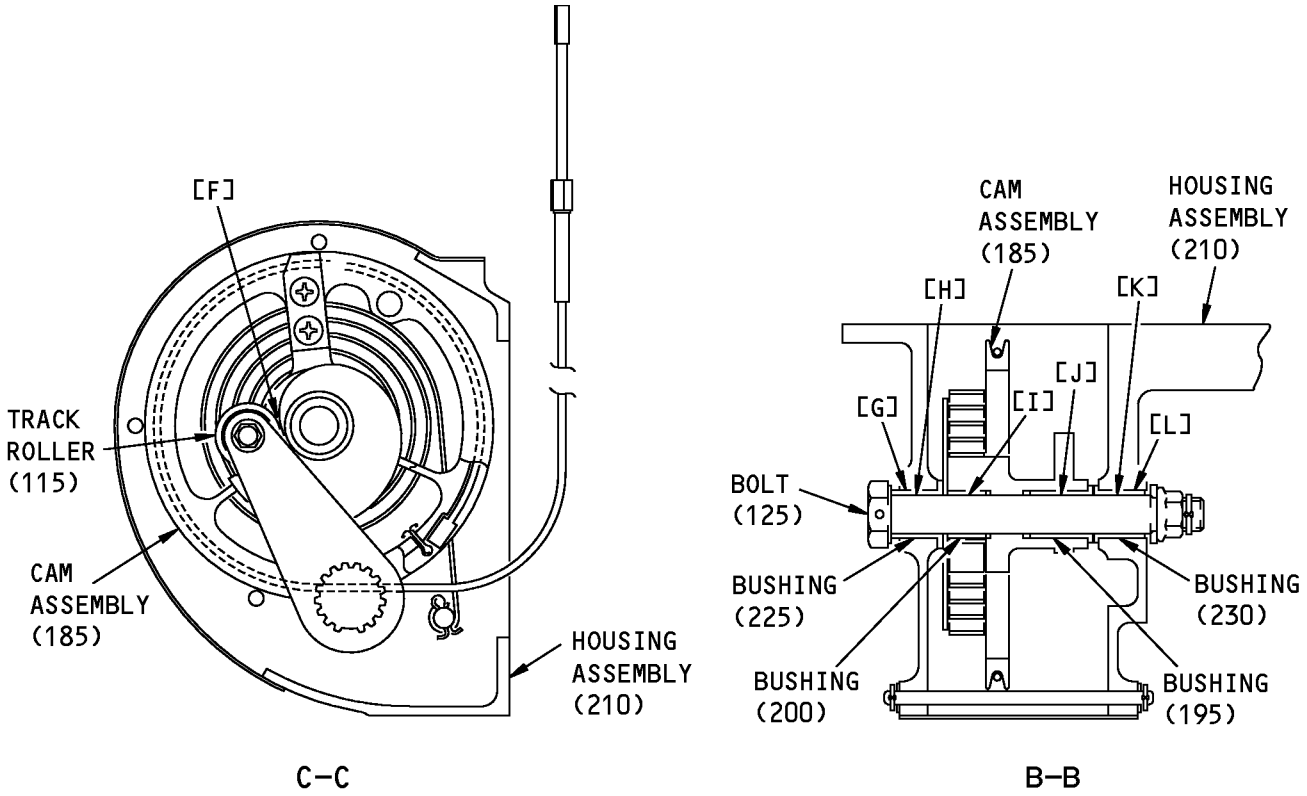
Nose Gear Manual Release Assembly
Figure 701 (Sheet 4 of 4)

FITS AND CLEARANCES





Fits and Clearances
Figure 801 (Sheet 1 of 3)



REF LETTER	REF IPL FIG. 1 MATING ITEM NO.	DESIGN DIMENSION*				SERVICE WEAR LIMIT*		
		DIMENSION		ASSEMBLY CLEARANCE [1]		DIMENSION		MAXIMUM CLEARANCE
		MIN	MAX	MIN	MAX	MIN	MAX	
[A]	ID 235 OD 60	1.0005 0.9980	1.0015 0.9990	0.0015	0.0035	0.9960	1.0030	0.0070
[B]	ID 240 OD 60	1.0005 0.9980	1.0015 0.9990	0.0015	0.0035	0.9960	1.0030	0.0070
[C]	ID 245 OD 240	1.1875 1.1890	1.1882 1.1893	-0.0008	-0.0023	N/A	N/A	N/A
[D]	ID 90 OD 90	N/A 1.0933	N/A 1.0938	N/A	N/A		[2] 1.0900	N/A

Fits and Clearances
Figure 801 (Sheet 2 of 3)

REF LETTER	REF IPL FIG. 1 MATING ITEM NO.	DESIGN DIMENSION* DIMENSION MIN	DESIGN DIMENSION* DIMENSION MAX	DESIGN DIMENSION* ASSEMBLY CLEARANCE 1 MIN	DESIGN DIMENSION* ASSEMBLY CLEARANCE 1 MAX	SERVICE WEAR LIMIT* DIMENSION MIN	SERVICE WEAR LIMIT* DIMENSION MAX	SERVICE WEAR LIMIT* MAXIMUM CLEARANCE
[E]	ID 245 OD 235	1.1875 1.1890	1.1882 1.1898	-0.0008	-0.0023	N/A	N/A	N/A
[F]	ID 185 OD 115	-0.001 0.8740	+0.001 0.8750	N/A	N/A		-0.005 0.870	N/A
[G]	ID 245 OD 225	0.6250 0.6261	0.6256 0.6267	-0.0005	-0.0017	N/A	N/A	N/A
[H]	ID 225 OD 125	0.5005 0.4985	0.5015 0.4995	0.0010	0.0030	0.4980	0.5045	0.0065
[I]	ID 200 OD 125	0.5005 0.4985	0.5015 0.4995	0.0010	0.0030	0.4980	0.5045	0.0065
[J]	ID 195 OD 125	0.5005 0.4985	0.5015 0.4995	0.0010	0.0030	0.4980	0.5045	0.0065
[K]	ID 230 OD 125	0.5005 0.4985	0.5015 0.4995	0.0010	0.0030	0.4980	0.5045	0.0065
[L]	ID 245 OD 230	0.6250 0.6261	0.6256 0.6267	-0.0005	-0.0017	N/A	N/A	N/A

* ALL DIMENSIONS ARE IN INCHES

1 NEGATIVE VALUES ARE FOR INTERFERENCE FIT.

2 REPLACE WITH A NEW BEARING IF THE FREE PLAY IS GREATER THAN 0.003 INCH.

ITEM NUMBERS REFER TO IPL FIG. 1

Fits and Clearances
Figure 801 (Sheet 3 of 3)

COMPONENT MAINTENANCE MANUAL

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

(NOT APPLICABLE)

BOEING®

COMPONENT MAINTENANCE MANUAL

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
09455	RBC TRANSPORT DYNAMICS CORP 3131 W SEGERSTROM AVE SANTA ANA, CALIFORNIA 92704-5872 FORMERLY TRANSPORT DYNAMICS AEROSPACE DIV; FABROID DIV TRANSPORT DYNAMICS V17571 & LEAR SEIGLER INC TRANSPORT DIV V98076; FORMERLY BFM TRANSPORT DYNAMICS
15653	ALCOA GLOBAL FASTENERS INC DIV KAYNAR PRODUCTS 800 S STATE COLLEGE BLVD FULLERTON, CALIFORNIA 92831-3001 FORMERLY VK6405 MICRODOT AEROSP LTD; FORMERLY KAYNAR TECH FORMERLY FAIRCHILD FASTENERS KAYNAR DIV
15860	NEW HAMPSHIRE BALL BEARINGS, INC ASTRO DIVISION 155 LEXINGTON AVENUE LACONIA, NEW HAMPSHIRE 03246-2937 FORMERLY ASTRO BEARING CORP, LOS ANGELES, CALIF.
50632	KAMATICS CORP SUB OF KAMAN CORP 1335 BLUE HILLS ROAD BLOOMFIELD, CONNECTICUT 06002-1304
56644	AURORA BEARING CO 970 SOUTH LAKE STREET AURORA, ILLINOIS 60506-5929
56878	SPS TECHNOLOGIES INC AEROSPACE AND INDUSTRIAL PRODUCTS DIV 301 HIGHLAND AVE JENKINTOWN, PENNSYLVANIA 19046 FORMERLY STANDARD PRESSED STEEL FORMERLY IN SALT LAKE, UTAH

Code	Name
62554	SIMMONDS MECAERO FASTENERS INC 1734 SEQUOIA AVENUE ORANGE, CALIFORNIA 92668
72962	HARVARD INDUSTRIES INC 3 WERNER WAY SUITE 210 LEBANON, NEW JERSEY 08833 FORMERLY ESNA V7A079 FORMERLY ELASTIC STOP NUT IN UNION, NJ
73134	ROLLER BEARING COMPANYOF AMER DBA HEIM BEARINGS DIV 60 ROUND HILL RD FAIRFIELD, CONNECTICUT 06430-0000 FORMERLY INCOM INTL HEIM DIV; HEIM UNIVERSAL CORP INCOM; FORMERLY HEIM DIV INCOM INTL; IMO IND HEIM BEARINGS DIV
81376	SMITH ACQUISITION COMPANY 2240 BUENA VISTA BALDWIN PARK, CALIFORNIA 91706
85495	Replaced: [V85495] BRILES MFG CO SEE V97928 OMARK INDUSTRIES OMARK INDUSTRIES SEE PRECISION FASTENING PRECISION FASTENING SUB OF OMARK IND INC SEE DEUTSCH FASTENER CORP V08524 Replaced: [V08524] DEUTSCH FASTENER CORP SEE CODE V97928 Replaced: [V97928] HUCK INTL SEE V17446 HUCK INTL by Code: Name and Address below 17446: HUCK INTL INC AEROSPACE FASTENER DIV 900 WATSON CENTER ROAD CARSON, CALIFORNIA 90745-4201 FORMERLY V32134 REXNORD INC; FORMERLY V97928 HUCK INTL
97613	SARGENT CONTROLS & AEROSPACE/KAHR BEARING DIV 5675 W BURLINGAME RD TUCSON, ARIZONA 85743 FORMERLY AETNA STEEL PROD KAHR BEARING DIV V96579 FORMERLY SARGENT IND KAHR BEARING DIV, BURBANK, CALIFORNIA

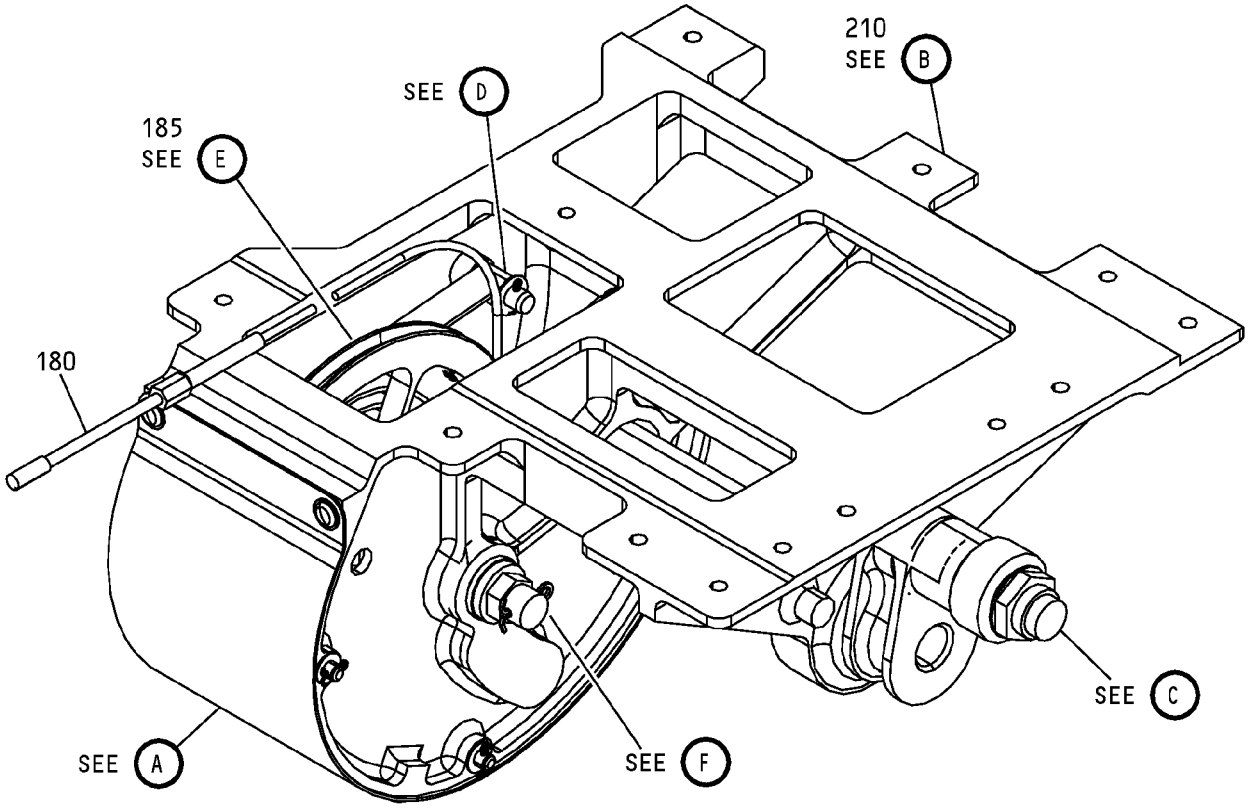
Code	Name
97928	Replaced: [V97928] SEE V17446 HUCK INTL by Code: Name and Address below 17446: HUCK INTL INC AEROSPACE FASTENER DIV 900 WATSON CENTER ROAD CARSON, CALIFORNIA 90745-4201 FORMERLY V32134 REXNORD INC; FORMERLY V97928 HUCK INTL
S0352	NIPPON MINIATURE BEARING CO LTD TOKYO, JAPAN

NUMERICAL INDEX

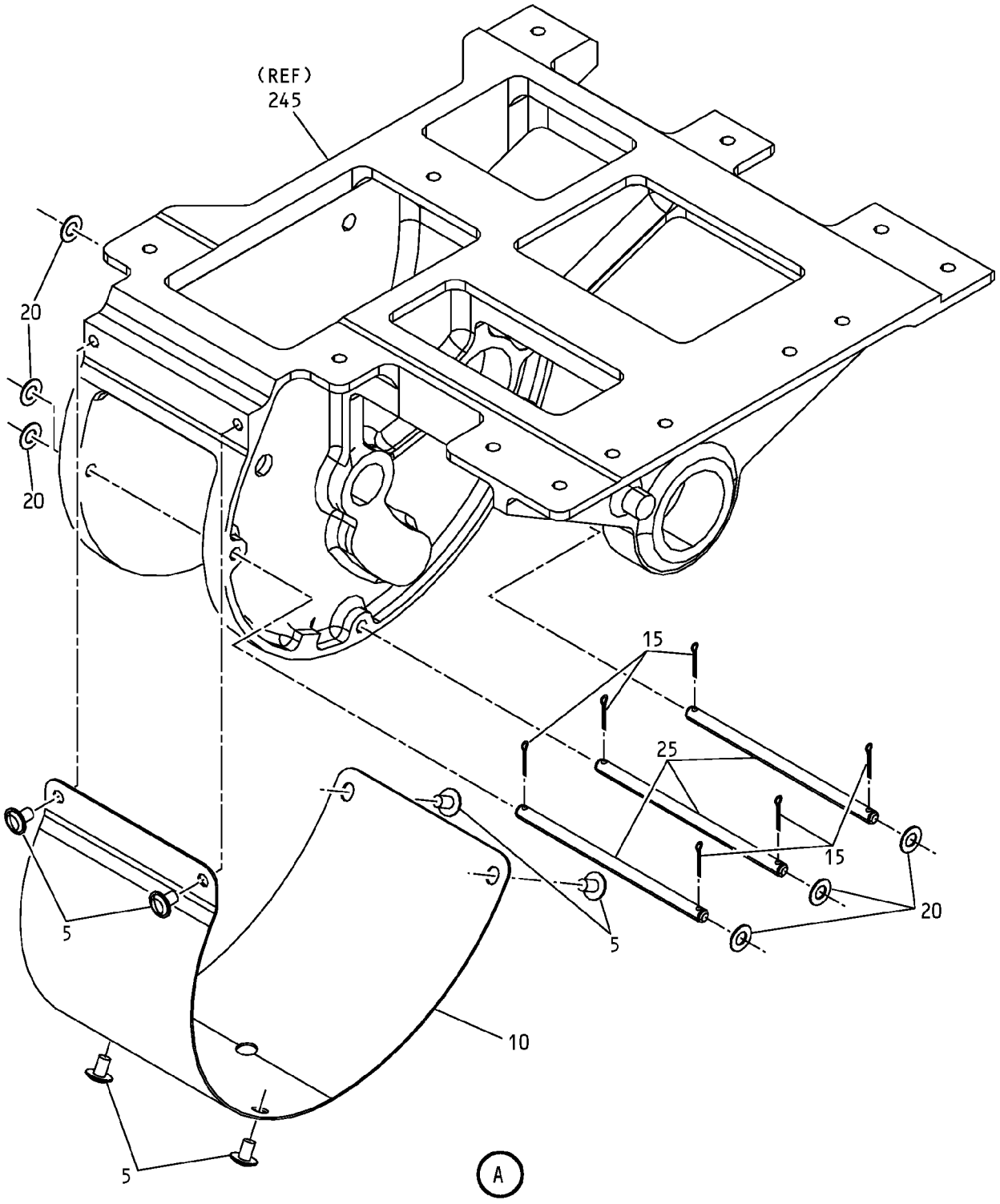
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
03-823-08EE011		1	90A	1
109LH9074-8		1	85	1
273A4510-1		1	1A	RF
273A4510-2		1	1B	RF
273A4510-3		1	1C	RF
273A4512-1		1	210	1
273A4512-2		1	245	1
273A4514-1		1	60	1
273A4514-2		1	70	1
273A4515-1		1	55	1
273A4516-1		1	50	1
273A4517-1		1	185	1
273A4517-2		1	205	1
273A4518-1		1	175	1
273A4518-2		1	175A	1
273A4519-1		1	25	3
273A4520-1		1	10	1
273A4520-2		1	10A	1
273A4521-1		1	155	1
273A4522-1		1	145	1
69235-820CM		1	85	1
ADB08-301N		1	90	1
		1	90C	1
ADB08V301NC		1	90B	1
		1	90D	1
BACB10ES08E		1	90A	1
BACB10FB08		1	90	1
		1	90C	1
BACB10FB08GC		1	90B	1
		1	90D	1
BACB28AK04-018		1	100	1
BACB28AV08B060A		1	225	1
BACB28AY08A075B		1	195	1
BACB28AY08B060A		1	230	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACB28AY16B050A		1	235	1
BACB28AY16B075A		1	240	1
BACB30NM4K10		1	95	1
BACB30NM4K2		1	45	1
BACB30PW8D54		1	125	1
BACB30VF8K32		1	75	1
BACC2D3B00382DG		1	180	1
BACN10JC8CM		1	85	1
BACN10YR4CM		1	110	1
BACN10YR7CD		1	135	1
BACP18BC02A04P		1	15	6
BACP18BC02A06P		1	140	2
BACP18BC03A06P		1	120	1
BACP18BD1A7		1	30A	1
BACP18BD3A37		1	170A	1
		1	170C	1
BACS12ER3K6		1	150	2
BACS12FA08K4		1	5	6
BACW10BP2NDP		1	35	1
BACW10BP3NDP		1	20	6
BACW10BP4NAPU		1	105	1
		1	160	1
BACW10BP7DP		1	130	1
BMN4122C1D2-8		1	85	1
		1	85	1
H01-8BAC		1	85	1
H52732-4CM		1	110	1
H52732-7CD		1	135	1
HTFB08		1	90	1
		1	90C	1
HTFB08GC		1	90B	1
		1	90D	1
KNDB08-61		1	90	1
		1	90C	1
KNDB08-70		1	90B	1

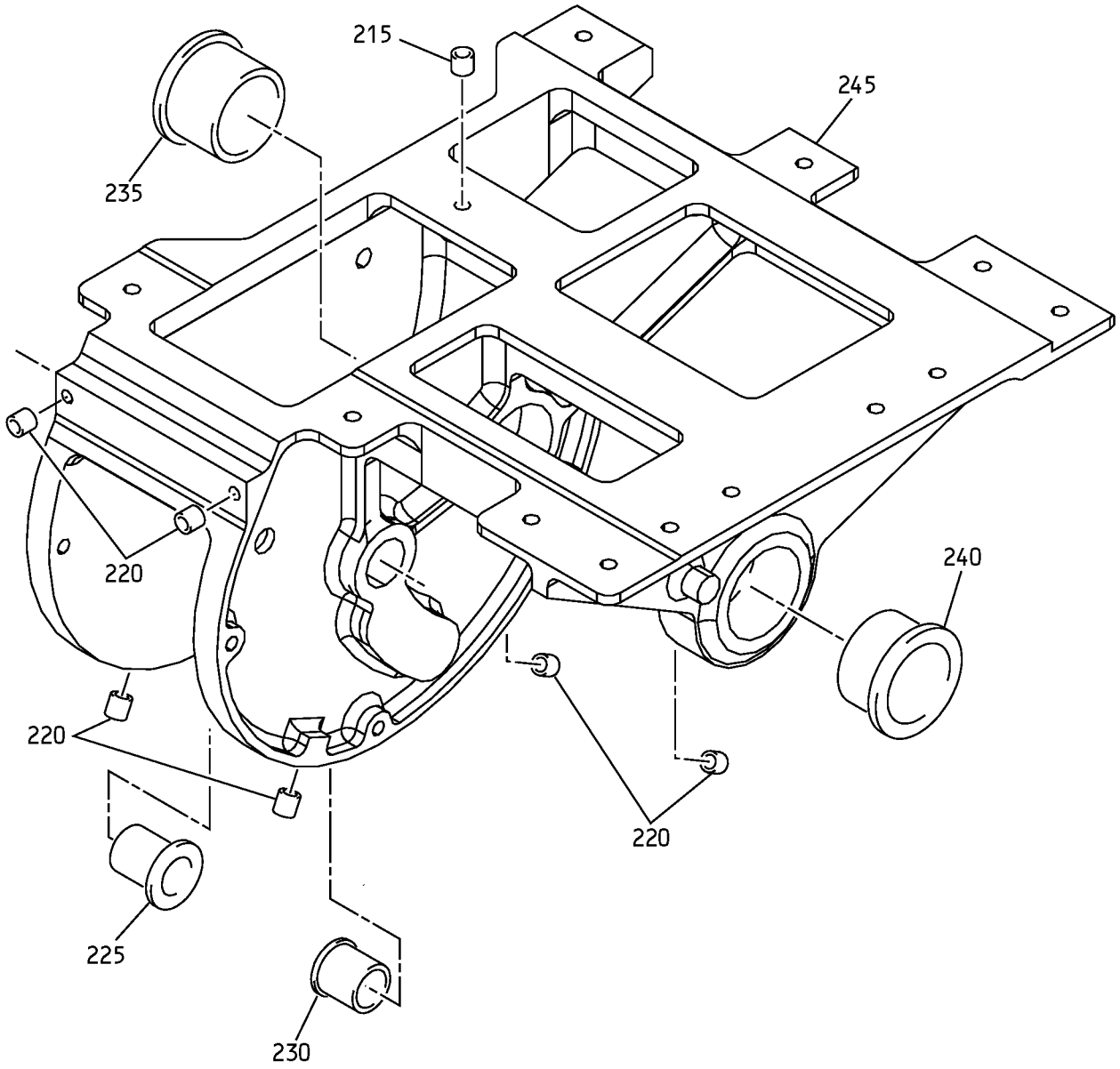
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
		1	90D	1
KRP178204FT		1	115	1
KSC145700BZ08		1	90	1
		1	90C	1
KSC145700BZ08GC		1	90B	1
		1	90D	1
M819341-08C016		1	200	1
MS20392-1A7		1	30	1
		1	30B	1
MS20392-3A37		1	170	1
		1	170B	1
MS21209C0810P		1	220	6
MS21209F1-10P		1	190	2
MS21209F1-15P		1	215	1
MS21209F4-15L		1	65	1
MS24586C96		1	40	1
NAS1149E0832R		1	80	1
NAS42DD8-16FC		1	165	1
NC08ET5		1	90A	1
NES08FB		1	90	1
		1	90C	1
NES08FBGC		1	90B	1
		1	90D	1
PLH54CM		1	110	1
PLH57CD		1	135	1
SWKN08E520		1	90A	1



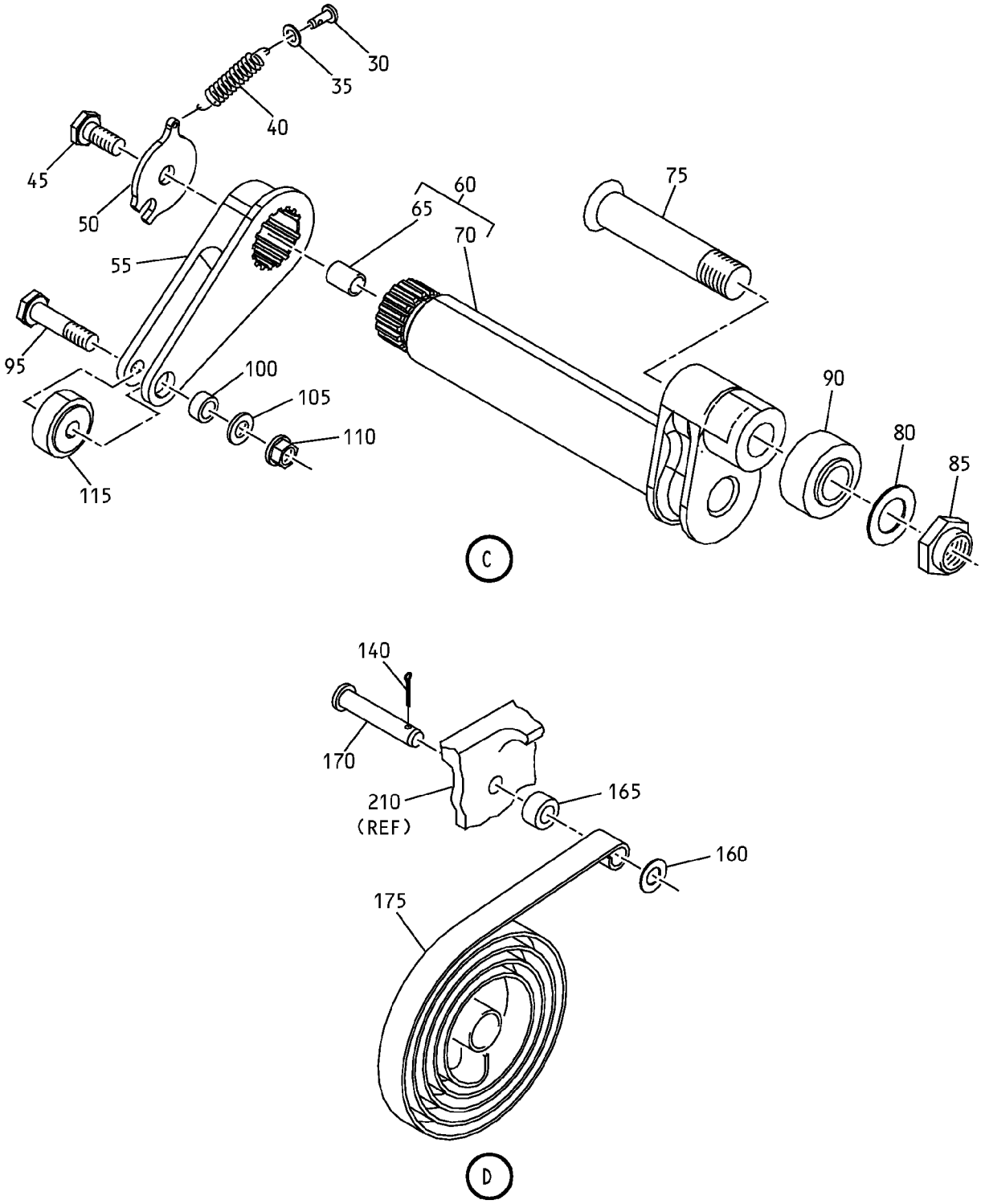
Nose Landing Gear Manual Release Assembly
IPL Figure 1 (Sheet 1 of 5)



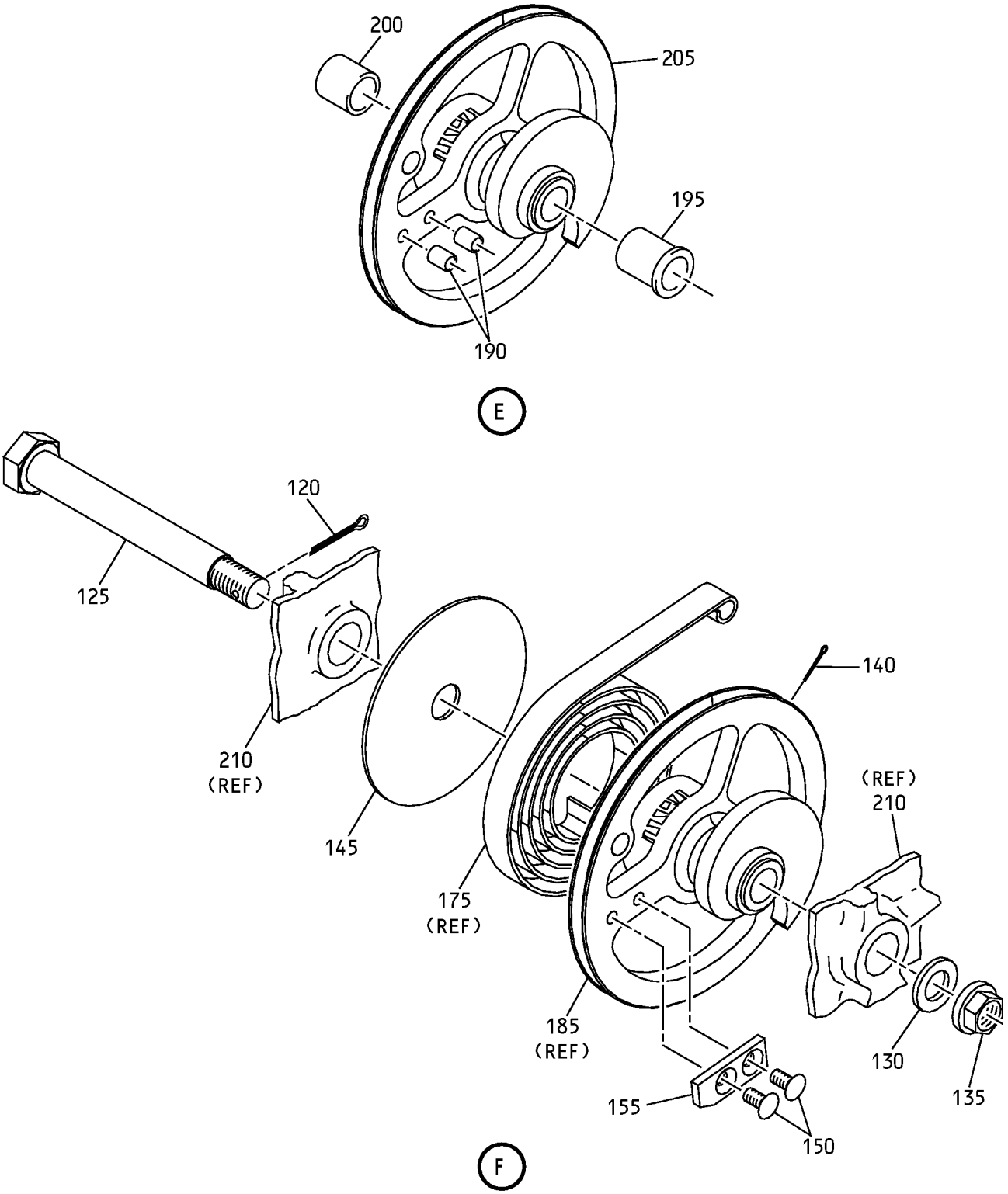
Nose Landing Gear Manual Release Assembly
IPL Figure 1 (Sheet 2 of 5)



Nose Landing Gear Manual Release Assembly
IPL Figure 1 (Sheet 3 of 5)



Nose Landing Gear Manual Release Assembly
IPL Figure 1 (Sheet 4 of 5)



Nose Landing Gear Manual Release Assembly
IPL Figure 1 (Sheet 5 of 5)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	273A4510-1		RELEASE ASSY-NOSE GEAR MANUAL RELEASE	A	RF
–1B	273A4510-2		RELEASE ASSY-NOSE GEAR MANUAL RELEASE	B	RF
–1C	273A4510-3		RELEASE ASSY-NOSE GEAR MANUAL RELEASE	C	RF
5	BACS12FA08K4		. SCREW		6
10	273A4520-1		. COVER	A	1
–10A	273A4520-2		. COVER	B, C	1
15	BACP18BC02A04P		. PIN-COTTER		6
20	BACW10BP3NDP		. WASHER		6
25	273A4519-1		. PIN-GUARD		3
30	MS20392-1A7		. PIN-DRILLED SHANK	A	1
–30A	BACP18BD1A7		. PIN-DRILLED SHANK (OPT ITEM 30B)	B, C	1
–30B	MS20392-1A7		. PIN-DRILLED SHANK (OPT ITEM 30A)	B, C	1
–30C	BACP18BD1A7		DELETED		
35	BACW10BP2NDP		. WASHER		1
40	MS24586C96		. SPRING		1
45	BACB30NM4K2		. BOLT		1
50	273A4516-1		. WASHER		1
55	273A4515-1		. ARM-FOLLOWER		1
60	273A4514-1		. SHAFT ASSY		1
65	MS21209F4-15L		. . INSERT		1
70	273A4514-2		. . SHAFT		1
75	BACB30VF8K32		. BOLT		1
80	NAS1149E0832R		. WASHER		1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
85	H01-8BAC		. NUT (V15653) (SPEC BACN10JC8CM) (OPT BMN4122C1D2-8 (V85495)) (OPT 109LH9074-8 (V72962)) (OPT 69235-820CM (V56878)) (OPT BMN4122C1D2-8 (V97928))		1
90	NES08FB		. BEARING (V73134) (SPEC BACB10FB08) (OPT KSC145700BZ08 (V50632)) (OPT KNDB08-61 (V97613)) (OPT HTFB08 (VS0352)) (OPT ADB08-301N (V15860)) (OPT ITEM 90A, 90B)	A, B	1
–90A	NC08ET5		. BEARING (V56644) (SPEC BACB10ES08E) (OPT SWKN08E520 (V81376)) (OPT 03-823-08EE011 (V09455)) (OPT ITEM 90, 90B)	A, B	1
–90B	ADB08V301NC		. BEARING (V15860) (SPEC BACB10FB08GC) (OPT HTFB08GC (VS0352)) (OPT KNDB08-70 (V97613)) (OPT KSC145700BZ08GC (V50632)) (OPT NES08FBGC (V73134)) (OPT ITEM 90, 90A)	A, B	1
–90C	NES08FB		. BEARING (V73134) (SPEC BACB10FB08) (OPT KSC145700BZ08 (V50632)) (OPT KNDB08-61 (V97613)) (OPT HTFB08 (VS0352)) (OPT ADB08-301N (V15860)) (OPT ITEM 90D)	C	1
–90D	ADB08V301NC		. BEARING (V15860) (SPEC BACB10FB08GC) (OPT HTFB08GC (VS0352)) (OPT KNDB08-70 (V97613)) (OPT KSC145700BZ08GC (V50632)) (OPT NES08FBGC (V73134)) (OPT ITEM 90C)	C	1

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
95	BACB30NM4K10		. BOLT		1
100	BACB28AK04-018		. BUSHING		1
105	BACW10BP4NAPU		. WASHER		1
110	H52732-4CM		. NUT (V15653) (SPEC BACN10YR4CM) (OPT PLH54CM (V62554))		1
115	KRP178204FT		. ROLLER-TRACK (V50632)		1
120	BACP18BC03A06P		. PIN-COTTER		1
125	BACB30PW8D54		. BOLT		1
130	BACW10BP7DP		. WASHER		1
135	H52732-7CD		. NUT (V15653) (SPEC BACN10YR7CD) (OPT PLH57CD (V62554))		1
140	BACP18BC02A06P		. PIN-COTTER		2
145	273A4522-1		. GUARD-SPRING		1
150	BACS12ER3K6		. SCREW		2
155	273A4521-1		. STOP		1
160	BACW10BP4NAPU		. WASHER		1
165	NAS42DD8-16FC		. SPACER		1
170	MS20392-3A37		. PIN-DRILLED SHANK	A	1
–170A	BACP18BD3A37		. PIN-DRILLED SHANK (OPT ITEM 170B)	B, C	1
–170B	MS20392-3A37		. PIN-DRILLED SHANK (OPT ITEM 170A)	B, C	1
–170C	BACP18BD3A37		. PIN-DRILLED SHANK	C	1
175	273A4518-1		. SPRING (REFERENCE SL 737-SL-32-151)	A, B	1
–175A	273A4518-2		. SPRING	C	1
180	BACC2D3B00382D~G		. CABLE ASSY		1
185	273A4517-1		. CAM ASSY		1
190	MS21209F1-10P		. . INSERT		2

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
195	BACB28AY08A075B		. . BUSHING		1
200	M819341-08C016		. . BUSHING		1
205	273A4517-2		. . CAM		1
210	273A4512-1		. HOUSING ASSY		1
215	MS21209F1-15P		. . INSERT		1
220	MS21209C0810P		. . INSERT		6
225	BACB28AV08B060A		. . BUSHING		1
230	BACB28AY08B060A		. . BUSHING		1
235	BACB28AY16B050A		. . BUSHING		1
240	BACB28AY16B075A		. . BUSHING		1
245	273A4512-2		. . HOUSING		1

–Item not Illustrated