COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

COLUMN CUTOUT SWITCH ASSEMBLY

PART NUMBER 251A4410–1, –2

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. 12
Jul 01/2009

To: All holders of COLUMN CUTOUT SWITCH ASSEMBLY 27-41-94.

Attached is the current revision to this COMPONENT MAINTENANCE MANUAL

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Subject/Page	Date	Subject/Page	Date	Subject/Page	Date
27-41-94 ILLUSTRATED PARTS LIST (cont)					
1024	Mar 01/2006				

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COMPONENT MAINTENANCE MANUAL

TEMPORARY REVISION AND SERVICE BULLETIN RECORD

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVE	DATE OF INCORPORATION INTO MANUAL
		PRR 38050	DEC 01/97

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Temporary Revision		Inserted		Removed	
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Temporary Revision		Inserted		Removed	
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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.

COLUMN CUTOUT SWITCH ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The column cutout switch assembly has 4 switches and 2 relays mounted with a wire bundle in a housing assembly. An input lever assembly attaches to a gear which drives a pinion shaft assembly in the housing assembly. A cam in the pinion shaft assembly operates the switches. A position transmitter is connected to the pinion shaft with a flexible coupling.

B. The input lever has a shearout joint which permits control column movement if there is a jam in the column cutout switch assembly.

2. Operation

A. The column cutout switch assembly is installed under the cockpit floor near the captain's control column. The assembly is operated by forward or aft movement of either the captain's or the first officer's control column.

B. The column cutout switch asembly stops the stabilizer trim motor when the control column is moved in a direction opposite to the trim command.

C. The position transmitter gives an electrical signal which is in proportion to the amount that the pinion shaft turns. Through the linkage with the lever assembly, the transmitter shows the position of the control columns.

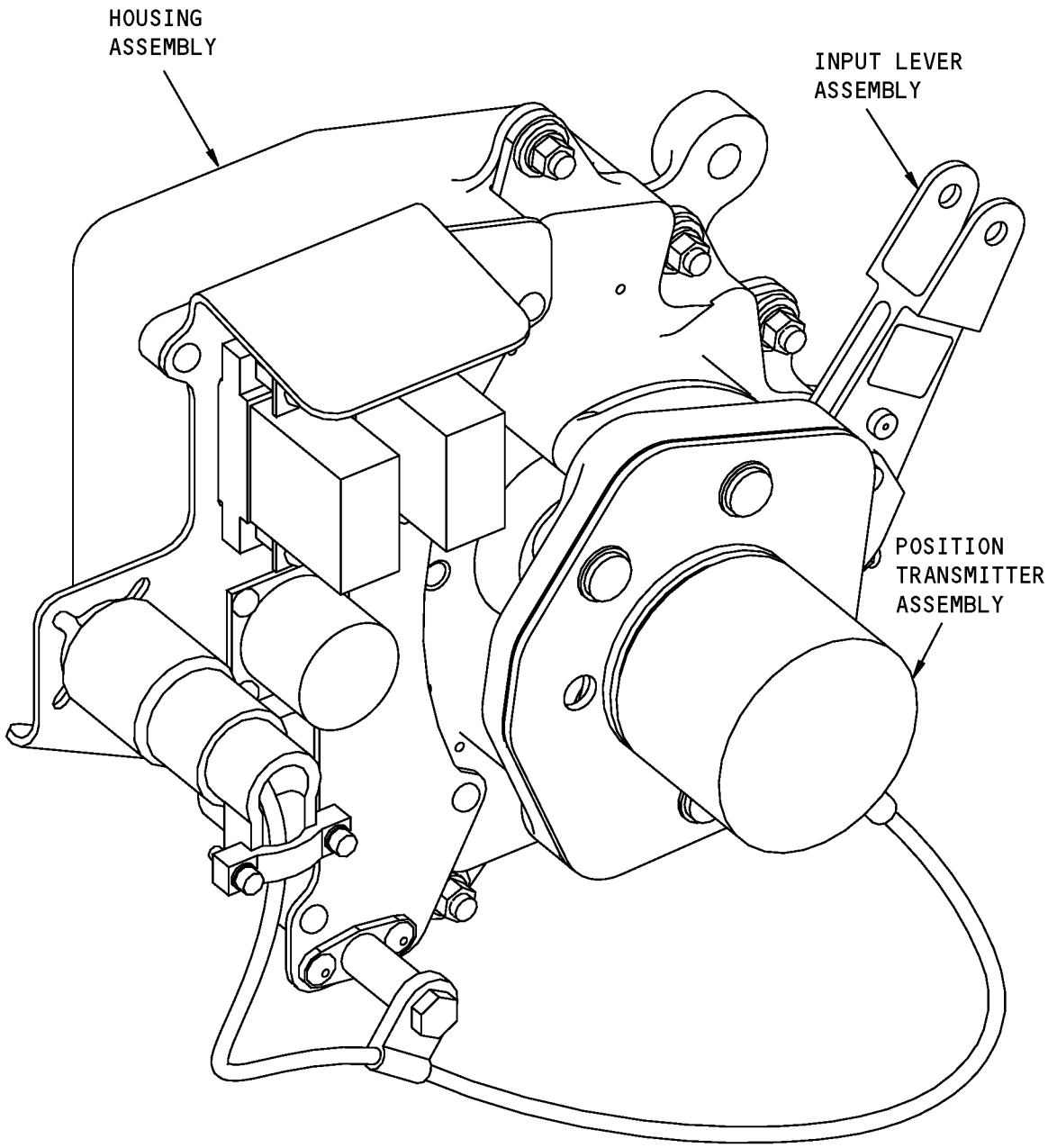
3. Leading Particulars (Approximate)

A. Length – 7 inches

B. Width – 9 inches

C. Height – 6 inches

D. Weight – 2.4 pounds



Column Cutout Switch Assembly
Figure 1

TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the column cutout switch assembly (1A) after an overhaul or for fault isolation.

B. There are three procedures:

(1) Do a check of the mechanical operation.

(2) Adjust the transmitter assembly.

(3) Do a check of the range of travel.

(4) Do a check of the operation of the switches (210) and relays (180).

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

D. Refer to IPL Figure 1 for item numbers.

2. Procedures

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
COM-1688	Indicator - Angle Position (Part #: 2623CC-44HCL/488-26, Supplier: 17755) (Part #: 8810-S3128, Supplier: 0VGU1) (Part #: 8810-S3204, Supplier: 0VGU1) (Part #: 8810A, Supplier: 0VGU1)
SPL-5372	Test Equipment - Stabilizer Trim Control Cutout Switch (Part #: C27006-48, Supplier: 81205)
SPL-5374	Test Equipment - Stabilizer Trim Control Cutout Switch (Part #: C27006-42, Supplier: 81205)
SPL-5455	Rig Pin, 0.1840 - 0.1860 in. dia, 5.50 in. minimum length (Part #: MS20392-2P176, Supplier: 81205)
SPL-6044	Test Fixture Assembly (C27006-24 included in C27006-47 & C27006-48) (Part #: C27006-48, Supplier: 81205) (Opt Part #: C27006-47, Supplier: 81205)

B. Do a check of the mechanical operation.

(1) Install the column cutout switch assembly (1A) in an applicable holding fixture.

NOTE: The C27006-24 test fixture assembly, SPL-6044 can be used to hold the assembly. C27006-24 test fixture assembly, SPL-6044 is included in C27006-42 stabilizer trim control cutout switch, SPL-5374 and C27006-48 test equipment, SPL-5372. If the C27006-24 test fixture assembly, SPL-6044 is used, do not install the test fixture pointer assembly on the lever assembly (135). The angle position indicator, COM-1688 (API), shows the lever positions in the test procedures, and not the pointer and the angle marks on the fixture.

(2) Make sure that the input lever moves freely and smoothly through its full range of travel.

(3) Turn the input lever as necessary to install the rig pin, SPL-5455 (or equivalent steel, alumninum, CRES, or titanium pin, 0.1840-0.1860 inch diameter, 3.28 inch minimum length) as shown in TESTING AND FAULT ISOLATION, Figure 101. Make sure that the distance between the clevis hole in the input lever and the bolt hole in the housing is 3.340-3.440 inches, as shown in the figure.

C. Adjust the transmitter assembly (30).

(1) Connect the transmitter assembly (55) to the 26 v ac power supply (400 Hz, adjustable, stabilized, 5-10 W output) and to the angle position indicator, COM-1688 as shown in TESTING AND FAULT ISOLATION, Figure 102.

(2) With the rig pin, SPL-5455 installed, loosen the clamp bolts (10) and turn the transmitter until the API shows 0.00 +/- 0.25 degrees. Tighten the bolts to hold the transmitter in position. Make sure that the API still shows 0.00 +/- 0.25 degrees.

NOTE: The above is used to rig the transmitter and not for fucntional testing. With the rig pin, SPL-5455 installed, the functional requirement is that if the input can be swept within the slop of the rigging pin so that the API shows at least one reading within 0.00 +/- 0.25 degrees, the transmitter is properly rigged.

(3) Remove the rig pin, SPL-5455.

D. Do a check of the range of travel. (TESTING AND FAULT ISOLATION, Figure 103)

NOTE: The clockwise and counterclockwise movement of the lever assembly (115) is measured from the transmitter (65) side of the column cutout switch assembly (1A).

(1) Turn the lever assembly (115) clockwise (CW) until the input mechanism touches the internal stop. Make sure that the API indication is between -135 and -150 degrees.

(2) Turn the lever assembly (115) counterclockwise (CCW) until the input mechanism touches the internal stop. Make sure that the API indication is between 135 and 150 degrees.

E. Do a check of the operation of the switches (210) and relays (180).

(1) Preparation

(a) Connect the trnsmitter asembly (55) to the 26 v ac power supply and to the angle position indicator, COM-1688 as shown in TESTING AND FAULT ISOLATION, Figure 102.

(b) Remove the rig pin, SPL-5455, if it is installed.

(c) Refer to TESTING AND FAULT ISOLATION, Figure 104 for identification of the pins in the connector (205).

(2) Do a check of the operation of the switches (210). Refer to TESTING AND FAULT ISOLATION, Figure 103 for the functional diagram.

(a) Turn the lever assembly (115) through the API indication range -26.45 to 23.23 degrees. Make sure that the circuit conditions between the pins in the connector (205) are as shown in TESTING AND FAULT ISOLATION, Figure 105.

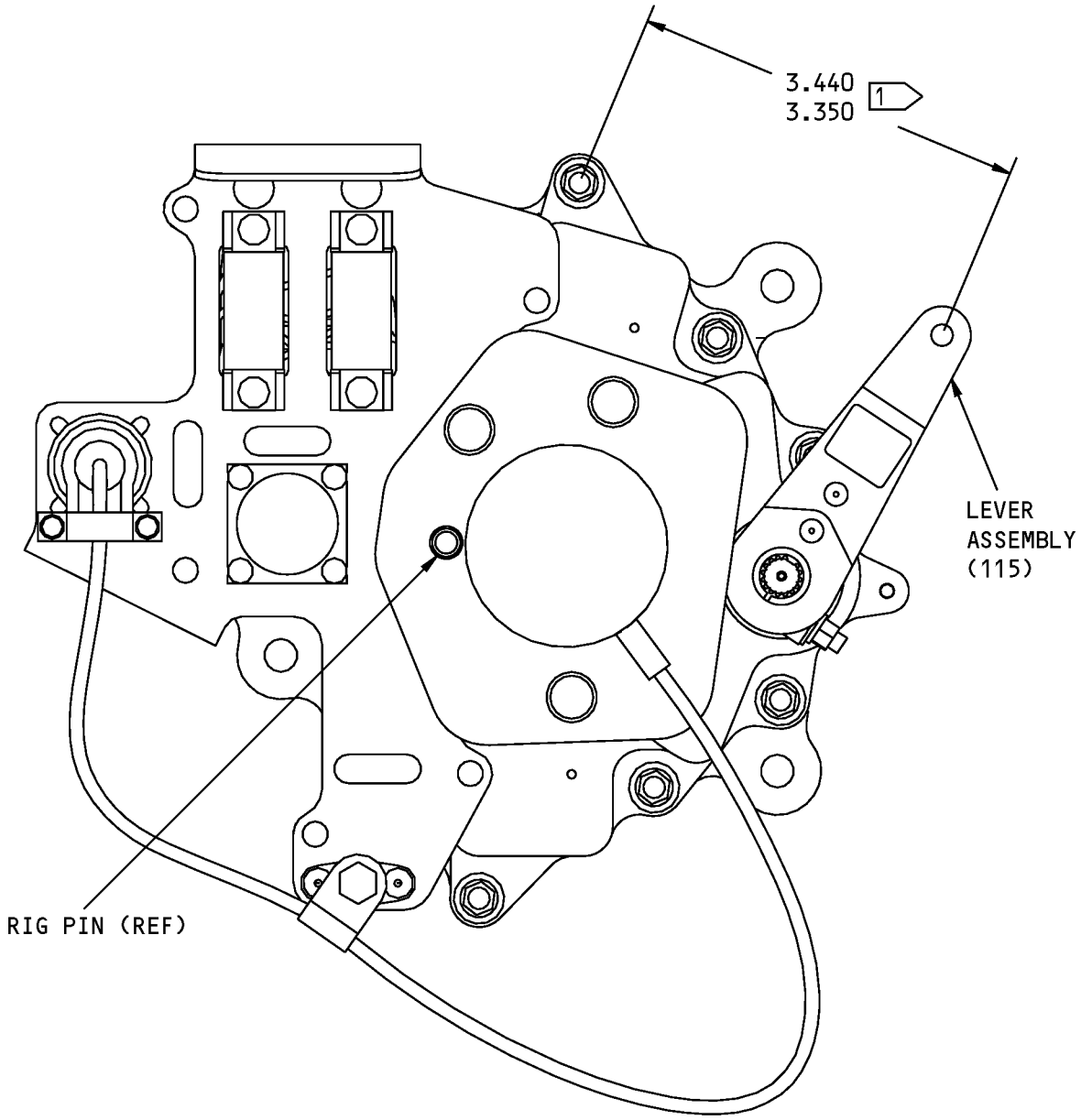
(b) Turn the lever assembly (115) through the API indication range -32.90 to -135.00 degrees. Make sure that the circuit conditions between the pins in the connector (205) are as shown in TESTING AND FAULT ISOLATION, Figure 105.

(c) Turn the lever assembly (115) through the API indication range 29.65 to 135.00 degrees. Make sure that the circuit conditions between the pins in the connector (205) are as shown in TESTING AND FAULT ISOLATION, Figure 105.

(3) Do a check of the operation of the relays (180).

(a) Apply 18-28 v dc (110 mA minimum current output) to pins 3 and 5 on the connector (205). Connect pin 2 or 7 to ground.

(b) Turn the lever assembly (115) through the API indication ranges as shwon in TESTING AND FAULT ISOLATION, Figure 106. Make sure that the circuit conditions between pins 8 and 10 are as shown in the figure.

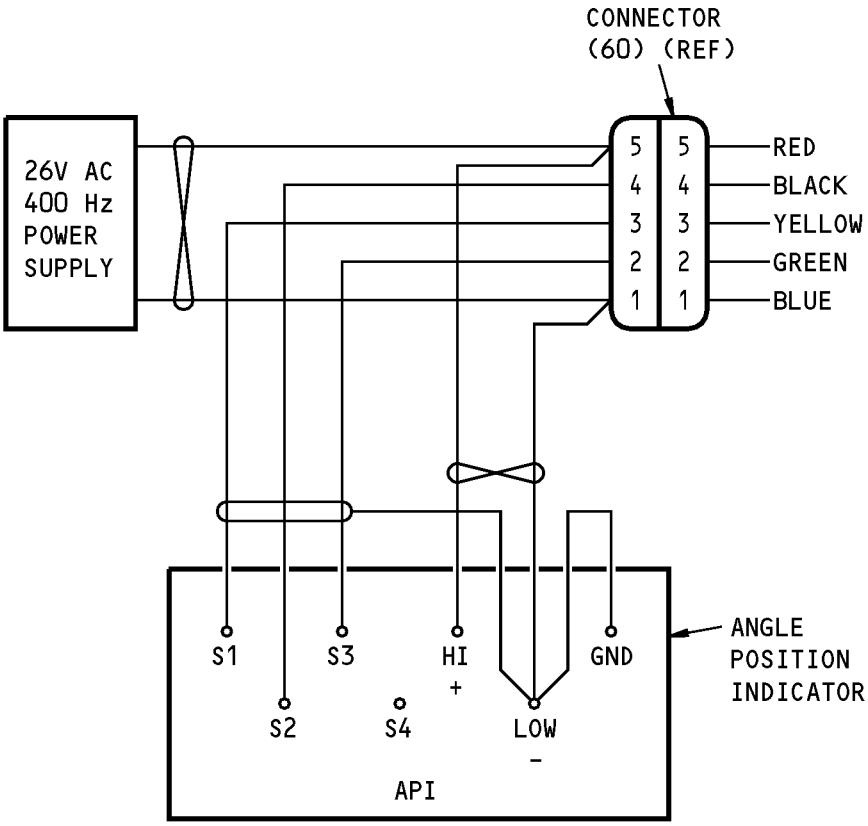


1 DIMENSION APPLIES WITH RIG PIN INSTALLED.

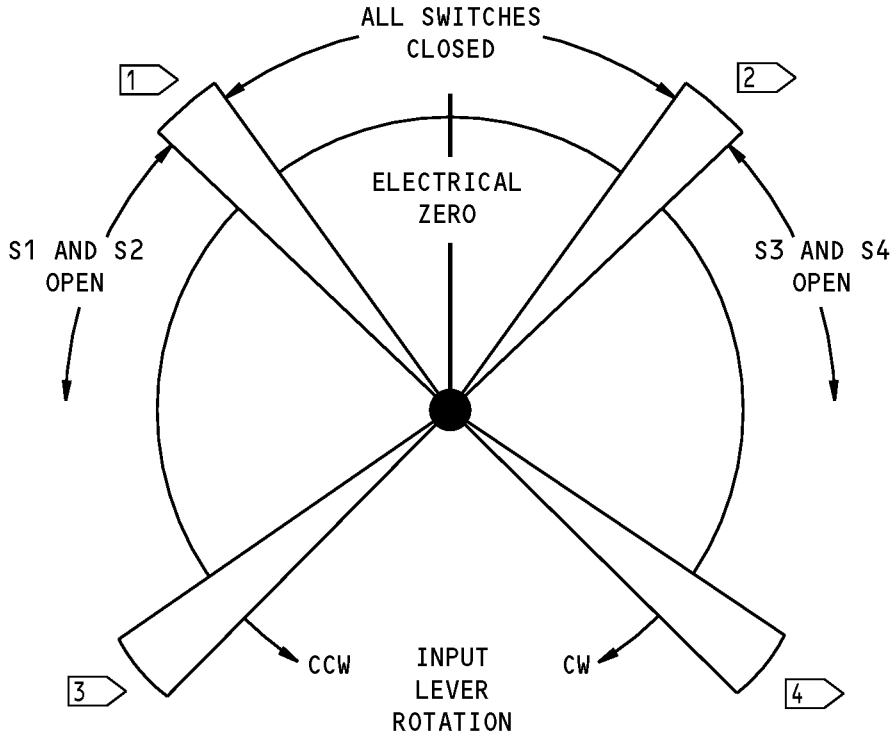
ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Check of the Rig Position
Figure 101



Angle Position Indicator Electrical Connections
Figure 102



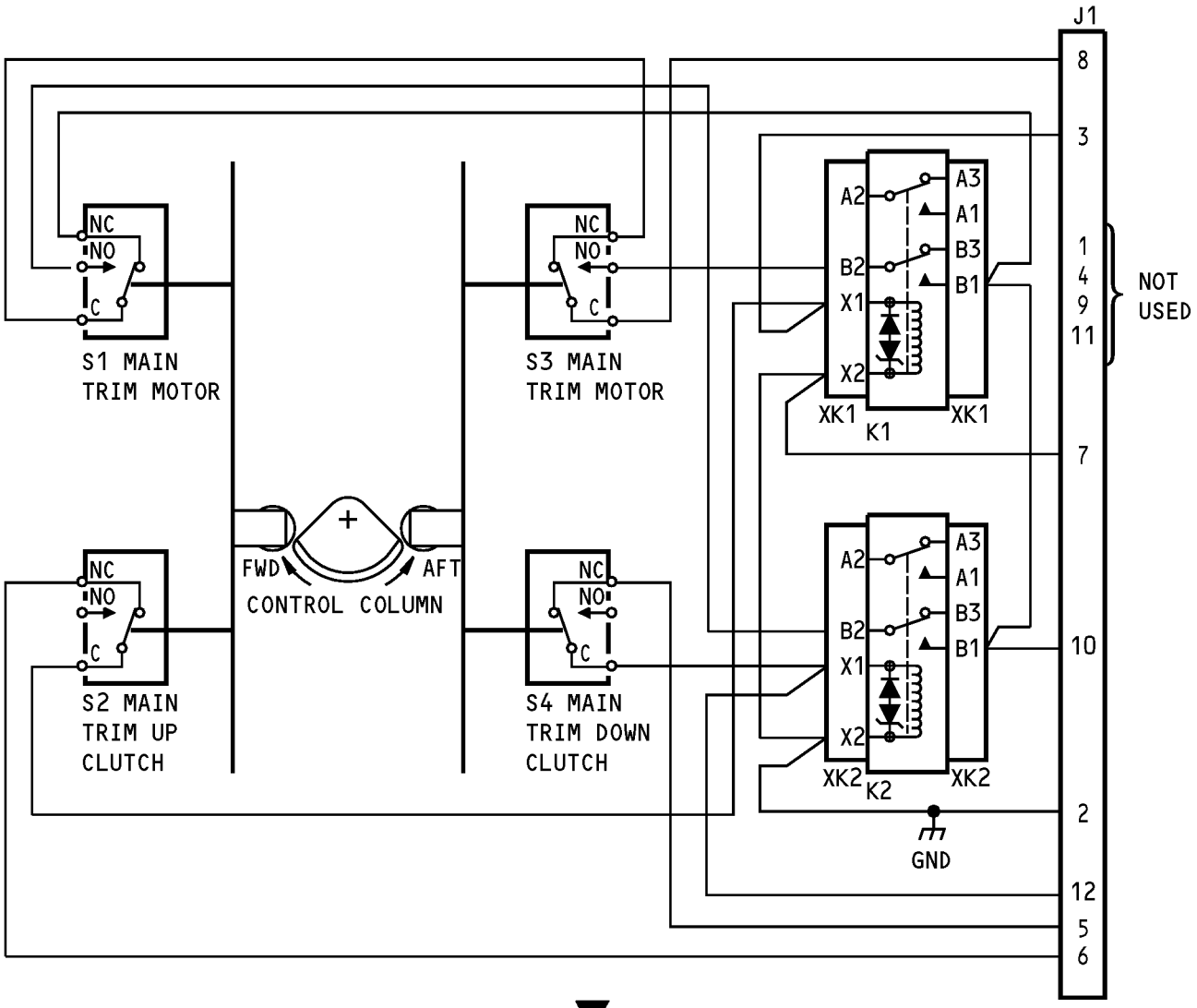
1 SWITCH TOLERANCE ZONE
API = 23.23 TO 29.65 DEGREES

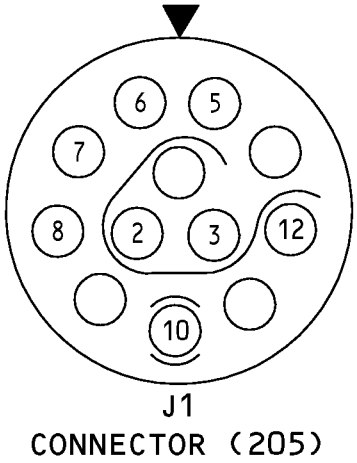
2 SWITCH TOLERANCE ZONE
API = -26.45 TO -32.90 DEGREES

3 INTERNAL STOP TOLERANCE ZONE
API = 135 TO 150 DEGREES

4 INTERNAL STOP TOLERANCE ZONE
API = -135 TO -150 DEGREES

Switch Operation - Functional Diagram
Figure 103





Wire Bundle Details
Figure 104

PINS [1] [2]	CIRCUIT CONDITION [1]			SWITCH/RELAY (REF)
	-26.45 TO 23.23	-135.00 TO -32.90	29.65 TO 135.00	
3,6	CLOSED	CLOSED	OPEN	S2
5,12	CLOSED	OPEN	CLOSED	S4
8,10	CLOSED	--	--	S1,S3
8,10	--	OPEN	--	K1,S1,S3
8,10	--	--	OPEN	K2,S1,S3

[1] CONDITION OF THE CIRCUIT BETWEEN THE PINS AT THE API INDICATIONS (DEGREES) SHOWN.

[2] REFER TO WIRE BUNDLE DETAILS TO IDENTIFY PINS IN THE CONNECTOR (205).

Check of Switch Operation
Figure 105

28V DC AT PINS [2]	GROUND AT PINS [2]	PINS [1] [2]	CIRCUIT CONDITION [1]		SWITCH/RELAY (REF)
			-135.00 TO -32.90	29.65 TO 135.00	
3,5	7 OR 2	8,10	CLOSED	--	K1,S3
3,5	7 OR 2	8,10	--	CLOSED	K2,S4

[1] CONDITION OF THE CIRCUIT BETWEEN THE PINS AT THE API INDICATIONS (DEGREES) SHOWN.

[2] REFER TO WIRE BUNDLE DETAILS TO IDENTIFY PINS IN THE CONNECTOR (205).

Check of Relay Operation
Figure 106

3. **Fault Correction**

A. Procedures

(1) Disassemble the column cutout switch assembly (1A) (DISASSEMBLY).

(2) Replace the defective parts identified by the test procedures. Refer to TESTING AND FAULT ISOLATION, Figure 104 for the wire bundle details.

(3) Assemble the column cutout switch assembly (1A) (ASSEMBLY).

(4) Do the tests on the unit again. Refer to TESTING AND FAULT ISOLATION, Paragraph 2.B. thru TESTING AND FAULT ISOLATION, Paragraph 2.E..

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the column cutout switch assembly (1A).

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

D. Refer to IPL Figure 1 for item numbers.

2. Disassembly

A. References

Reference	Title
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT

B. Procedure

(1) Remove the transmitter assembly (30).

(a) Loosen the screws on the flex coupling (80).

(b) Remove the bolts (10), washers (15), screw (20), and clamp (25), then remove the transmitter assembly (30) from the column cutout switch assembly (1A).

(c) Remove the flex coupling (80) if it is attached to the transmitter shaft.

(d) Remove the screws (35), washers (40), and the plate (45), then remove the transmitter assembly (55) from the coverplate (50).

NOTE: Do not remove the connector (60) from the transmitter (65) unless necessary for repair or replacement.

(2) Remove the bolts (70), washers (75), and the support assembly (85).

NOTE: Do not remove the inserts (90) from the support assembly unless necessary for repair or replacement.

(3) Remove the bolt (100), washer (105), nut (110), and lever assembly (135).

NOTE: Do not disassemble the lever assembly unless necessary for repair or replacement.

(4) Remove the bolts (5) to remove the cover assembly (225) from the housing assembly (350).

NOTE: The cover assembly will stay attached to the housing assembly by the wire bundle (177).

(5) Remove the screws (245), washers (250), nuts (255), and the cover assembly (260).

NOTE: Do not remove the inserts (265, 270) or the pins (275, 280) from the cover assembly unless necessary for repair or replacement.

(6) Remove the bearings (290, 300) from the cover assembly (260) (SOPM 20-50-03).

(7) Remove the gear (145) and the pinion shaft assembly (310) from the housing assembly (340).

(8) Remove the flex coupling (80) if it is attached to the pinion shaft (290).

(9) Remove the bolts (150) and washers (155) that attach the switches (210) to the housing assembly (340).

(10) Remove the screw (160), washers (165), and nut (170) that attach the ground terminal (215) to the housing assembly (340).

(11) Remove the cover assembly (225) with the wire bundle (177) and other attached parts from the housing assembly (340).

(12) Disassemble the wire bundle assembly (175).

(a) Remove the fasteners that attach the relay sockets (185) and relays (180) to the cover assembly (225).

(b) Remove the bolts (190), washers (195), and nuts (200) which attach the connector (205) to the cover assembly (225). Remove the wire bundle (177) with the attached parts from the cover assembly.

NOTE: Do not disconnect the switches, relay sockets, or connector from the wire bundle (177) unless necessary for repair or replacement.

Do not remove the rivets (230) and nut spacer (235) from the cover assembly (225) unless necessary for repair or replacement.

(13) Remove the bearings (295) from the housing assembly (340) (SOPM 20-50-03).

NOTE: Do not remove the inserts (345), decals (355, 360, 380, 385, 390, 395), or markers (365, 370, 375) from the housing assembly unless necessary for repair or replacement.

CLEANING

1. General

A. This procedure has the data necessary to clean the column cutout switch assembly (1A).

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. Cleaning

A. References

Reference	Title
SOPM 20-30-01	CLEANING AND RELUBRICATING BEARINGS
SOPM 20-30-03	GENERAL CLEANING PROCEDURES

B. Procedure

(1) Clean the bearings (290, 295, 300) as specified in SOPM 20-30-01.

(2) Use standard industry procedures and refer to SOPM 20-30-03 to clean other parts.

CHECK

1. General

A. This procedure has the data necessary to find defects in the material of the specified parts.

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

C. Refer to the Standard Overhaul Practices Manual (SOPM) for 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) Use standard industry procedures to do a visual check of all the parts for defects. Do the penetrant or magnetic particle check if the visual check shows possible damage or if you suspect possible damage on the parts listed below:

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

(a) Fitting (130)

(b) Arm (135)

(c) Gear (145)

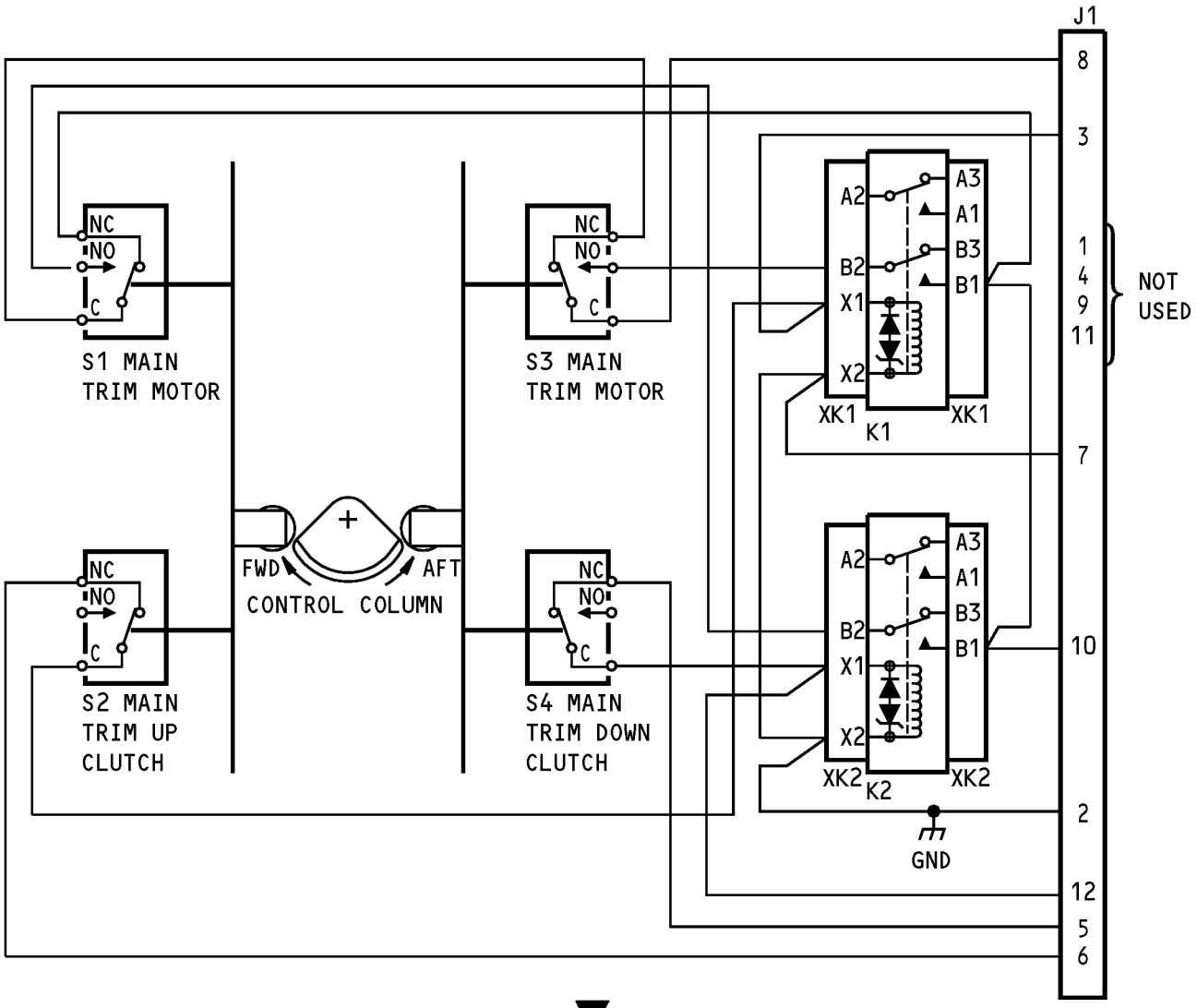
(d) Pinion shaft (335)

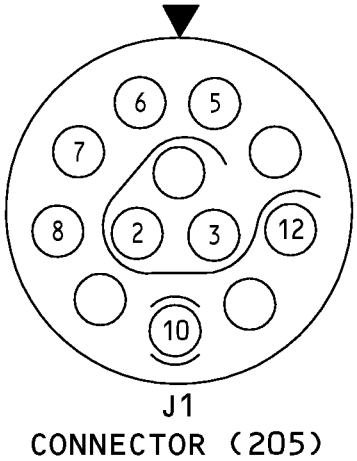
(3) Do a penetrant check (SOPM 20-20-02) of these parts:

(a) Cam (320)

(b) Housing (350)

(4) Do a continuity check of the wire bundle (177). Refer to CHECK, Figure 501.





Wire Bundle Details
Figure 501

REPAIR

1. General

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

Table 601: Refinish Details

PART NUMBER	NAME	REPAIR
—	REFINISH OF OTHER PARTS	1-1
251A4436	PINION SHAFT ASSEMBLY	2-1, 2-2
69-73309	LEVER ASSEMBLY	3-1
BAC27DCT627	MARKER	4-1
BAC27DCT628	MARKER	
BAC27DCT643	MARKER	
BAC27TCT0012	DECAL	
BAC27TCT0013	DECAL	
BAC27TCT0014	DECAL	
BAC27TCT0015	DECAL	
BAC27TCT0018	DECAL	
BAC27TCT0019	DECAL	

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)
∅	DIAMETER
S ∅	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
◎ | ∅ 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
⌖ | ∅ 0.002 Ⓢ | B	LOCATED AT TRUE POSITION WITHIN 0.002 DIA RELATIVE TO DATUM B, REGARDLESS OF FEATURE SIZE
⊥ | ∅ 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 has the data necessary to refinish the parts which are not given in the specified 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

B. References

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

C. General

NOTE: For stripping of protective finishes, refer to SOPM 20-30-02. 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 listed in REPAIR 1-1, Table 601 are for repair of the initial finish.

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
Fig. 1		
Plate (45), coverplate (50), cover (240)	Aluminum alloy	Anodize (F-17.31) and apply primer, C00259 (F-20.02).
Support (95)	Aluminum alloy	Anodize (F-17.31) and apply primer, C00259 (F-20.02), but do not apply primer in the insert holes.
Fitting (130), arm (135)	CRES 150-170 ksi	Passivate (F-17.09)
Gear (145)	CRES, 180 ksi minimum	Passivate (F-17.25).
Support (95)	Aluminum alloy	Anodize (F-17.31) and apply primer, C00259 (F-20.02), but do not apply primer in the bearing bores, or the holes for the rig pin and index pins. Do not apply primer in the insert holes.

Table 601: Refinish Details (Continued)

IPL FIG. & ITEM	MATERIAL	FINISH
Housing (350)	Aluminum alloy	Anodize (F-17.31) and apply primer, C00259 (F-20.02), but do not apply primer in the bearing bores, or in the holes for the rig pin, index pins, and electrical ground connection. Do not apply primer in the insert holes.

PINION SHAFT ASSEMBLY - REPAIR 2-1

251A4436–2

1. General

A. This procedure has the data necessary to disassemble and assemble the pinion shaft assembly (310), and to replace parts on the 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. Replacement of Parts

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
A50009	Sealant - Low Density, Chromate Type Synthetic Rubber	BMS5-142, Class B-1/2

B. References

Reference	Title
SOPM 20-10-02	MACHINING OF ALLOY STEEL
SOPM 20-50-12	APPLICATION OF ADHESIVES
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure

NOTE: For miscellaneous materials, refer to SOPM 20-60-04

(1) Disassemble the pinion shaft assembly (310).

NOTE: If replacement of the pinion (330) or the cam (320) is necessary, we recommend that you replace the pinion shaft (335) at the same time. This is to make sure that the holes for the rivets (315, 325) will be aligned after they are machined.

(a) Remove the rivet (325), then remove the pinion (330) from the pinion shaft (335).

(b) Remove the rivet (315), then remove the cam (320) from the pinion shaft (335).

(2) Assemble the pinion shaft assembly (310). Refer to REPAIR 2-1, Figure 601.

(a) If new parts are used, install the pinion (330) or the cam (320) on the pinion shaft (335) and machine (SOPM 20-10-02) the holes for the rivets (315, 325) as shown in REPAIR 2-1, Figure 601. Make sure that the cam and the pinion are in the correct relation to the pinion shaft before the holes are machined. Remove the parts from the pinion shaft.

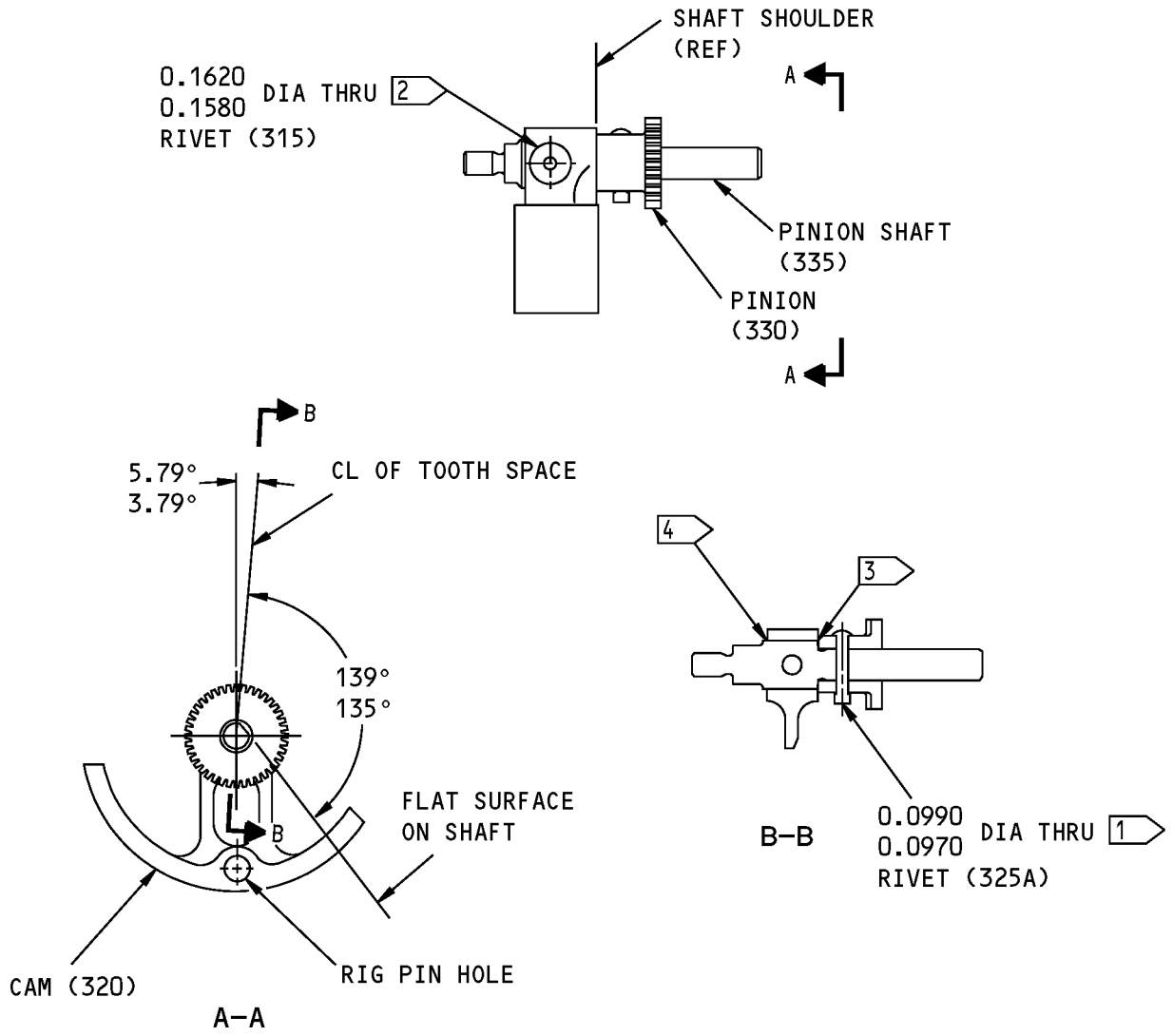
NOTE: The angular position of the hole for the rivet (325) is not controlled.

(b) Chemical treat (F-17.10) the bare metal in the rivet holes in the cam (320).

(c) Install the pinion (330) on the pinion shaft (335), then install the rivet (325) to hold the parts together.

(d) Apply sealant, A50009 to the faying surfaces of the pinion (330) and the cam (320) (SOPM 20-50-12), then install the cam on the pinion shaft (335). Install the rivet (315) to hold the cam in position.

(e) Apply a fillet seal of sealant, A50009 to the joints between the cam (320) and the pinion shaft (335).



1. ANGULAR POSITION OF THIS HOLE IS NOT CONTROLLED
2. CHEMICAL TREAT (F-17.10) THE BARE METAL IN THE HOLES IN THE CAM
3. APPLY FAY SURFACE SEAL WITH BMS 5-142
4. APPLY FILLET SEAL WITH BMS 5-142

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

251A4436-2 Pinion Shaft Assembly - Parts Replacement
Figure 601

PINION SHAFT ASSEMBLY - REPAIR 2-2

251A4436–2

1. General

A. This procedure has the data necessary to repair and refinish the parts of the pinion shaft assembly (310).

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 Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

2. Refinish

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

B. References

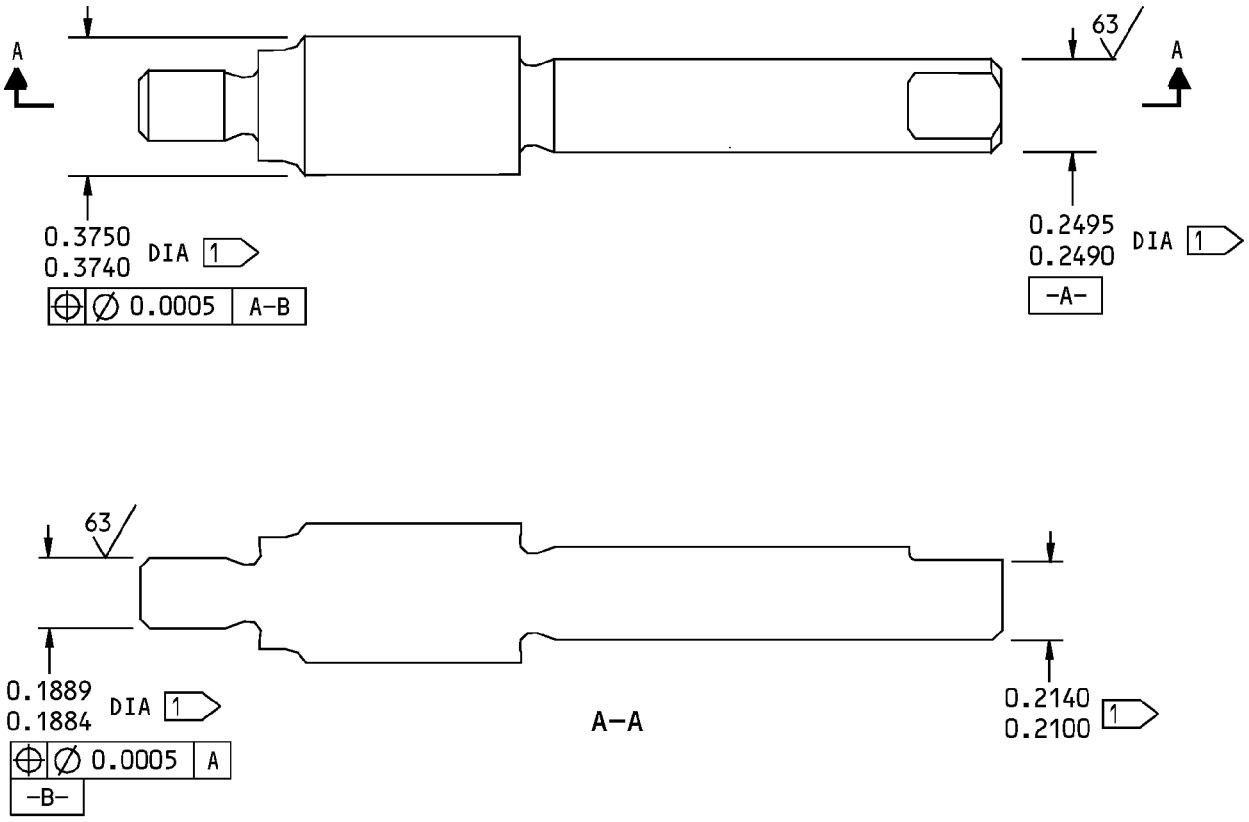
Reference	Title
SOPM 20-30-02	STRIPPING OF PROTECTIVE FINISHES
SOPM 20-41-01	DECODING TABLE FOR BOEING FINISH CODES
SOPM 20-60-02	FINISHING MATERIALS

C. Procedures

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

(1) Cam (320) – Anodize (F-17.31) and apply primer, C00259 (F-20.02), but do not apply primer in the holes for the pinion shaft and the rig pin. Material: Aluminum alloy.

(2) Pinion shaft (335) – Cadmium plate (F-16.06). Refer to REPAIR 2-2, Figure 601. Material: CRES, 180-200 ksi.



1 DIMENSIONS APPLY AFTER PLATING

125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

251A4437-2 Pinion Shaft Refinish
Figure 601

LEVER ASSEMBLY - REPAIR 3-1

69-73309–1

1. General

A. This procedure has the data necessary to disassemble and assemble the lever assembly (115), and to replace parts on the assembly.

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 Standard True Position Dimensioning Symbols shown in the repair.

D. Refer to IPL Figure 1 for item numbers.

2. Replacement of Parts

A. References

Reference	Title
SOPM 20-10-02	MACHINING OF ALLOY STEEL

B. Procedure

(1) Disassemble the lever assembly (115).

(a) Remove the rivets (120, 125).

(b) Remove the fitting (130) from the arm (135).

NOTE: Do not remove the marker (140) from the arm unless replacement is necessary.

(2) Assemble the lever assembly (115). Refer to REPAIR 3-1, Figure 601.

(a) Install the fitting (130) in the arm (135) as shown in REPAIR 3-1, Figure 601. If new parts are used, machine the 0.158-0.159 inch diameter holes for the rivets as shown in the figure (SOPM 20-10-02).

(b) Install the rivets (120, 125). The driven heads of the rivets must be 0.185 inch in diameter, or larger.

(c) Clean out the center hole in the rivets (120, 125) to the initial 0.040-0.046 inch diameter.

3. Marker Replacement

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
B00571	Coating - Clear Hydraulic Fluid Resistant Topcoat	BAC5710, Type 41

B. References

Reference	Title
SOPM 20-30-03	GENERAL CLEANING PROCEDURES
SOPM 20-44-01	APPLICATION OF SPECIAL PURPOSE COATINGS AND FINISHES
SOPM 20-50-05	APPLICATION OF ALUMINUM FOIL AND OTHER MARKERS

Reference	Title
SOPM 20-60-02	FINISHING MATERIALS

C. Procedure

NOTE: For finishing materials, refer to SOPM 20-60-02.

(1) Remove the marker (140).

(2) Clean the surface of the arm (135) (SOPM 20-30-03).

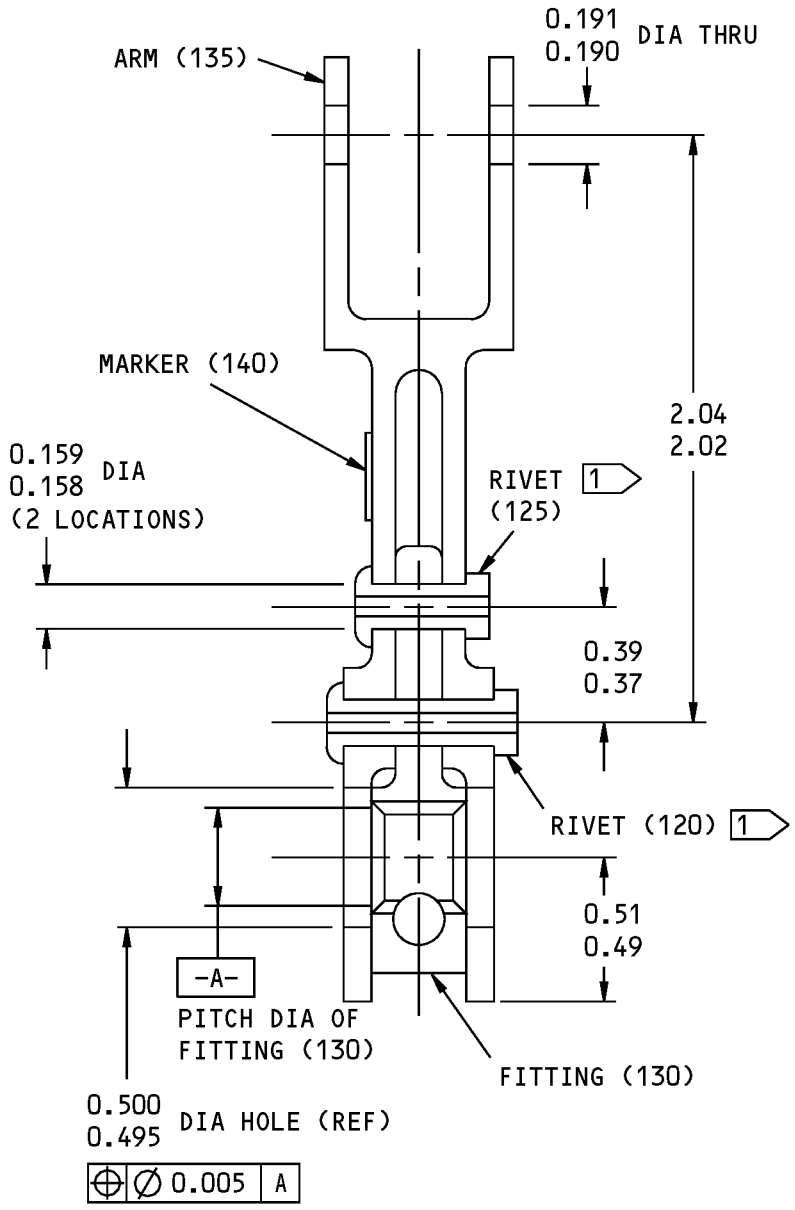
(3) Install the marker (140) on the arm (135) as shown in REPAIR 3-1, Figure 601 (SOPM 20-50-05).

(4) Apply Type 41 coating, B00571 to the edges of the marker (SOPM 20-44-01).

4. Refinish

A. Procedures

(1) Refinish the fitting (130) and the arm (135) as necessary. Refer to REPAIR 1-1.



1 CLEAN OUT THE CENTER HOLE IN THE RIVET TO 0.040–0.046 DIA AFTER INSTALLATION

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

69-73309-1 Lever Assembly - Parts Replacement
Figure 601

DECAL OR MARKER - REPAIR 4-1

BAC27DCT627, BAC27DCT628, BAC27DCT643, BAC27TCT0012, BAC27TCT0013, BAC27TCT00014, BAC27TCT0015, BAC27TCT0018, –BAC27TCT00019

1. General

A. This procedure has the data necessary to replace the decals (355, 360, 380, 385, 390, 395) and markers (365, 370, 375) on the control column switch assembly (1A).

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. Decal (355, 360, 380, 385, 390, 395) Replacement

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
B00571	Coating - Clear Hydraulic Fluid Resistant Topcoat	BAC5710, Type 41

B. References

Reference	Title
SOPM 20-30-03	GENERAL CLEANING PROCEDURES
SOPM 20-44-01	APPLICATION OF SPECIAL PURPOSE COATINGS AND FINISHES
SOPM 20-50-05	APPLICATION OF ALUMINUM FOIL AND OTHER MARKERS
SOPM 20-60-02	FINISHING MATERIALS

C. Procedures

NOTE: For finishing materials, refer to SOPM 20-60-02.

(1) Remove the damaged or defective decal (355, 360, 380, 385, 390, 395).

(2) Clean the surface of the housing (350) (SOPM 20-30-03).

(3) Install the decal approximately in the location shown in REPAIR 4-1, Figure 601 (SOPM 20-50-05).

(4) Apply Type 41 coating, B00571 to the edges of the decal (SOPM 20-44-01).

3. Marker (365, 370, 375) Replacement

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
B00571	Coating - Clear Hydraulic Fluid Resistant Topcoat	BAC5710, Type 41
C50074	Coating - Teflon Filled, Non Decorative, Sprayable Material (Color - BAC 700 White)	BMS 10-86 Type I

B. References

Reference	Title
SOPM 20-30-03	GENERAL CLEANING PROCEDURES
SOPM 20-44-01	APPLICATION OF SPECIAL PURPOSE COATINGS AND FINISHES
SOPM 20-50-05	APPLICATION OF ALUMINUM FOIL AND OTHER MARKERS
SOPM 20-50-10	APPLICATION OF STENCILS, INSIGNIA, SILK SCREEN, PART NUMBERING AND IDENTIFICATION MARKINGS
SOPM 20-60-02	FINISHING MATERIALS

C. Procedures

NOTE: For finishing materials, refer to SOPM 20-60-02.

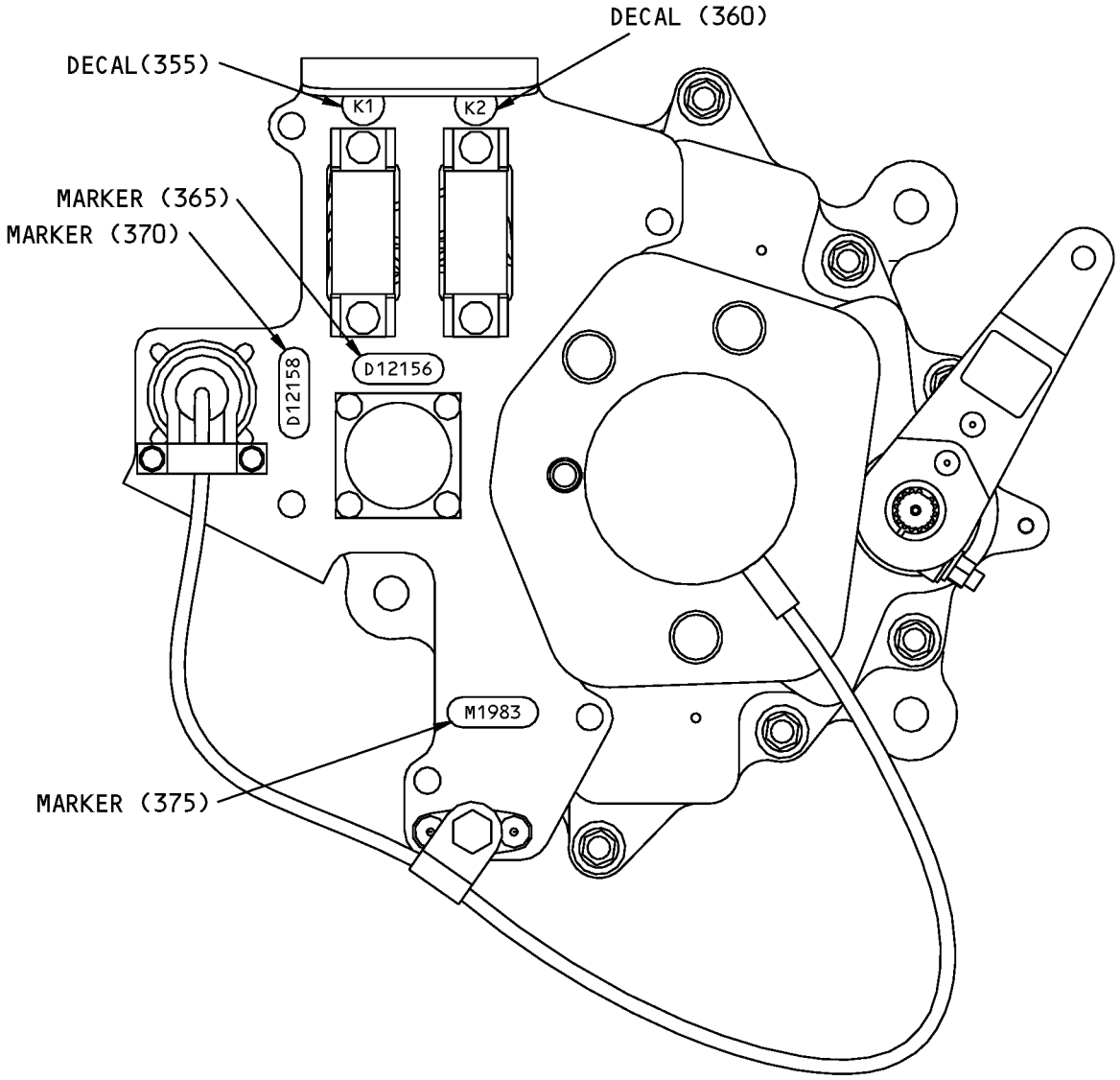
NOTE: As an alternative to the marker (375), you can use a rubber stamp to put the module number (M1983) at the applicable location. Apply Type 27 coating coating, C50074 over the identification marks. (SOPM 20-50-10).

(1) Remove the damaged or defective marker (365, 370, 375).

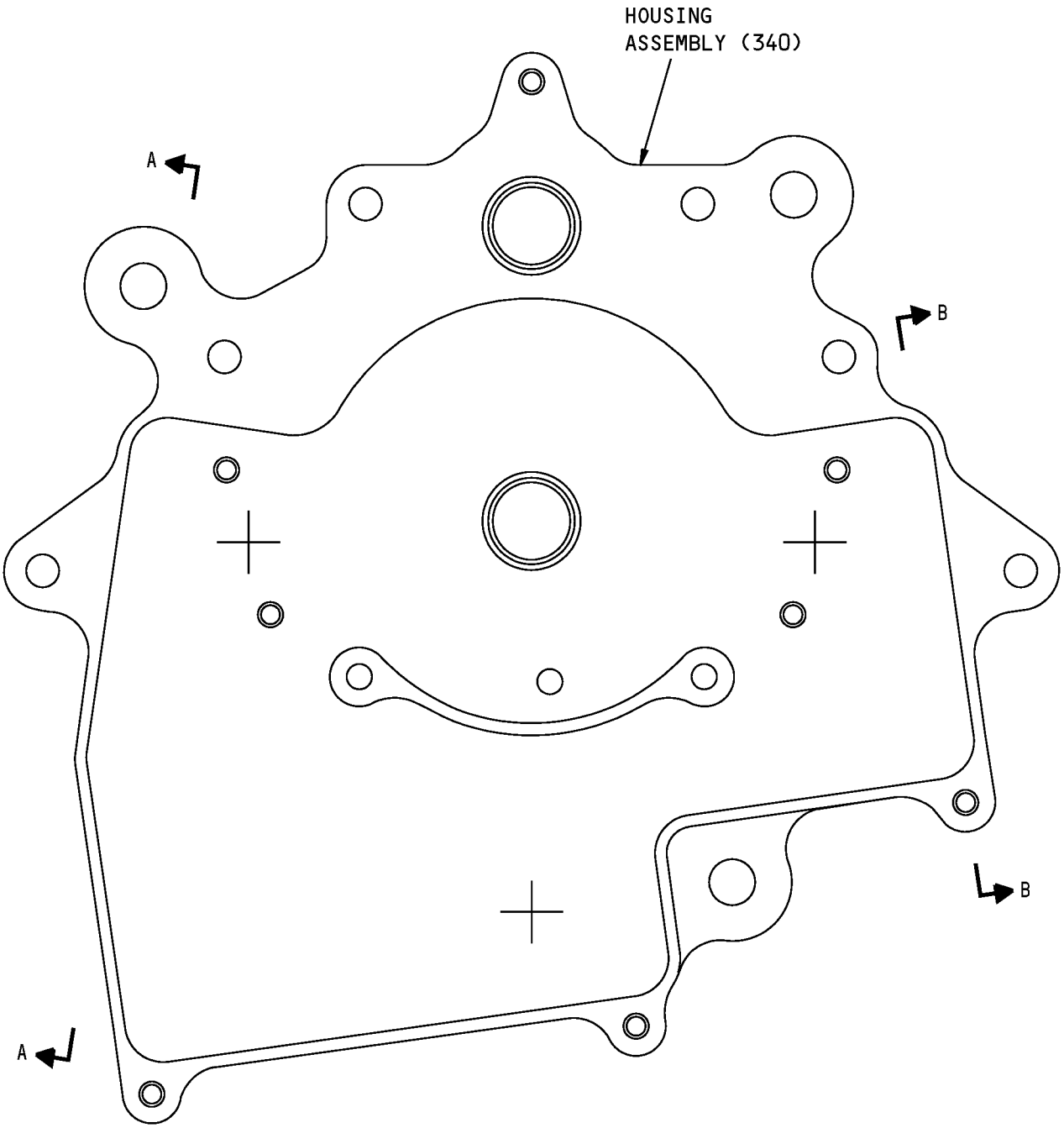
(2) Clean the surface of the housing (350) (SOPM 20-30-03).

(3) Install the marker approximately in the location shown in REPAIR 4-1, Figure 601 (SOPM 20-50-05).

(4) Apply Type 41 coating, B00571 to the edges of the marker (SOPM 20-44-01).

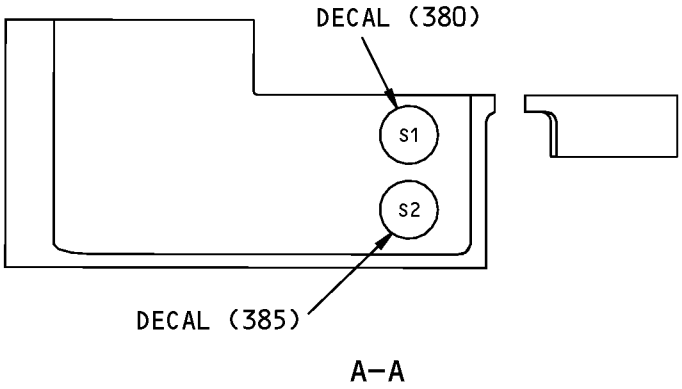


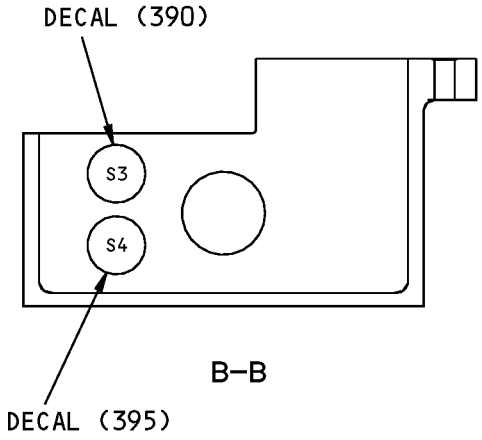
BAC27DCT627, BAC27DCT629, BAC27DCT643, BAC27TCT0012, BAC27TCT0013, BAC27TCT0014, BAC27TCT0015, BAC27TCT0018, BAC27TCT0019 Decal and Marker Replacement
Figure 601 (Sheet 1 of 3)



ITEM NUMBERS REFER TO IPL FIG. 1

BAC27DCT627, BAC27DCT629, BAC27DCT643, BAC27TCT0012, BAC27TCT0013, BAC27TCT0014, BAC27TCT0015, BAC27TCT0018, BAC27TCT0019 Decal and Marker Replacement
Figure 601 (Sheet 2 of 3)





ITEM NUMBERS REFER TO IPL FIG. 1

BAC27DCT627, BAC27DCT629, BAC27DCT643, BAC27TCT0012, BAC27TCT0013, BAC27TCT0014, BAC27TCT0015, BAC27TCT0018, BAC27TCT0019 Decal and Marker Replacement
Figure 601 (Sheet 3 of 3)

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the column cutout switch assembly (1A). There are two parts:

(1) Assembly of the column cutout switch assembly (1A)

(2) Storage

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
A00247	Sealant - Pressure And Environmental - Chromate Type	BMS 5-95
A50009	Sealant - Low Density, Chromate Type Synthetic Rubber	BMS5-142, Class B-1/2
C00913	Compound - Corrosion Inhibiting Material, Nondrying Resin Mix	BMS 3-27
D00013	Grease - Aircraft And Instrument Grease	MIL-PRF-23827 (NATO G-354) (Supersedes MIL-G-23827)
D00015	Grease - Aircraft Bearing (Use BMS 3-24 until existing stocks are depleted, BMS 3-33 supersedes BMS 3-24)	BMS3-24 (Superseded by BMS 3-33)

B. References

Reference	Title
SOPM 20-11-03	REPAIR OF ELECTRICAL TERMINATIONS AND ELECTRICAL BONDING AREAS
SOPM 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-60-02	FINISHING MATERIALS
SOPM 20-60-03	LUBRICANTS
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure

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) Install the bearings (295) in the housing assembly (340) with sealant, A00247 (SOPM 20-50-03).

(2) Install the bearings (290, 300) in the cover assembly (260) with sealant, A00247 (SOPM 20-50-03).

(3) Install the gear (145) and pinion shaft assembly (310). Refer to ASSEMBLY, Figure 702.

(a) Apply a layer of grease, D00015 or grease, D00013 to the short end of the shaft of the pinion shaft assembly (310). Apply a layer of the grease to the ID of the applicable bearing (295) in the housing assembly (350). Install the pinion shaft assembly into the bearing in the housing.

(b) Install the rig pin in the cam (320) and the housing assembly (350).

(c) Apply a layer of grease, D00015 or grease, D00013 to the short shaft on the gear (145), and to the applicable bearing (295) in the housing assembly (350). Install the gear into the bearing in the housing.

(4) Remove the backlash between the gear (145) and the pinion (330).

(a) Make a record of where the gear (145) engages the pinion (330).

(b) Pull the gear (145) out and turn the floating part of the pinion (330) 2 to 4 teeth.

(c) Install the gear (145) again so that the gear teeth engage the fixed part of the pinion (330) in the same location as before.

NOTE: The spring load on the floating part of the pinion removes the backlash between the gear and the pinion.

(5) Assemble the wire bundle assembly (175).

(a) Install the relays (180) and relay sockets (185) on the cover assembly (225) with the socket fasteners. Make sure that the polarizing pins on the relays are located as shown in ASSEMBLY, Figure 701.

(b) Install the connector (205) with the bolts (190), washers (195), and nuts (200). Make sure that the master keyway on the connector is located as shown in ASSEMBLY, Figure 701.

(6) Install the switches (210) in pairs in the housing assembly (340) with the bolts (150) and washers (155). Refer to ASSEMBLY, Figure 702.

(7) Install the cover assembly (225) with the wire bundle assembly (175) on the housing assembly (340) with the bolts (5).

(8) Install the cover assembly (260).

(a) Install the washer (305) on the pinion shaft assembly (310).

(b) Apply a layer of grease, D00015 or grease, D00013 to the shaft on the gear (145), and to the end of the pinion shaft assembly (310). Apply the grease to the ID of the bearings (290, 300) in the cover assembly (260).

(c) Install the cover assembly (260) on the housing assembly (340) with the screws (245), washers (250), and nuts (255).

(9) Install the lever assembly (115). Refer to ASSEMBLY, Figure 702.

(a) Install the lever assembly (115) with the marker (140) on the front side as shown in ASSEMBLY, Figure 702. Install the bolt (100), washer (105), and nut (110) to hold the lever assembly to the gear (145).

(b) With the rig pin installed, measure the distance between the clevis hole in the input lever assembly (115) and the applicable bolthole in the housing (350). Make sure that the distance is 3.350-3.440 inches.

(c) If the distance is not correct, remove the lever assembly (115) and the cover assembly (260), and adjust the position of the gear (145) as necessary. Install the cover asembly and lever assembly and measure the distance again.

(10) Install the electrical ground connection (SOPM 20-11-03).

(a) Clean the area around the screw (160) hole on the inside of the housing assembly (340) to prepare for the electrical bonding.

(b) Install the screw (160), washers (165), and nuts (170) to attach the ground terminal (215) on the wire bundle assembly (175) to the housing assembly (340).

(c) Measure the resistance between the ground terminal and the housing (350). Make sure the resistance is not more than 0.001 ohm.

(d) Apply a fillet seal of sealant, A50009 at the edges of the joints between the electrical faying surfaces.

(e) Refinish the housing (350) as necessary, on the surfaces not covered by the electrical ground connections. Refer to REPAIR 1-1.

NOTE: You can chemical treat (F-17.10) the bare metal as an alternative to the anodize.

(11) Install the cover assembly (225) with the wire bundle (177) on the housing assembly (340) with the bolts (5).

(12) Install the flex coupling (80) on the pinion shaft assembly (310).

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.

(a) Apply corrosion inhibiting compound, C00913 to the end of the pinion shaft assembly (310). Put the pinion shaft into the smaller "D" hole in the flex coupling (80).

NOTE: Look at the clamping slots in the flex coupling from the side, with the screw heads up. The smaller "D" hole is on the right end.

(b) Push the flex coupling (80) fully against the pinion shaft (335), then tighten the applicable clamping screw on the flex coupling to 12-15 pound-inches.

(13) Install the support assembly (85) with the bolts (70) and washers (75).

(14) Install the transmitter assembly (30).

(a) Attach the transmitter assembly (55) to the coverplate (50) with the plate (45), screws (35), and washers (40).

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.

(WARNING PRECEDES)

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.

(b) Apply corrosion inhibiting compound, C00913 to the shaft of the transmitter (65). Put the transmitter shaft into the larger "D" hole in the flex coupling (80). Turn the transmitter body until the transmitter cable is aligned approximately as shown in ASSEMBLY, Figure 702, then install the bolts (10) and washers (15).

(c) Push the flex coupling (80) and the pinion shaft (335) until the shoulder of the pinion shaft is against the bearing (295) in the housing assembly (340). Hold the flex coupling in this position and tighten the applicaable clamping screw to 12-15 pound-inches.

(d) Install the clamp (25) on the transmitter cable with the screw (20).

(15) Rig the column cutout switch assembly and do the functional test per TESTING AND FAULT ISOLATION.

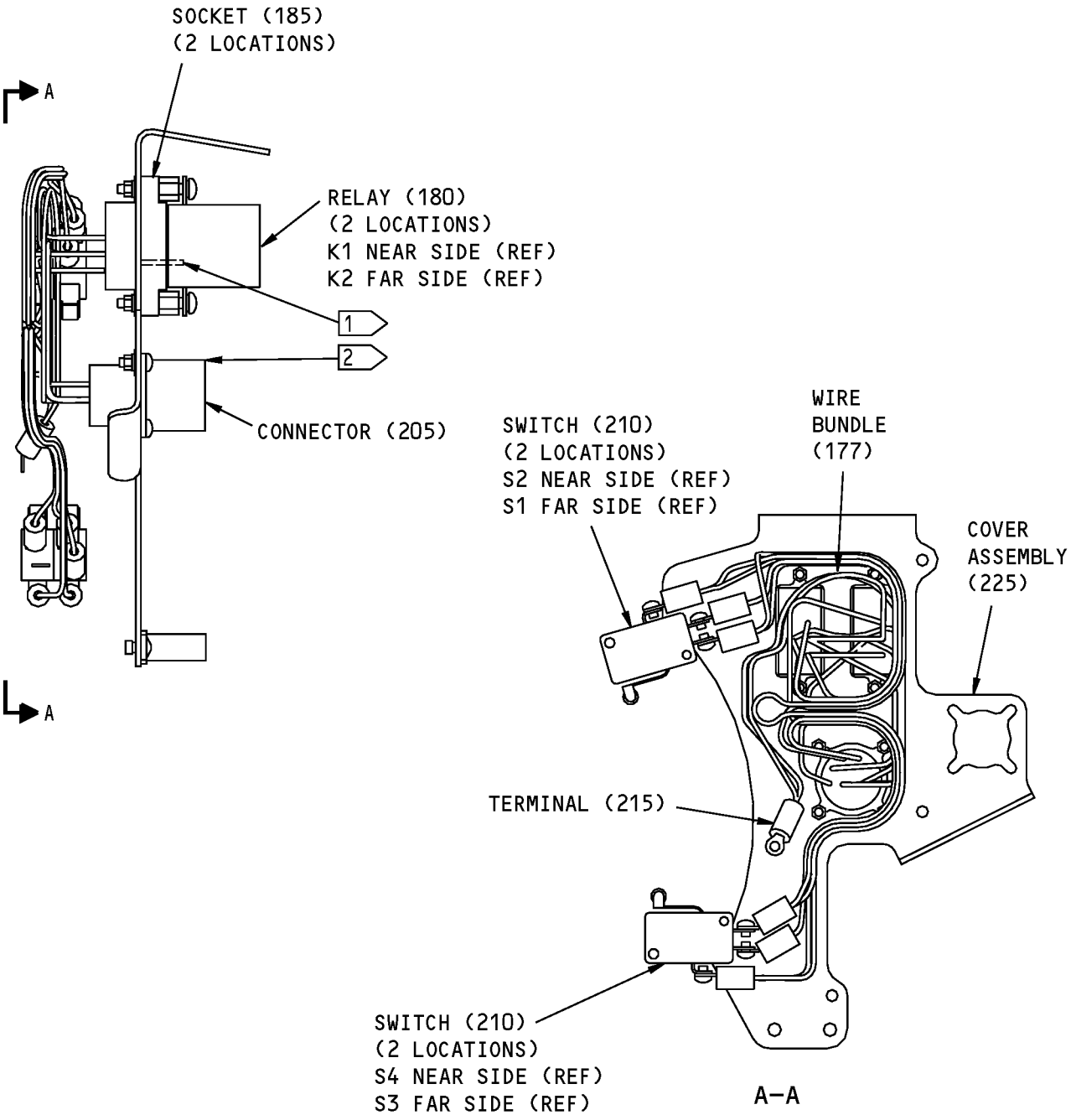
3. Storage

A. References

Reference	Title
SOPM 20-44-02	TEMPORARY PROTECTIVE COATINGS

B. Procedure

(1) Use standard industry procedures to store this component. Refer to SOPM 20-44-02 for more data.

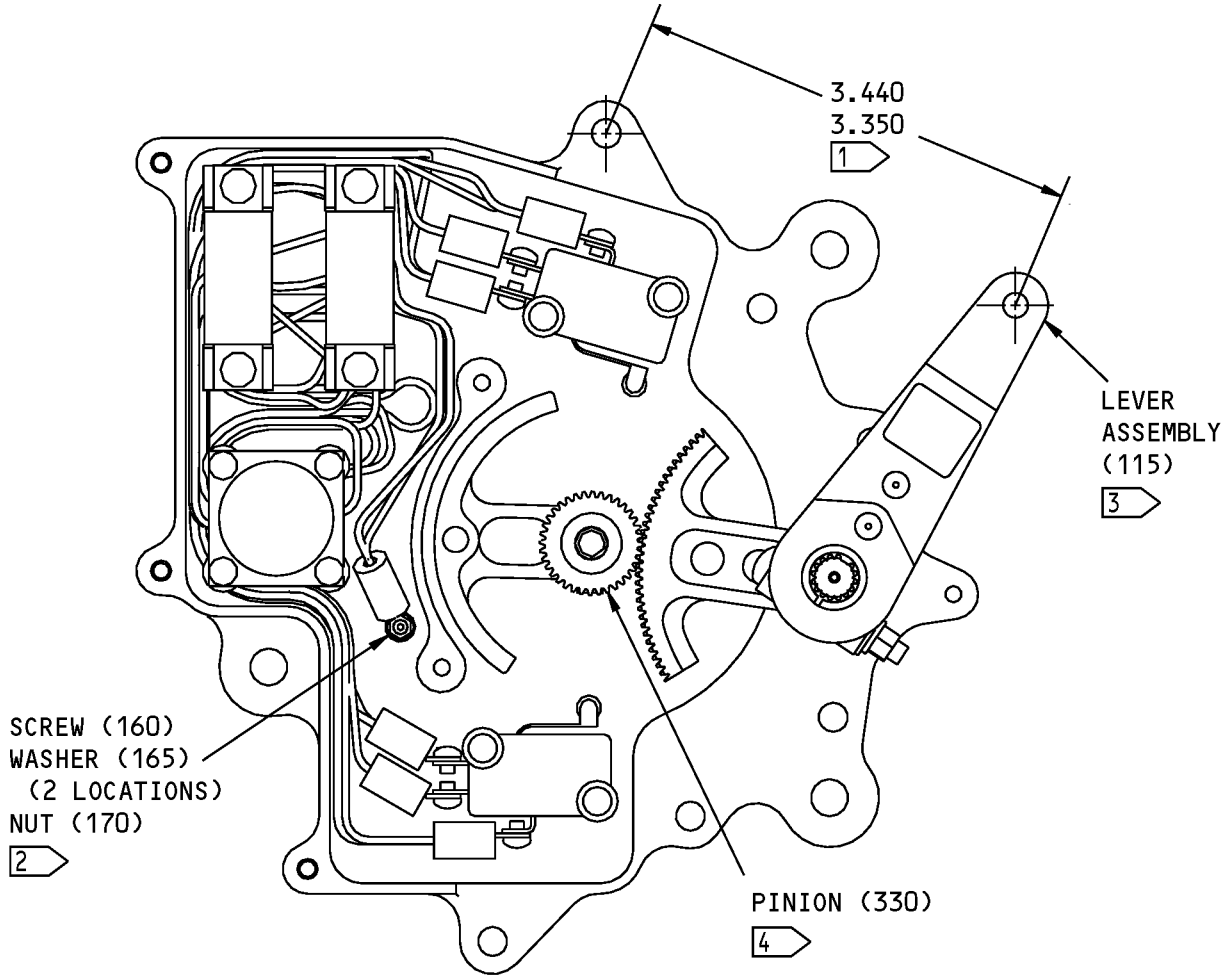


1 INSTALL THE RELAYS WITH THE POLARIZING PINS IN THE LOCATIONS SHOWN.

2 THE MASTER KEYWAY ON THE CONNECTOR POINTS IN THIS DIRECTION.

ITEM NUMBERS REFER TO IPL FIG. 1

Wire Bundle Assembly Details
Figure 701



NOTE: THE TRANSMITTER ASSEMBLY (30), COVER ASSEMBLIES (225,260), SUPPORT ASSEMBLY (85), AND FLEX COUPLING (80) ARE NOT SHOWN.

1 MEASURE THIS DIMENSION WITH THE RIG PIN INSTALLED.

2 INSTALL THE SCREW FROM THE OUTSIDE OF THE HOUSING. INSTALL ONE WASHER ON EACH SIDE OF THE TERMINAL (215). REFER TO SOPM 20-50-03.

3 INSTALL THE LEVER ASSEMBLY WITH THE MARKER (140) ON THE FRONT FACE AS SHOWN.

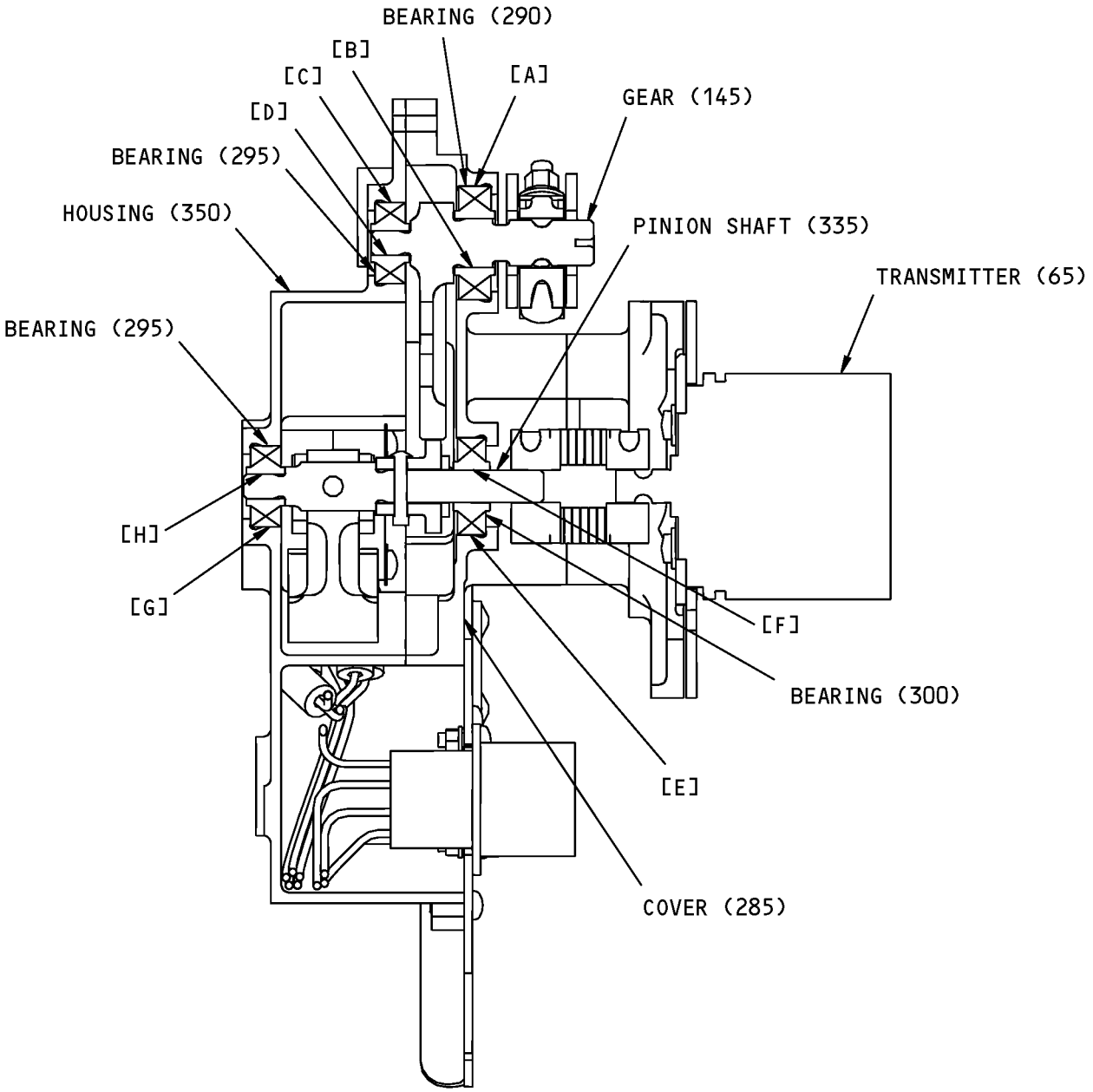
4 TURN THE FLOATING GEAR ON THE PINION 2 TO 4 TEETH DURING ASSEMBLY TO REMOVE THE BACKLASH.

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

Assembly Details
Figure 702

FITS AND CLEARANCES



Fits and Clearances
Figure 801 (Sheet 1 of 2)

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 285 OD 290	0.8730 0.8746	0.8743 0.8750	-0.0020	-0.0003			
[B]	ID 290 OD 145	0.3746 0.3742	0.3750 0.3747	-0.0001	0.0008			
[C]	ID 350 OD 295	0.6239 0.6246	0.6244 0.6250	-0.0011	-0.0002			
[D]	ID 295 OD 145	0.1897 0.1892	0.1900 0.1897	0.0000	0.0008			
[E]	ID 285 OD 300	0.7488 0.7496	0.7493 0.7500	-0.0012	-0.0003			
[F]	ID 300 OD 335	0.2497 0.2490	0.2500 0.2495	0.0002	0.0010			
[G]	ID 350 OD 295	0.6239 0.6246	0.6244 0.6250	-0.0011	-0.0002			
[H]	ID 295 OD 335	0.1897 0.1884	0.1900 0.1889	0.0008	0.0016			

* ALL DIMENSIONS ARE IN INCHES

1 NEGATIVE VALUES ARE FOR INTERFERENCE FIT.

Fits and Clearances
Figure 801 (Sheet 2 of 2)

REF IPL		NAME	TORQUE*	
FIG. NO.	ITEM NO.		POUND-INCHES	POUND-FEET
1	80	Screw 1	12-15	

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

1 THESE SCREWS ARE PART OF THE FLEX COUPLING (80)

Torque Table
Figure 802

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. General

A. This section lists the special tools, fixtures, and equipment necessary for maintenance.

NOTE: Equivalent substitutes may be used.

Special Tools

Reference	Description	Part Number	Supplier
SPL-5372	Test Equipment - Stabilizer Trim Control Cutout Switch	C27006-48	81205
SPL-5374	Test Equipment - Stabilizer Trim Control Cutout Switch	C27006-42	81205
SPL-5455	Rig Pin, 0.1840 - 0.1860 in. dia, 5.50 in. minimum length	MS20392-2P176	81205
SPL-6044	Test Fixture Assembly (C27006-24 included in C27006-47 & C27006-48)	C27006-48 Opt: C27006-47	81205 81205

Commercial Tools

Reference	Description	Part Number	Supplier
COM-1688	Indicator - Angle Position	2623CC-44HCL/488-26	17755
		8810-S3128	0VGU1
		8810-S3204	0VGU1
		8810A	0VGU1

Tool Supplier Information

CAGE Code	Supplier Name	Supplier Address
0VGU1	NORTH ATLANTIC INDUSTRIES, INC.	170 WILBUR PLACE BOHEMIA, NY 11716 Telephone: (631) 567-1100 Facsimile: (516) 567-1823 www.naii.com
17755	TRANSMAGNETICS, INC.	170 WILBUR PLACE (MOVED FROM FARMINGDALE) BOHEMIA, NY 11716 Telephone: (516) 567-1100 Facsimile: (516) 567-1823

Tool Supplier Information (Continued)

CAGE Code	Supplier Name	Supplier Address
81205	THE BOEING COMPANY	17930 INTERNATIONAL BLVD. SOUTH SEATAC, WA 98188-4321 Telephone: 206-662-6650 Facsimile: 206-662-7145

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
00779	TYCO ELECTRONICS CORP 2800 FULLING MILL ROAD PO BOX 3608 MIDDLETOWN, PENNSYLVANIA 17057 FORMERLY AMP INC; FORMERLY V04618 FORMERLY GENICOM COMP V01526
04169	WESTERN SKY INDUSTRIES A DIVISION OF ATLAS CORPORATION 1280 SAN LUIS OBISPO STREET HAYWARD, CALIFORNIA 94544-7916 FORMERLY WESTERN SKY IND VB0008
05574	VIKING ELECTRONICS INC. 5455 ENDEAVOUR CT MOORPARK, CALIFORNIA 93021 FORMERLY VIKING IND DATACON DIV; VIKING SPECIAL PROD V53156; FORMERLY VIKING CONN SUB OF CRITON CORP; ARIZONA INTEGRATED ELEC V0P9C6; FORMERLY IN CHATSWORTH, CA
09922	SOURIAU USA INC 25 GRUMBACHER DR YORK, PENNSYLVANNIA 17402-9417 FORMERLY FRAMATOME CONNECTORS FRANCE FORMERLY V59610 IIIN VALENCIA, CALIFORNIA
11815	CHERRY AEROSPACE FASTENERS DIV OF TEXTRON 1224 EAST WARNER AVENUE PO BOX 2157 SANTA ANA, CALIFORNIA 92707-0157 FORMERLY IN LOS ANGELES, CALIF , FORMERLY CHERRY FASTENERS TOWNSEND DIV OF TEXTRON INC V71087

Code	Name
13201	HELICAL PRODUCT CO 901 WEST MCCOY LANE PO BOX 1069 SANTA MARIA, CALIFORNIA 93456
14726	WEARNES HOLLINGSWORTH CORP 1601 NORTH POWERLINE ROAD POMPANO BEACH, FLORIDA 33060-1622 FORMERLY MIDLAND ROSS CORP ELECTRONIC CONNECTOR DIV FORMERLY INTERCONNECTION PRODUCTS INC POMPANO PLANT
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
21335	TIMKEN US CORPORATION DIV FAFNIR 336 MECHANIC STREET LEBANON, NH 03766-0267 FORMERLY FAFNIR BRG AND TEXTRON INC FAFNIR DIV IN NEW BRITAIN, CONNECTICUT ; FORMERLY TORRINGTON CO THE SPECIAL PRODUCTS DIV SUB OF THE INGERSOLL-RAND CO V8D210 FORMERLY TORRINGTON CO FAFNIR BEARING DIV IN TORRINGTON, CT
27238	BRISTOL INDUSTRIES 630 EAST LAMBERT ROAD PO BOX 630 BREA, CALIFORNIA 92621-4119
29964	ALLIED DEVICES CORP 2365 MILBURN AVENUE PO DRAWER E BALDWIN, NEW YORK 11510-3321
35344	Replaced: [V35344] LEACH CORP RELAY DIV SEE LEACH CORP CONTROL PROD DIV V58657 by Code: Name and Address below 58657: LEACH INTERNATIONAL OF NORTH AMERICA 6900 ORANGETHORPE AVE PO BOX 5032 BUENA PARK, CALIFORNIA 90622-5032 FORMERLY LEACH CORP V35344 AND V00614 FORMERLY LEACH CORP

Code	Name
38443	MRC BEARINGS 402 CHANDLER STREET JAMESTOWN, NEW YORK 14701-3802 FORMERLY MARLIN-ROCKWELL CORP DIV TRW AND TRW INC
40920	MPB MINIATURE PRECISION BEARING DIV PRECISION PARK PO BOX 547 KEENE, NEW HAMPSHIRE 03431 FORMERLY MPB CORP AND MINIATURE BRG DIV MPB CORP
43991	FAG BEARING INCORPORATED 118 HAMILTON AVENUE STAMFORD, CONNECTICUT 06904 FORMERLY NORMA-HOFFMAN BEARING CORPORATION FORMERLY NORMA FAG BEARINGS CORPORATION
52828	REPUBLIC FASTENER MFG CORP 1300 RANCHO CONEJO BLVD NEWBURY PARK, CALIFORNIA 91320-1405 FORMERLY IN SYLMAR, CALIFORNIA
56623	BABCOCK INC 14930 E ALONDRA BLVD LA MIRADA, CALIFORNIA 90638-5752 FORMERLY IN COSTS MESA, CA & IN ORANGE, CA
56878	SPS TECHNOLOGIES INC AEROSPACE AND INDUSTRIAL PRODUCTS DIV 301 HIGHLAND AVE JENKINTOWN, PENNSYLVANIA 19046 FORMERLY STANDARD PRESSED STEEL FORMERLY IN SALT LAKE, UTAH
58982	PRECISION CONNECTOR DESIGNS INC CENTENNIAL PARK 2 TECHNOLOGY DRIVE PEABODY, MASSACHUSETTS 01960 FORMERLY IN WINCHESTER, MASSACHUSETTS
62554	SIMMONDS MECAERO FASTENERS INC 1734 SEQUOIA AVENUE ORANGE, CALIFORNIA 92668

Code	Name
72962	HARVARD INDUSTRIES INC 3 WERNER WAY SUITE 210 LEBANON, NEW JERSEY 08833 FORMERLY ESNA V7A079 FORMERLY ELASTIC STOP NUT IN UNION, NJ
78290	STRUTHERS-DUNN INC SOUTH WINDSOR, CONNECTICUT 06074 OBSOLETE - SEE V00213
82686	HORIZON AEROSPACE LLC DBA TRANSICOIL 2560 GENERAL ARMISTEAD AVE NORRISTOWN, PENNSYLVANIA 19403-5214 FORMERLY TRANSCOIL INC. COMPONENTS & CONTROLS
83086	NEW HAMPSHIRE BALL BEARING, INC HITECH DIVISION 172 JAFFREY ROAD PETERBOROUGH, NEW HAMPSHIRE 03458
91929	HONEYWELL INC MICRO SWITCH DIV 11 WEST SPRING STREET FREEPORT, ILLINOIS 61032 FORMERLY MICRO SWITCH A DIV OF HONEYWELL FORMERLY V74059 AND V40228
98410	ETC-MOLEX SUB OF MOLEX INC 4820 PARK BLVD PINELLAS PARK, FLORIDA 33565-7246 FORMERLY ETC DIV OF ITT IN SOLON, OHIO
98927	ELECSPEC CORP ELECTRONIC SPECIALITY DIV 14511 NORTHEAST 13TH AVENUE PO BOX 3501 VANCOUVER, WASHINTON 98668-3501 FORMERLY ELECTRONIC SPECIALTY CO PROTLAND ELECTRONCI DIV FORMERLY DATRON SYSTEMS INC ELECTRONIC SPECIALITY DIV FORMERLY IN PORTLAND, OREGON
K8455	RHP BEARINGS PLC RHP AEROSPACE OLDENDS LANE STONEHOUSE GL10 3RM UK

REFERENCE DESIGNATOR INDEX

REFERENCE DESIGNATOR	PART NUMBER	FIG-ITEM
J1	BACC45FN12-12P	1-205

NUMERICAL INDEX

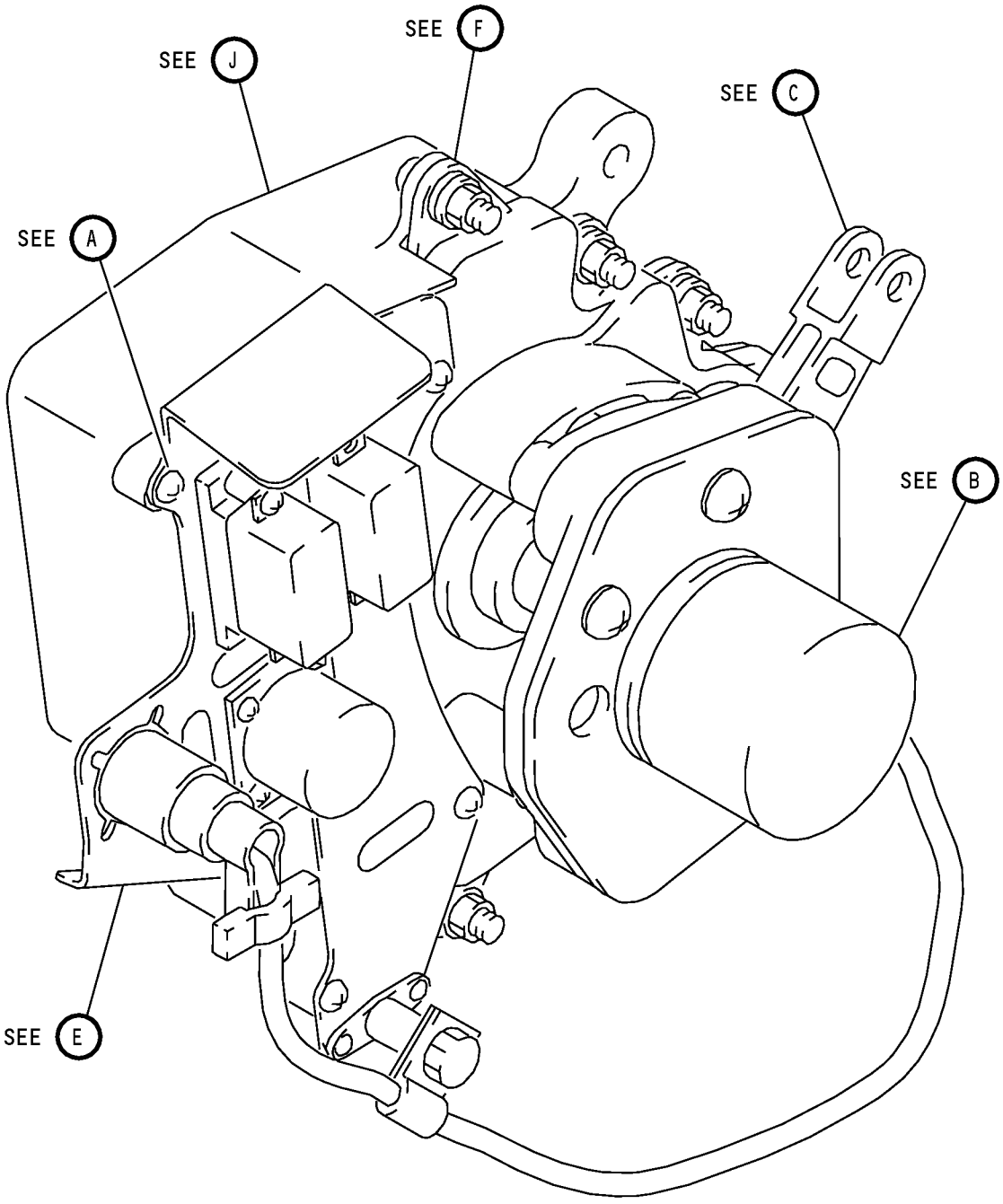
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
000300-1538		1	185	2
102-006-1		1	185	2
251A4410-1		1	1A	RF
251A4410-2		1	1B	RF
251A4411-4		1	320	1
251A4412-1		1	340	1
251A4412-2		1	350	1
251A4414-1		1	225	1
251A4414-2		1	240	1
251A4416-1		1	175	1
251A4416-2		1	177	1
251A4431-1		1	30	1
251A4432-1		1	260A	1
251A4432-2		1	285A	1
251A4432-3		1	260	1
251A4432-4		1	285	1
251A4433-1		1	85	1
251A4433-2		1	95	1
251A4434-1		1	50	1
251A4435-1		1	45	1
251A4436-2		1	310	1
251A4437-2		1	335	1
253T4015-7		1	55	1
320553		1	215	1
52273-1		1	220	10
61GB2319-1A320		1	180	2
65C25548-3		1	145	1
66-25992-1		1	120	1
66-25992-2		1	125	1
69-73307-1		1	130	1
69-73308-1		1	135	1
69-73309-1		1	115	1
7384-667MM634MM		1	80	1
80724-440		1	170	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
		1	200	4
AA820-04		1	215	1
AP48KS36		1	330A	1
BAC27DCT0391		1	140	1
BAC27DCT627		1	365	1
BAC27DCT628		1	370	1
BAC27DCT643		1	375	1
BAC27TCT0012		1	380	1
BAC27TCT0013		1	385	1
BAC27TCT0014		1	390	1
BAC27TCT0015		1	395	1
BAC27TCT0018		1	355	1
BAC27TCT0019		1	360	1
BACB10AP3		1	295	2
BACB10AP4		1	300	1
BACB10AP6		1	290	1
BACB30LK04-1		1	5A	5
		1	190A	4
BACB30LK04K1		1	5	5
		1	190	4
BACB30LK2-14		1	100	1
BACB30NT04K12		1	150	4
BACB30NT3K10		1	70	4
BACB30NT3K2		1	10	3
BACC10DK2		1	25	1
BACC10DK3		1	25A	1
BACC45FN12-12P		1	205	1
BACC63BN10B5P		1	60	1
BACN10TL3A8		1	235	1
BACN10YR04CD		1	170	1
		1	200	4
BACN10YR08CD		1	110	1
BACN10YR3CD		1	255	6
BACR13CF2AB		1	180	2
BACR15BB4D		1	230	2

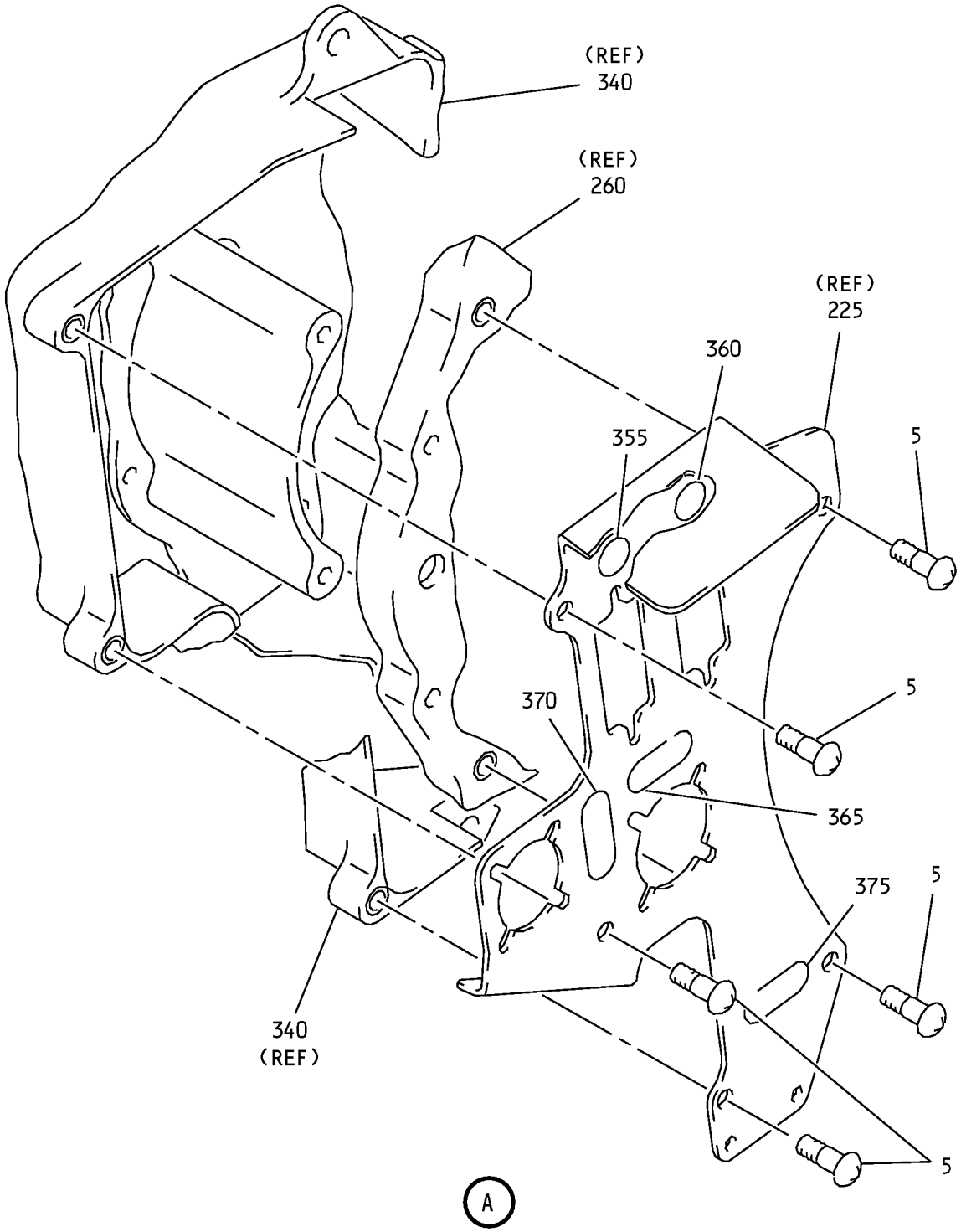
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BACR15BB5D12C		1	315	1
BACS12BG04AP4		1	35	4
BACS12GU3K6		1	20	1
BACS16X1A		1	185	2
BACT12AC48		1	215	1
BACT12AR201		1	220	10
BH00312-04		1	170	1
		1	200	4
BR246S0111		1	180	2
BR64S105		1	180	2
BRH30C04		1	170	1
		1	200	4
DP701T36		1	330	1
FCA210-71		1	180	2
H52732-04CD		1	170	1
		1	200	4
H52732-08CD		1	110	1
H52732-3CD		1	255	6
JD4L018		1	180	2
JD4L031		1	180	2
LH3858-40		1	170	1
		1	200	4
LLMKP3A		1	295	2
LLMKP4A		1	300	1
LLMKP6A		1	290	1
MCS23E		1	295	2
MCS24E		1	300	1
MCS26E		1	290	1
MKP3A		1	295	2
MKP3A2TS		1	295	2
MKP3AFS428		1	295	2
MKP3AG20		1	295	2
MKP3ALY196		1	295	2
MKP3ASD610		1	295	2
MKP3ATT		1	295	2

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
MKP3E6531		1	295	2
MKP4A		1	300	1
MKP4A2TS		1	300	1
MKP4AFS428		1	300	1
MKP4AG20		1	300	1
MKP4ALY196		1	300	1
MKP4ASD610		1	300	1
MKP4ATT		1	300	1
MKP4E6531		1	300	1
MKP6A		1	290	1
MKP6A2TS		1	290	1
MKP6AFS428		1	290	1
MKP6AG20		1	290	1
MKP6ALY196		1	290	1
MKP6ASD610		1	290	1
MKP6ATT		1	290	1
MKP6E6531		1	290	1
MS16562-213		1	325A	1
MS21209C0415P		1	265	2
		1	345	7
MS21209F1-15P		1	90	3
		1	270	4
NAS1149CN416R		1	155	4
		1	195	4
NAS1149D0332J		1	15	3
		1	75	4
NAS1149D0363J		1	250	6
NAS1149DN432J		1	40	4
NAS1149DN832J		1	105	1
NAS514P440-5		1	160	1
NAS600-17P		1	150A	4
NAS607-2-3P		1	275	1
NAS607-2-5P		1	280	2
NAS620A4L		1	165	2
NAS620C416		1	305	1

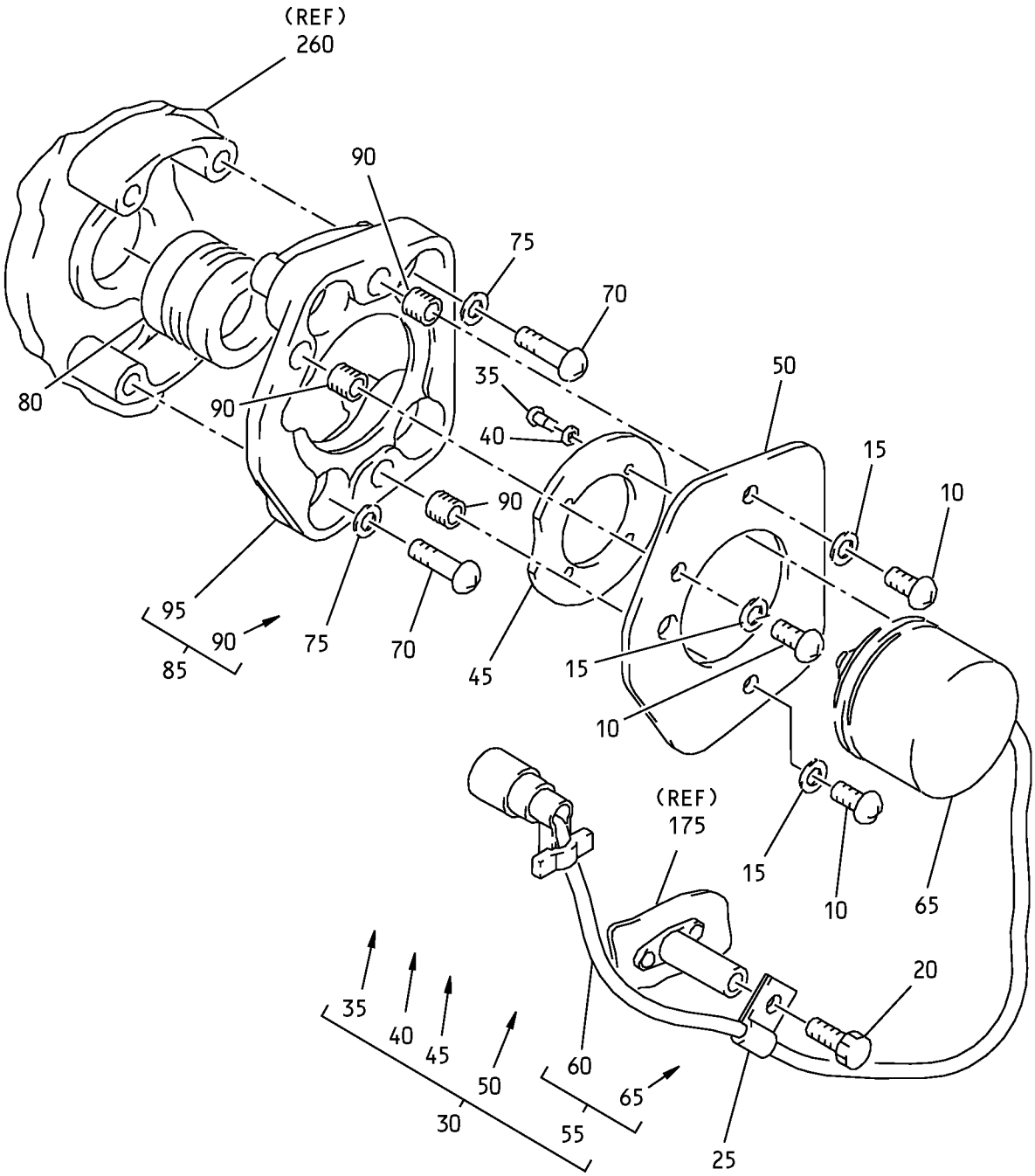
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
NAS623-3-4		1	245	6
NAS8200AP4		1	35A	4
PLH504CD		1	170	1
		1	200	4
PLH508CD		1	110	1
PLH53CD		1	255	6
R1880SN		1	215	1
RSF116200		1	185	2
T6113C440		1	170	1
		1	200	4
U221557		1	65	1
V3L2228		1	210	4
WSI4A8		1	235	1



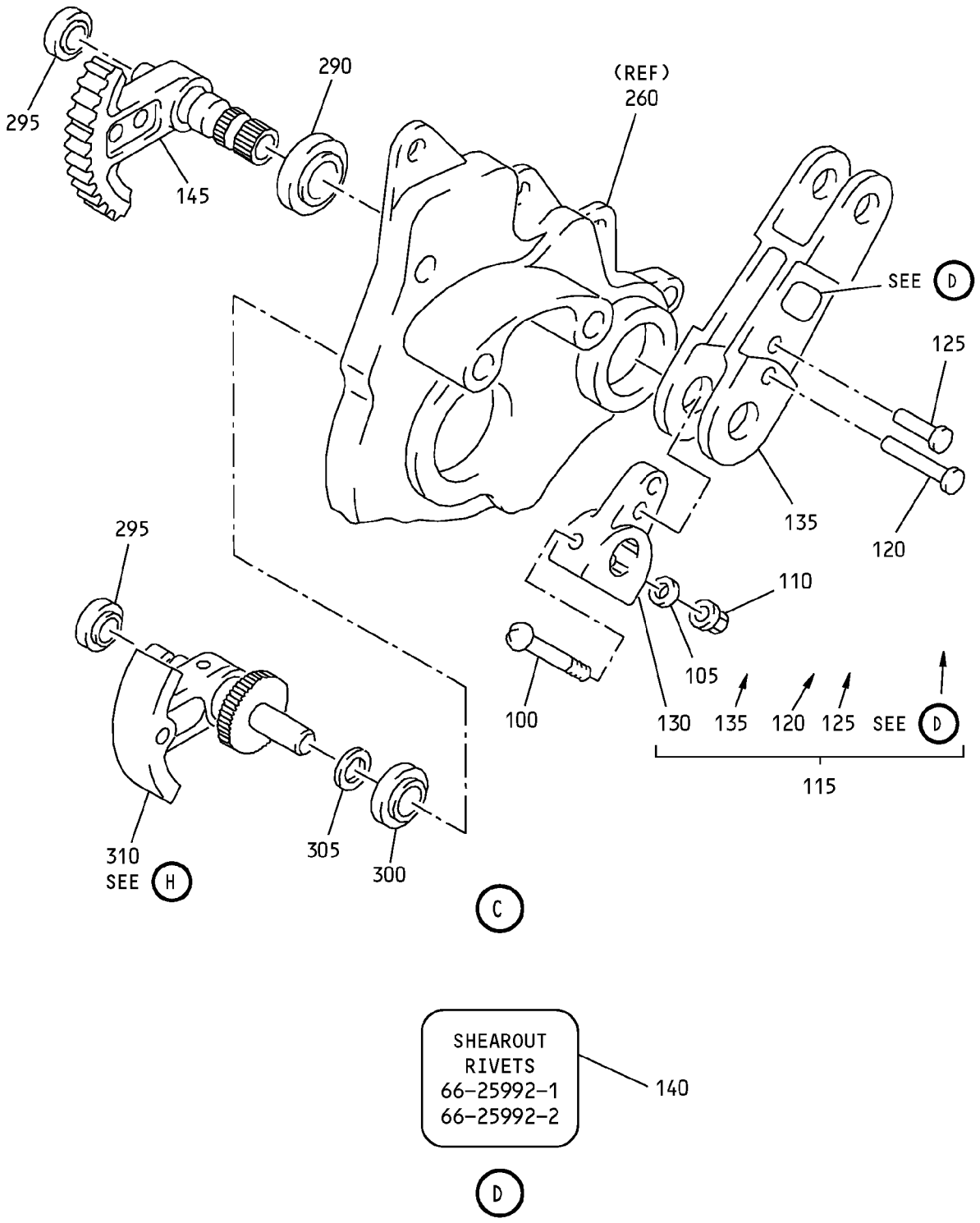
Column Cutout Switch Assembly
IPL Figure 1 (Sheet 1 of 8)



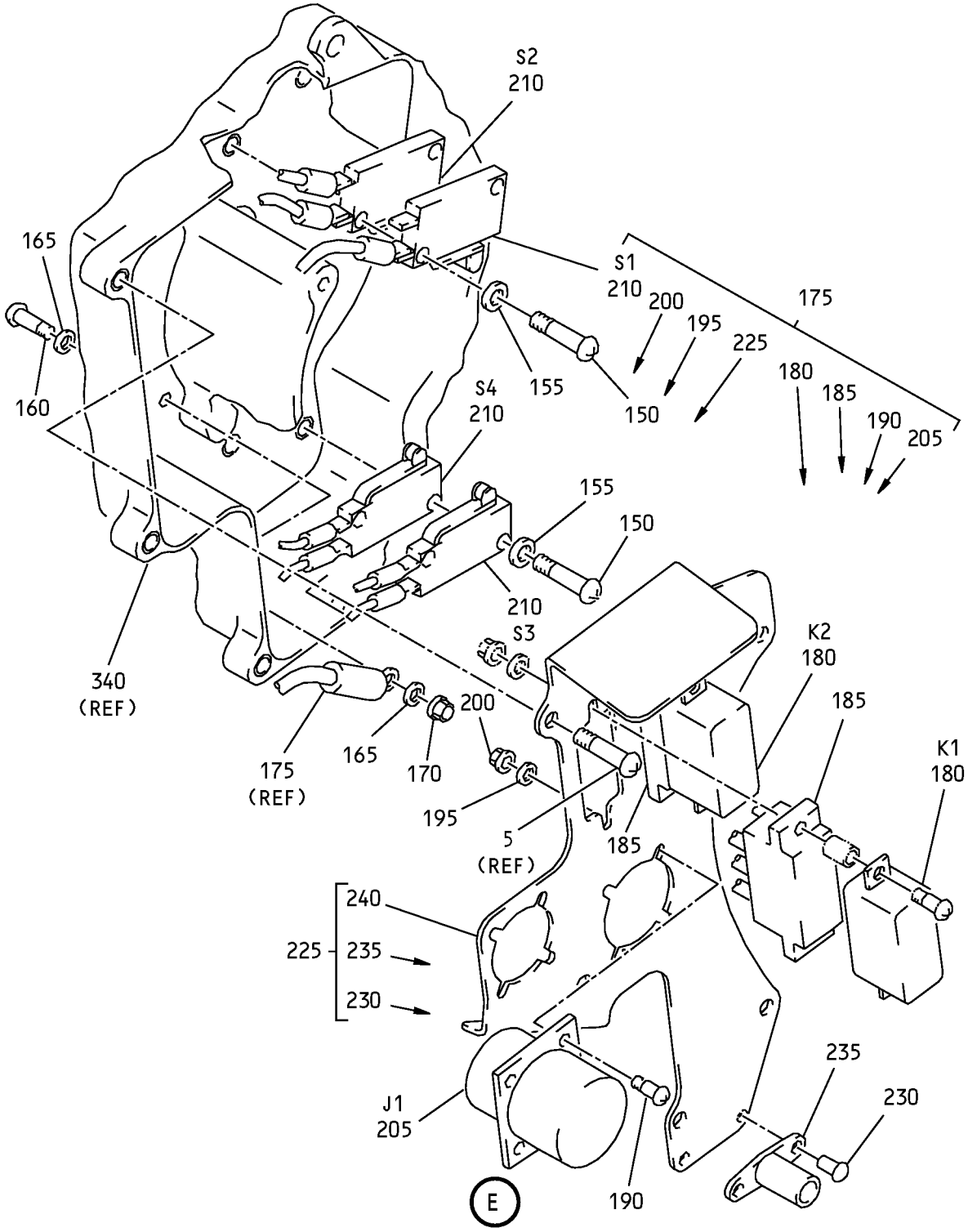
Column Cutout Switch Assembly
IPL Figure 1 (Sheet 2 of 8)



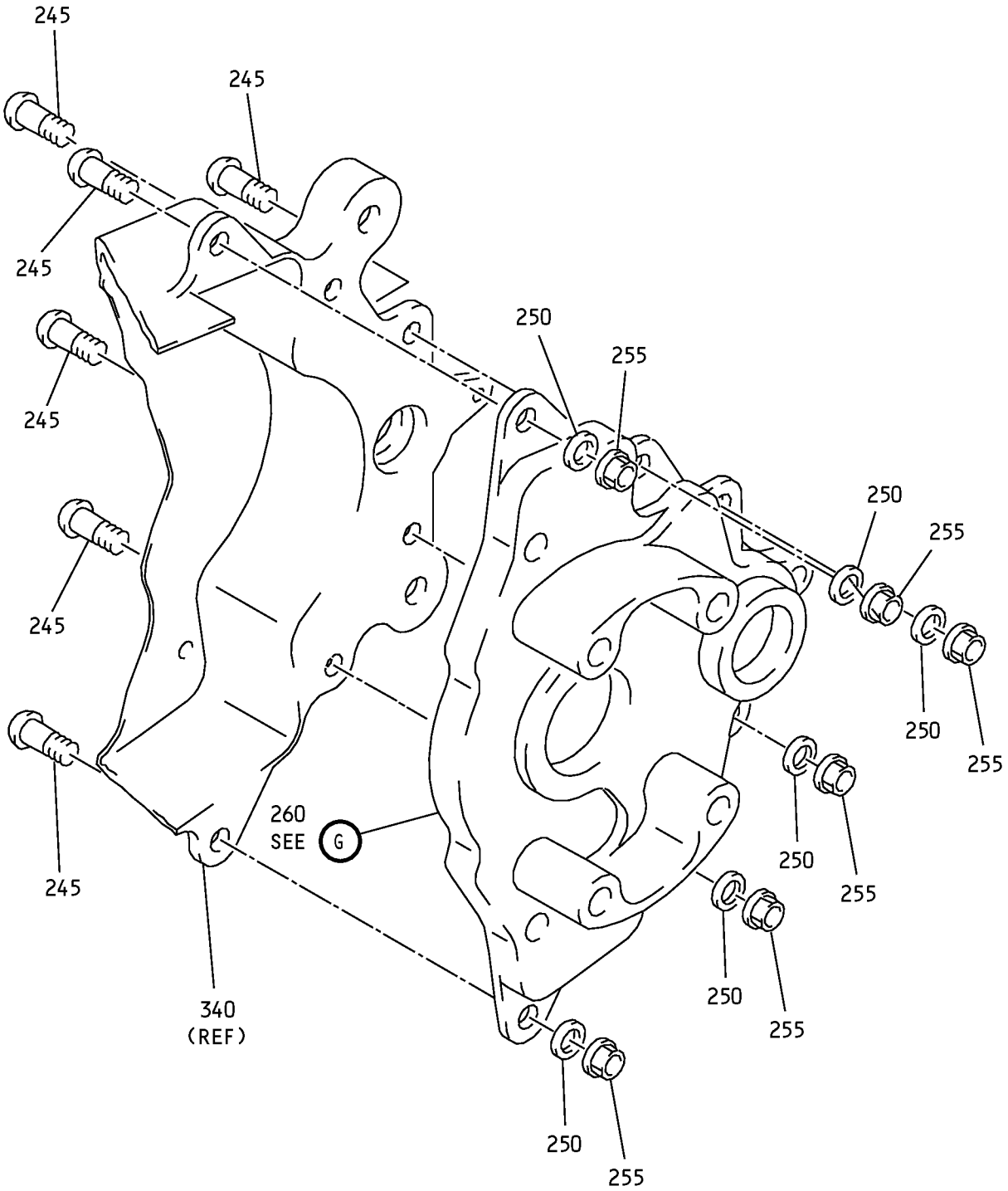
Column Cutout Switch Assembly
IPL Figure 1 (Sheet 3 of 8)



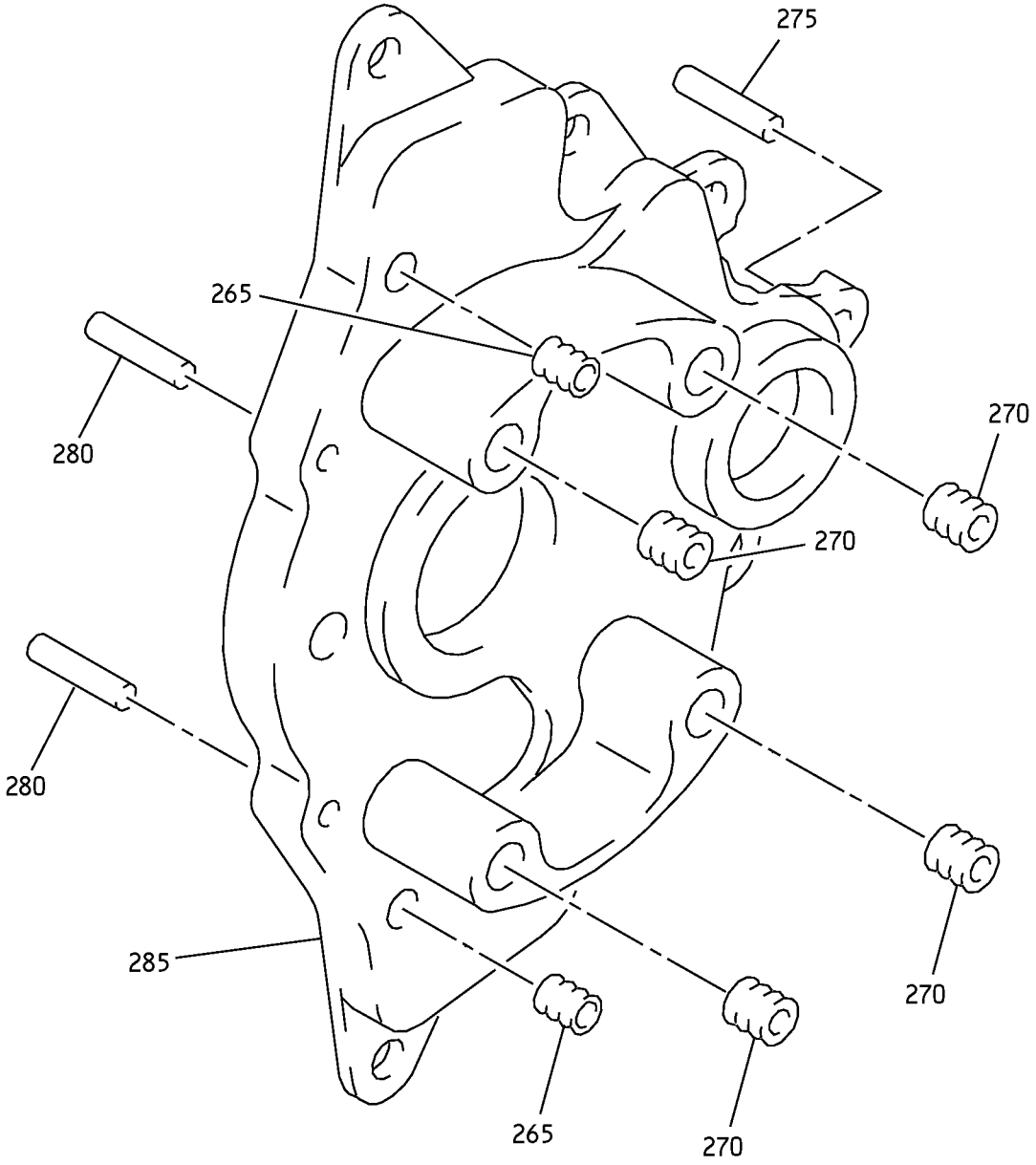
Column Cutout Switch Assembly
IPL Figure 1 (Sheet 4 of 8)



Column Cutout Switch Assembly
IPL Figure 1 (Sheet 5 of 8)

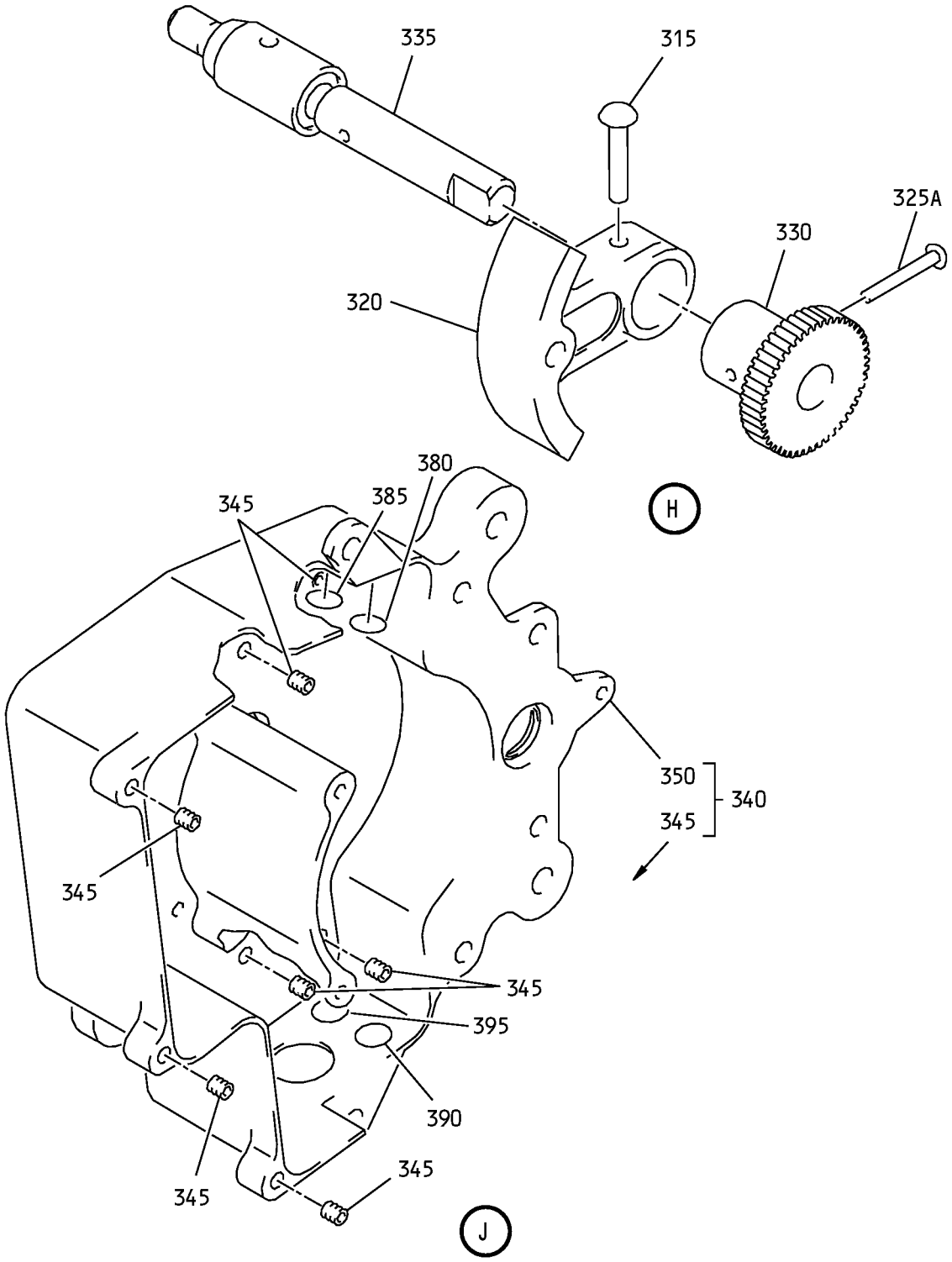


Column Cutout Switch Assembly
IPL Figure 1 (Sheet 6 of 8)



G

Column Cutout Switch Assembly
IPL Figure 1 (Sheet 7 of 8)



Column Cutout Switch Assembly
IPL Figure 1 (Sheet 8 of 8)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
1A	251A4410-1		SWITCH ASSY-COLUMN CUTOUT	A	RF
–1B	251A4410-2		SWITCH ASSY-COLUMN CUTOUT	B	RF
5	BACB30LK04K1		. BOLT (OPT ITEM 5A)		5
–5A	BACB30LK04-1		. BOLT (OPT ITEM 5)		5
10	BACB30NT3K2		. BOLT		3
15	NAS1149D0332J		. WASHER		3
20	BACS12GU3K6		. SCREW		1
25	BACC10DK2		. CLAMP	A	1
–25A	BACC10DK3		. CLAMP	B	1
30	251A4431-1		. TRANSMITTER ASSY		1
35	BACS12BG04AP4		. . SCREW (OPT ITEM 35A)		4
–35A	NAS8200AP4		. . SCREW (OPT ITEM 35)		4
40	NAS1149DN432J		. . WASHER		4
45	251A4435-1		. . PLATE		1
50	251A4434-1		. . COVERPLATE		1
55	253T4015-7		. . TRANSMITTER ASSY		1
60	BACC63BN10B5P		. . . CONNECTOR		1
65	U221557		. . . TRANSMITTER (V82686)		1
70	BACB30NT3K10		. BOLT		4
75	NAS1149D0332J		. WASHER		4
80	7384-667MM634MM		. COUPLING (V13201)		1
85	251A4433-1		. SUPPORT ASSY		1
90	MS21209F1-15P		. . INSERT		3
95	251A4433-2		. . SUPPORT		1
100	BACB30LK2-14		. BOLT		1
105	NAS1149DN832J		. 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–					
110	H52732-08CD		. NUT (V15653) (SPEC BACN10YR08CD) (OPT PLH508CD (V62554))		1
115	69-73309-1		. LEVER ASSY		1
120	66-25992-1		. . RIVET		1
125	66-25992-2		. . RIVET		1
130	69-73307-1		. . FITTING		1
135	69-73308-1		. . ARM		1
140	BAC27DCT0391		. . MARKER		1
145	65C25548-3		. GEAR		1
150	BACB30NT04K12		. BOLT (OPT ITEM 150A)		4
–150A	NAS600-17P		. SCREW (OPT ITEM 150)		4
155	NAS1149CN416R		. WASHER		4
160	NAS514P440-5		. SCREW		1
165	NAS620A4L		. WASHER		2
170	H52732-04CD		. NUT (V15653) (SPEC BACN10YR04CD) (OPT BH00312-04 (V27238)) (OPT BRH30C04 (V52828)) (OPT LH3858-40 (V72962)) (OPT T6113C440 (V11815)) (OPT 80724-440 (V56878)) (OPT PLH504CD (V62554))		1
175	251A4416-1		. WIRE BUNDLE ASSY		1
177	251A4416-2		. . WIRE BUNDLE		1
180	61GB2319-1A320		. . RELAY (V98927) (SPEC BACR13CF2AB) (OPT JD4L018 (V35344)) (OPT JD4L031 (V35344)) (OPT BR246S0111 (V56623)) (OPT BR64S105 (V56623)) (OPT FCA210-71 (V78290))		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–					
185	000300-1538		. . SOCKET (V05574) (SPEC BACS16X1A) (OPT 102-006-1 (V09922)) (OPT RSF116200 (V58982))		2
190	BACB30LK04K1		. . BOLT (OPT ITEM 190A)		4
–190A	BACB30LK04-1		. . BOLT (OPT ITEM 190)		4
195	NAS1149CN416R		. . WASHER		4
200	H52732-04CD		. . NUT (V15653) (SPEC BACN10YR04CD) (OPT BH00312-04 (V27238)) (OPT BRH30C04 (V52828)) (OPT LH3858-40 (V72962)) (OPT T6113C440 (V11815)) (OPT 80724-440 (V56878)) (OPT PLH504CD (V62554))		4
205	BACC45FN12-12P		. . CONNECTOR (J1)		1
210	V3L2228		. . SWITCH (V91929)		4
–215	AA820-04		. . TERMINAL (V98410) (SPEC BACT12AC48) (OPT R1880SN (V14726)) (OPT 320553 (V00779))		1
–220	52273-1		. . TERMINAL (V00779) (SPEC BACT12AR201)		10
225	251A4414-1		. . COVER ASSY		1
230	BACR15BB4D		. . . RIVET (SIZE DETERMINED ON INST)		2
235	WSI4A8		. . . SPACER-NUT (V04169) (SPEC BACN10TL3A8)		1
240	251A4414-2		. . . COVER		1
245	NAS623-3-4		. SCREW		6
250	NAS1149D0363J		. WASHER		6

–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
255	H52732-3CD		. NUT (V15653) (SPEC BACN10YR3CD) (OPT PLH53CD (V62554))		6
260	251A4432-3		. COVER ASSY (OPT ITEM 260A)		1
–260A	251A4432-1		. COVER ASSY (OPT ITEM 260)		1
265	MS21209C0415P		. . INSERT		2
270	MS21209F1-15P		. . INSERT		4
275	NAS607-2-3P		. . PIN		1
280	NAS607-2-5P		. . PIN		2
285	251A4432-4		. . COVER (USED ON ITEM 260)		1
–285A	251A4432-2		. . COVER (USED ON ITEM 260A)		1
290	MKP6ASD610		. BEARING (V83086) (SPEC BACB10AP6) (OPT LLMKP6A (V38443)) (OPT MKP6AFS428 (V21335)) (OPT MKP6ATT (V43991)) (OPT MKP6A2TS (V43991)) (OPT MKP6E6531 (V21335)) (OPT MKP6AG20 (V38443)) (OPT MKP6ALY196 (V40920)) (OPT MKP6A (V38443)) (OPT MCS26E (VK8455))		1
295	MKP3ASD610		. BEARING (V83086) (SPEC BACB10AP3) (OPT LLMKP3A (V38443)) (OPT MKP3AFS428 (V21335)) (OPT MKP3ATT (V43991)) (OPT MKP3A2TS (V43991)) (OPT MKP3E6531 (V21335)) (OPT MKP3AG20 (V38443)) (OPT MKP3ALY196 (V40920)) (OPT MKP3A (V38443)) (OPT MCS23E (VK8455))		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–					
300	MKP4ASD610		. BEARING (V83086) (SPEC BACB10AP4) (OPT LLMKP4A (V38443)) (OPT MKP4AFS428 (V21335)) (OPT MKP4ATT (V43991)) (OPT MKP4A2TS (V43991)) (OPT MKP4E6531 (V21335)) (OPT MKP4AG20 (V38443)) (OPT MKP4ALY196 (V40920)) (OPT MKP4A (V38443)) (OPT MCS24E (VK8455))		1
305	NAS620C416		. WASHER		1
310	251A4436-2		. SHAFT ASSY-PINION		1
315	BACR15BB5D12C		. . RIVET		1
320	251A4411-4		. . CAM		1
325	MS20615-3M10		DELETED		
325A	MS16562-213		. . PIN		1
330	DP701T36		. . PINION (OPT ITEM 330A) (V29964)		1
–330A	AP48KS36		. . PINION (OPT ITEM 330)		1
335	251A4437-2		. . SHAFT		1
340	251A4412-1		. HOUSING ASSY		1
345	MS21209C0415P		. . INSERT		7
350	251A4412-2		. . HOUSING		1
355	BAC27TCT0018		. DECAL		1
360	BAC27TCT0019		. DECAL		1
365	BAC27DCT627		. MARKER		1
370	BAC27DCT628		. MARKER		1
375	BAC27DCT643		. MARKER		1
380	BAC27TCT0012		. DECAL		1
385	BAC27TCT0013		. DECAL		1
390	BAC27TCT0014		. DECAL		1
395	BAC27TCT0015		. DECAL		1

–Item not Illustrated