COMPONENT MAINTENANCE MANUAL WITH ILLUSTRATED PARTS LIST

AUTOTHROTTLE SWITCHPACK ASSEMBLY

PART NUMBER 254A1150–1, –10, –11, –12, –2, –7, –8, –9

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COMPONENT MAINTENANCE MANUAL

Revision No. 16
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To: All holders of AUTOTHROTTLE SWITCHPACK ASSEMBLY 22-32-34.

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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COMPONENT MAINTENANCE MANUAL

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

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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 38340	NOV 01/99

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

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

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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.

AUTOTHROTTLE SWITCHPACK ASSEMBLY - DESCRIPTION AND OPERATION

1. Description

A. The 254A1150-1, -2, -7 thru -10 switchpack assembly consists of three plate assemblies, a cam with a crank, two wire bundle assemblies and nine switches. DESCRIPTION AND OPERATION, Figure 1 provides an overall view of the assembly.

B. The 254A1150-11, -12 switchpack assembly consists of a cam switch assembly which includes a wire bundle, and a crank. IPL Figure 2 provides an overall view of the assembly.

C. The plates and the crank are made of aluminum alloy.

D. The cam is made of CRES.

E. Refer to PRECISION MECHANISM CORP. 22-32-01 for information about the cam switch assembly.

2. Operation

A. The switchpack assembly monitors the autothrottle assembly and sends the output signals to the thrust management system.

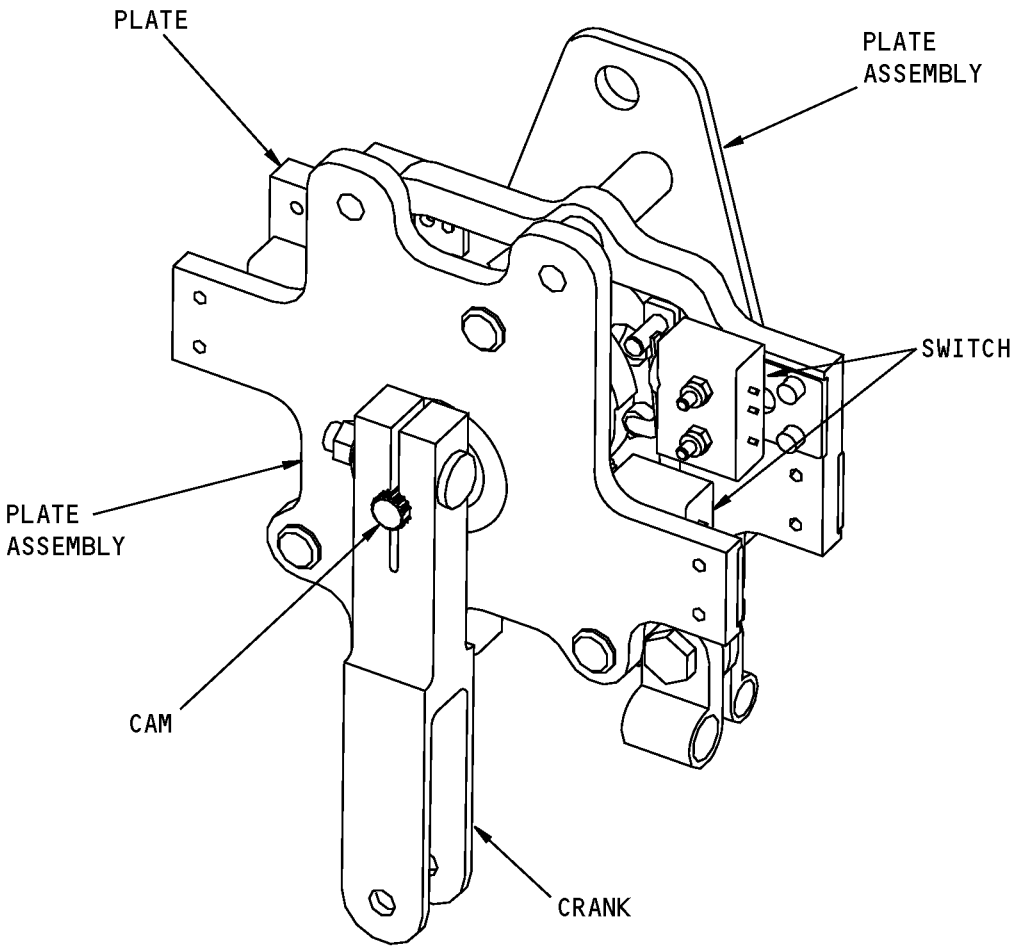
3. Leading Particulars (Approximate)

A. Length – 4.5 inches

B. Width – 4.0 inches plus a 22-inch long wire bundle

C. Height – 5.5 inches

D. Weight – 2.0 pounds



Autothrottle Switchpack Assembly
Figure 1

TESTING AND FAULT ISOLATION

1. General

A. This procedure has the data necessary to do a test of the mechanism after an overhaul or for fault isolation.

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

C. Refer to IPL Figure 1 and IPL Figure 2 for item numbers.

2. Testing and Fault Isolation

A. Tools/Equipment

NOTE: Equivalent substitutes may be used.

Reference	Description
STD-3946	Voltmeter - Simpson, Model 260

B. References

Reference	Title
PRECISION MECHANISM CORP. 22-32-01	Autothrottle Switchpack Assembly

C. Procedure (254A1150-1, -2, -7 thru -10) (TESTING AND FAULT ISOLATION, Figure 101, 102)

NOTE: Make sure cam (130) rotates freely.

(1) Use a model 260 simpson voltmeter, STD-3946 to verify the NO and the NC condition with the pin C of each switch (140, 145, 160, 165).

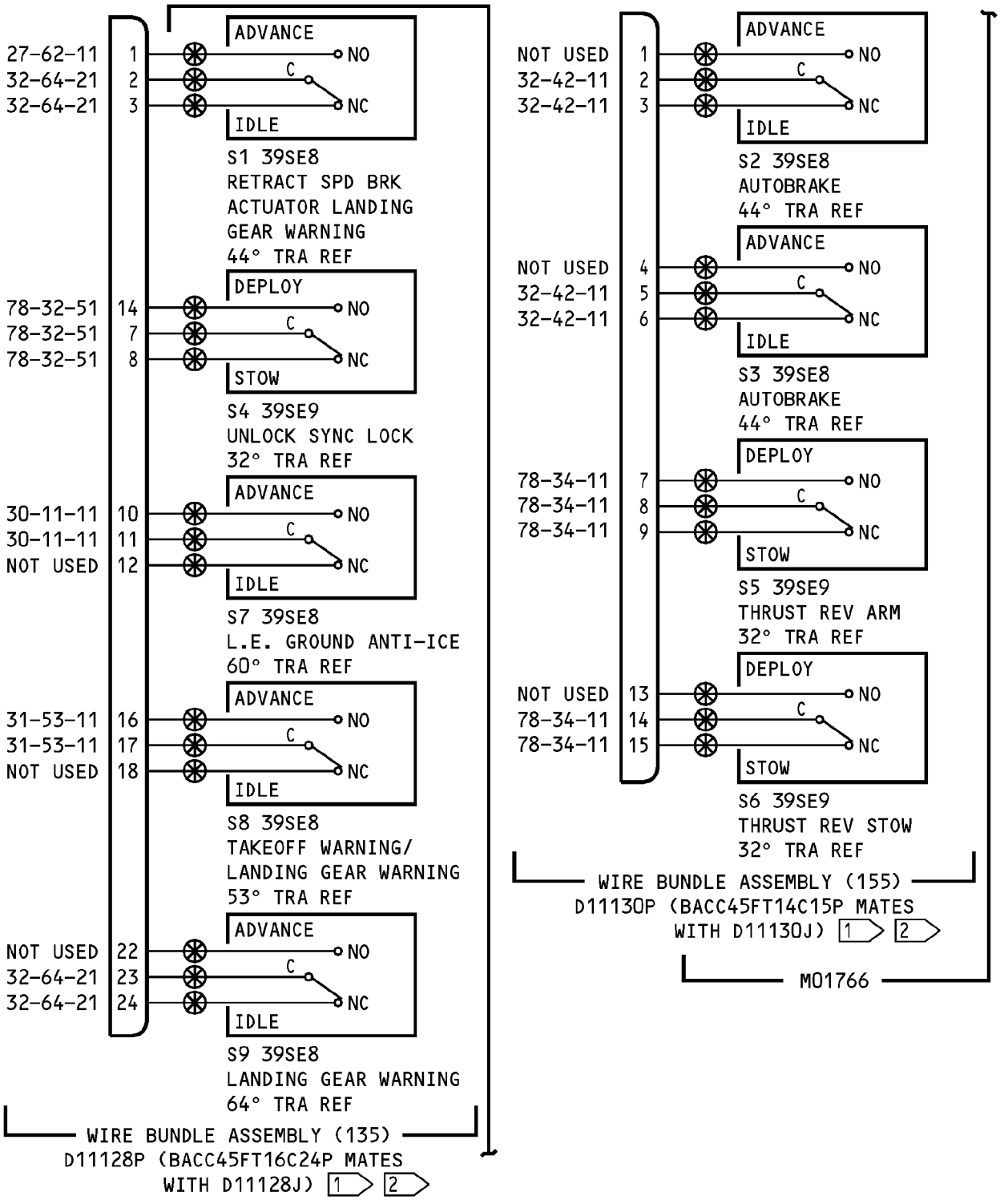
(2) Press the actuator arm of each switch and verify the reverse condition with the pin C.

NOTE: NO is the normally open state, NC is the normally closed state (or continuous) and C is the common pin. Open = 900,000 ohms or greater. Closed = 0.5 ohms or less.

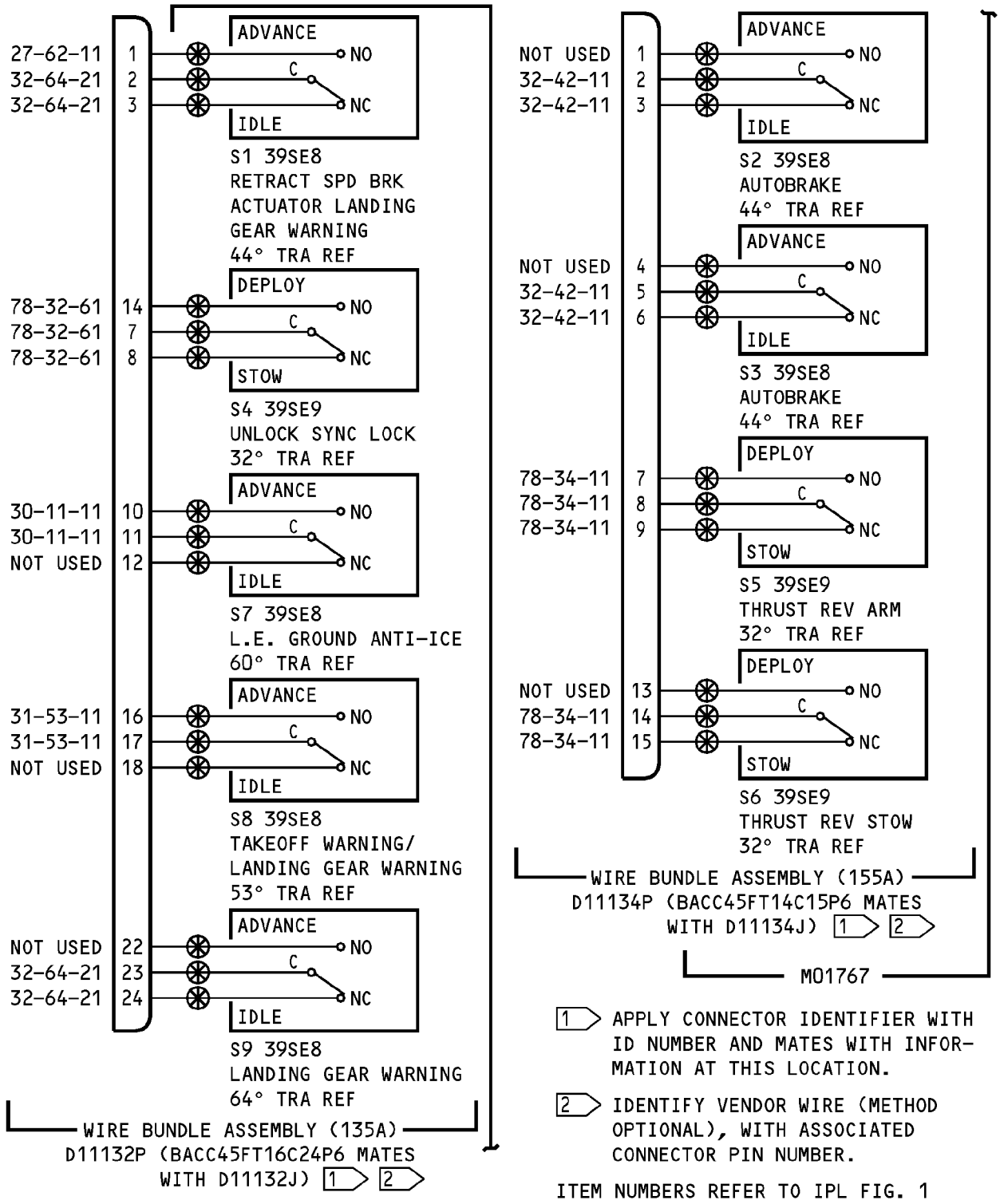
(3) Use a model 260 simpson voltmeter, STD-3946 to verify that each switch operates (Open/Closes) as the Cam (130) is rotated (TESTING AND FAULT ISOLATION, Figure 102).

D. Procedure (254A1150-11, -12)

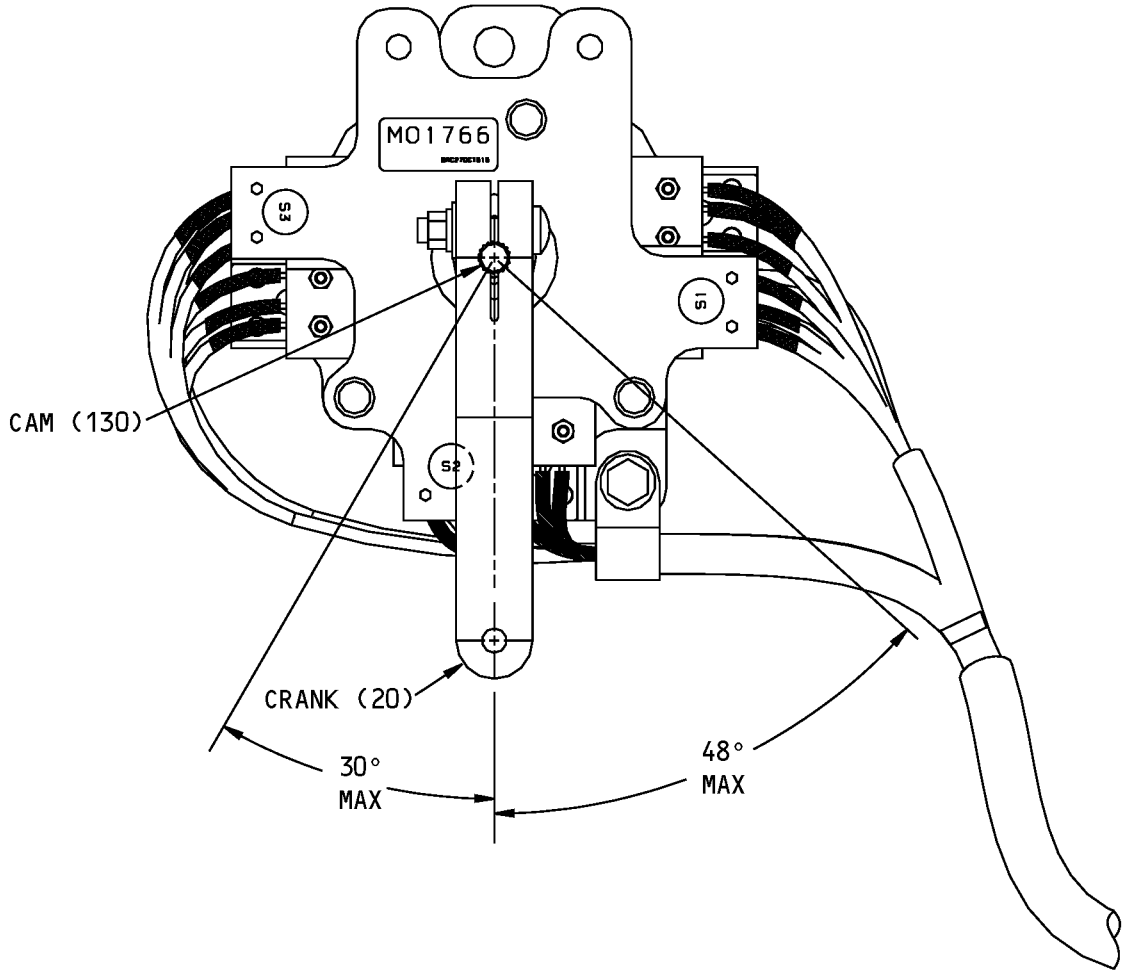
(1) Refer to PRECISION MECHANISM CORP. 22-32-01 for information about testing and fault isolation on the switch cam assembly (25).



Switchpack Assembly Wiring Diagram
Figure 101 (Sheet 1 of 2)



Switchpack Assembly Wiring Diagram
Figure 101 (Sheet 2 of 2)



Switchpack Assembly Operation Range
Figure 102

DISASSEMBLY

1. General

A. This procedure has the data necessary to disassemble the switchpack 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 the Standard Overhaul Practices Manual (SOPM) for the SOPM subjects identified in this procedure.

D. Refer to IPL Figure 1 and IPL Figure 2 for item numbers.

2. Disassembly

A. References

Reference	Title
PRECISION MECHANISM CORP. 22-32-01	Autothrottle Switchpack Assembly

B. Procedure (254A1150-1, -2, -7 thru -10)

(1) Use standard industry procedures and the steps shown below to disassemble the switchpack assembly.

NOTE: Do not remove the wires from the switches unless replacement of the switch is necessary.

(a) Attach a tag, with the switch number, to each switch for the switch location in the assembly procedure.

(b) Remove the nut (70), the bolt (60), the washer (65A), and the clamps (75, 80) from the plate (110).

(c) Remove the screws (85A), the washers (90), and the switches (140, 145, 160, 165) from the plates (45, 95, 110).

(d) Remove the nut (15), the washer (10A), and the screw (5) from the crank (20).

(e) Remove the bolts (25), the spacers (30, 35) and the nuts (40) and the cam (130) from the plates (45, 95, 110).

C. Procedure (254A1150-11, -12)

(1) Use standard industry procedures and the steps shown below to disassemble the switchpack assembly.

(2) Remove the nut (15), the washer (10), and the bolt (5) from the crank (20).

(3) Refer to PRECISION MECHANISM CORP. 22-32-01 for information on disassembly of the cam switch assembly (25), including whether or not disassembly is applicable.

CLEANING

1. General

A. This procedure has the data necessary to clean the switchpack assembly.

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

C. Refer to IPL Figure 1 and IPL Figure 2 for item numbers.

2. Cleaning

A. References

Reference	Title
PRECISION MECHANISM CORP. 22-32-01	Autothrottle Switchpack Assembly
SOPM 20-30-01	CLEANING AND RELUBRICATING BEARINGS
SOPM 20-30-03	GENERAL CLEANING PROCEDURES

B. Procedure (254A1150-1, -2, -7 thru -10)

(1) Use standard industry procedures and refer to SOPM 20-30-03 to clean all parts except bearings.

(2) Clean bearings (50, 120) as shown in SOPM 20-30-01.

C. Procedure (254A1150-11, -12)

(1) Use standard industry procedures and refer to SOPM 20-30-03 to clean all parts except cam switch assembly (25).

(2) Refer to PRECISION MECHANISM CORP. 22-32-01 for information on cleaning the cam switch assembly (25), including whether or not cleaning is applicable.

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 dimension and wear limits on 254A1150-1, -2, -7 thru -10 switchpack assemblies. Refer to PRECISION MECHANISM CORP. 22-32-01 for information on fits and clearances for the cam switch assembly (25) contained in 254A1150-11, -12 switchpack assemblies, including whether or not fits and clearances is applicable.

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

D. Refer to IPL Figure 1 and IPL Figure 2 for item numbers.

2. Check

A. References

Reference	Title
PRECISION MECHANISM CORP. 22-32-01	Autothrottle Switchpack Assembly
SOPM 20-20-01	MAGNETIC PARTICLE INSPECTION
SOPM 20-20-02	PENETRANT METHODS OF INSPECTION

B. Procedure (254A1150-1, -2, -7 thru -10)

(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) Cam (130)

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

(a) Crank (20)

(b) Plate (55, 105, 125)

C. Procedure (254A1150-11, -12)

(1) Use standard industry procedures to do a visual check of all the parts for defects except cam switch assembly (25) . Do the penetrant check if the visual check shows possible damage or if you suspect possible damage on the parts listed below:

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

(a) Crank (20)

(3) Refer to PRECISION MECHANISM CORP. 22-32-01 for information on the check of the cam switch assembly (25) contained in switchpack assemblies 254A1150-11, -12, including whether or not a check is applicable.

REPAIR

1. General

A. Except for the cam switch assembly (25) contained in switchpack assemblies 254A1150-11, -12, 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
254A1151	PLATE ASSEMBLY	2-1, 2-2
254A1152	CAM	3-1
254A1154	CRANK	4-1

B. Refer to PRECISION MECHANISM CORP. 22-32-01 for information on the repair of the cam switch assembly (25) contained in switchpack assemblies 254A1150-11, -12, including whether or not repair is applicable.

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 Practice 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. General

(1) Instructions for the repair of the parts listed in REPAIR 1-1, Table 601 is for repair of the initial finish.

B. Procedure

(1) Refer to REPAIR 1-1, Table 601

Table 601: Refinish Details

IPL FIG. & ITEM	MATERIAL	FINISH
IPL Fig. 1		
No parts currently applicable		

PLATE ASSEMBLY - REPAIR 2-1

254A1151–1, –3

1. General

A. This procedure has the data necessary to replace the bearing on the plate assemblies (45, 110).

B. Refer to the Standard Overhaul Practice 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. Bearing Replacement

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 20-50-03	BEARING AND BUSHING REPLACEMENT
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure

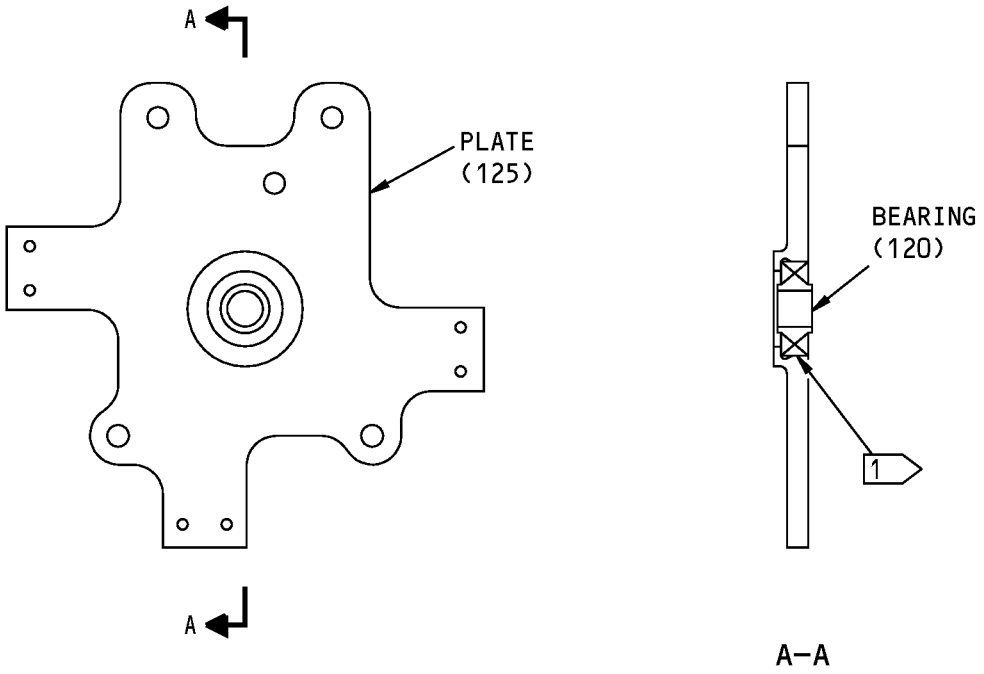
NOTE: For miscellaneous materials, refer to SOPM 20-60-04.

(1) Replace the bearings (120, 50).

(a) Remove the bearings (120, 50) from the plates (125, 55) as shown in REPAIR 2-1, Figure 601 and REPAIR 2-1, Figure 602.

(b) Install the bearings with the wet sealant, A00247 on the plate (125, 55) inner diameter and the bearing (120, 50) outer diameter (SOPM 20-50-03)

1) Obey the flagnote 1 in REPAIR 2-1, Figure 601 and REPAIR 2-1, Figure 602.



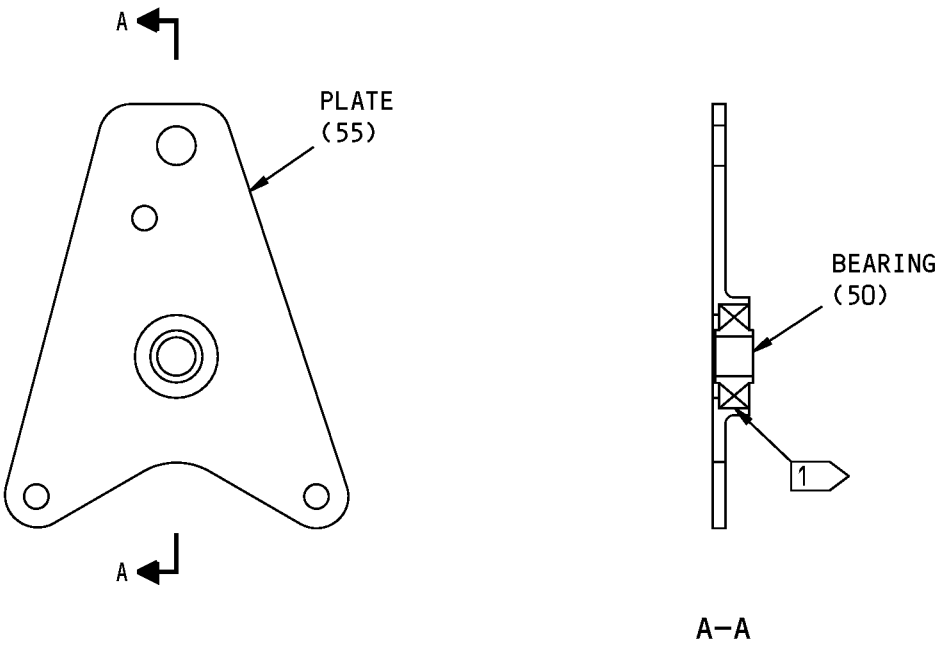
1 INSTALL THE BEARING (120) WITH WET BMS 5-95 SEALANT ON THE PLATE (125) INNER DIAMETER AND THE BEARING OUTER DIAMETER.

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1151-1 Plate Assembly Bearing Replacement
Figure 601



1 INSTALL THE BEARING (50) WITH WET BMS 5-95 SEALANT ON THE PLATE (55) INNER DIAMETER AND THE BEARING OUTER DIAMETER.

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1151-3 Plate Assembly Bearing Replacement
Figure 602

PLATE - REPAIR 2-2

254A1151–4, –5, –6

1. General

A. This procedure has the data necessary to repair and refinish the plates (55, 95, 125).

B. Refer to the Standard Overhaul Practice 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.

E. General repair details:

(1) Material: Aluminum alloy

2. Plate 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

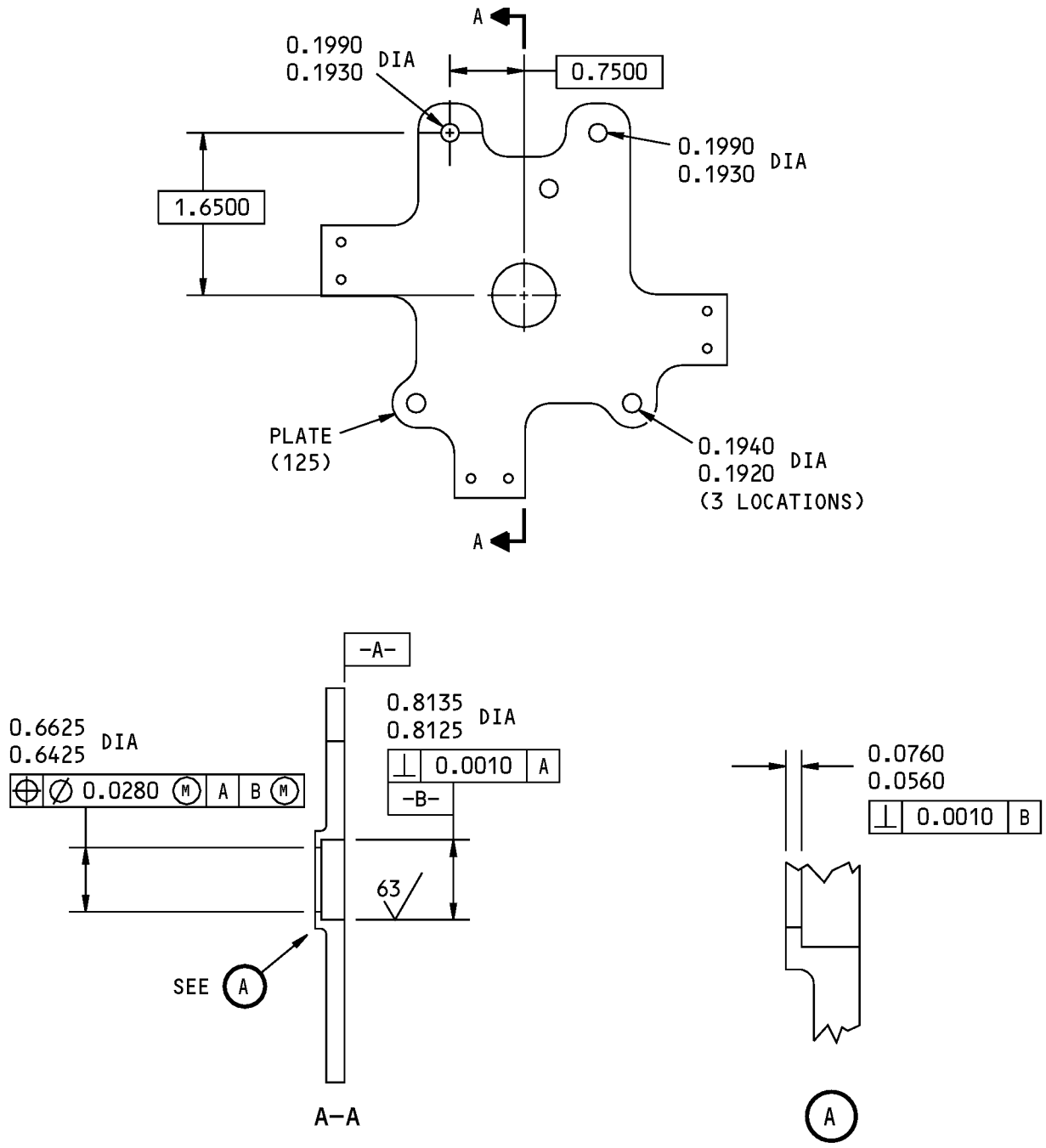
C. Procedure (REPAIR 2-2, Figure 601, REPAIR 2-2, Figure 602 and REPAIR 2-2, Figure 603)

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) Put a finish on the plates (55, 105, 125).

(a) Boric acid/sulfuric acid anodize (F-17.31).

(b) Apply primer, C00259 (F-20.03).

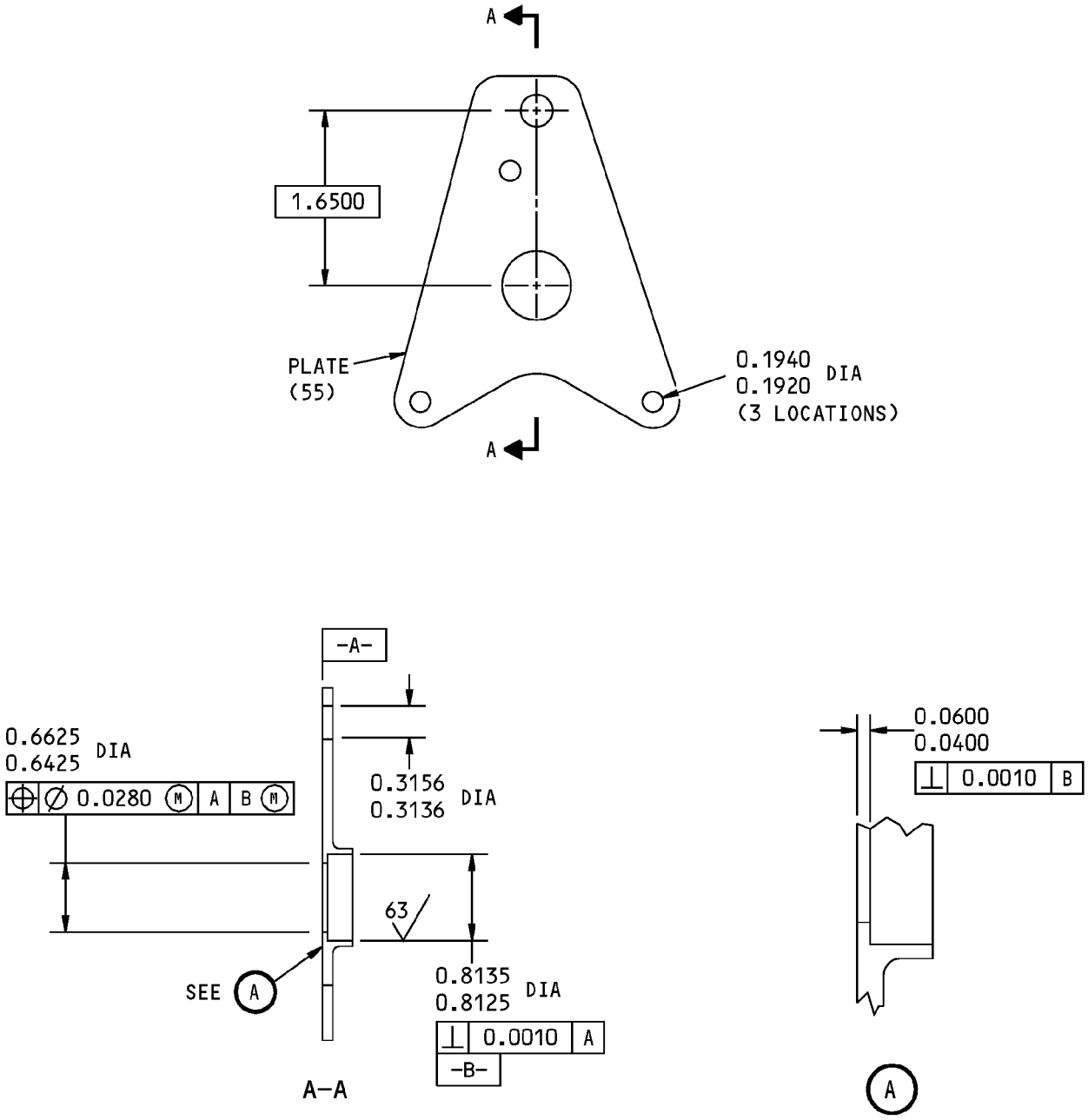


BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1151-4 Plate Repair
Figure 601

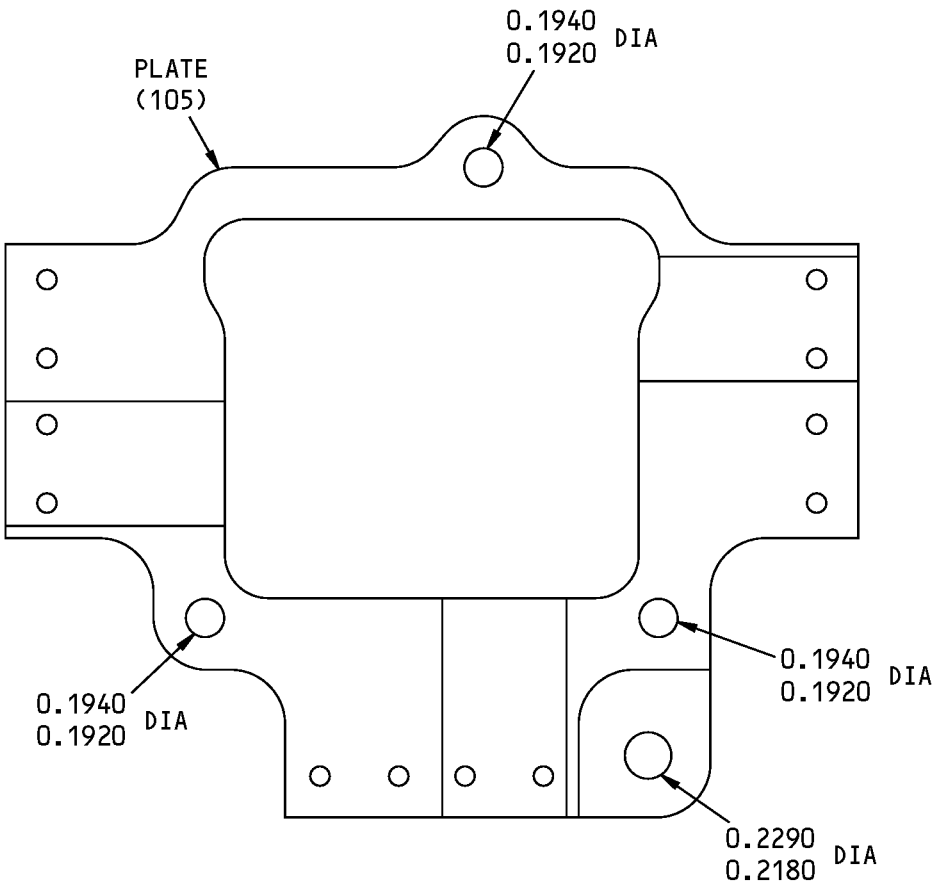


BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1151-6 Plate Repair
Figure 602



BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1151-5 Plate Repair
Figure 603

CAM - REPAIR 3-1

254A1152–1, –2, –3, –4

1. General

A. This procedure has the data necessary to repair and refinish the cam (130).

B. Refer to the Standard Overhaul Practice 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.

E. General repair details:

(1) Material: 15-5PH CRES, 180-200 ksi

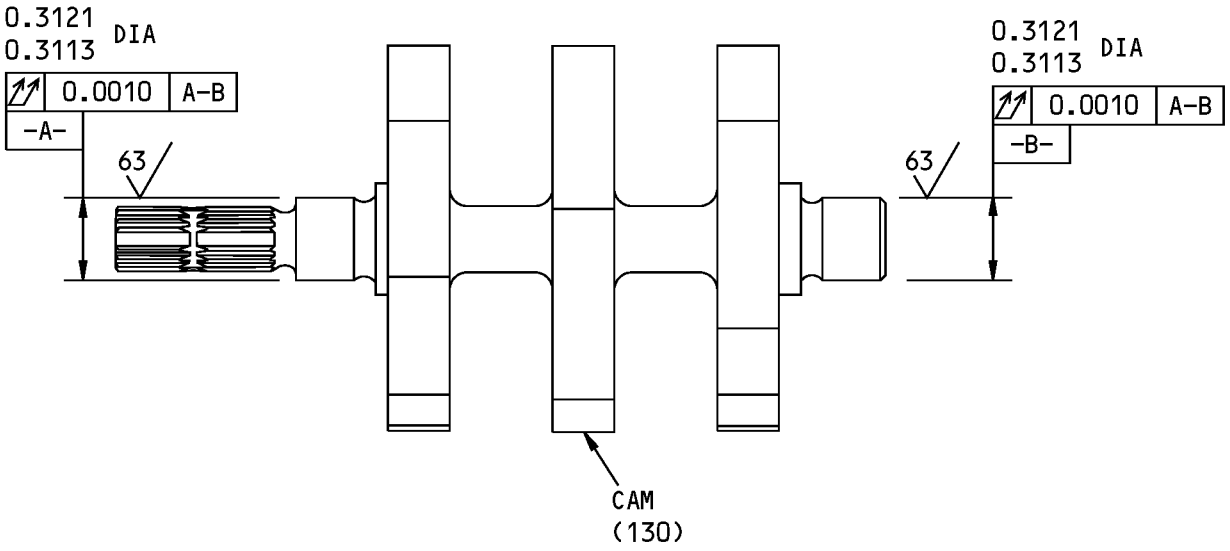
2. Cam Refinish

A. Procedure (REPAIR 3-1, 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.

(1) Put a finish on the cam (130).

(a) Prepare the surface and passivate (F-17.09).



125 ALL MACHINED SURFACES UNLESS SHOWN DIFFERENTLY

BREAK ALL SHARP EDGES, BUT NOT THE EDGES ON THE LIP OF THE CAM (TYPICAL 18 LOCATIONS)

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1152-1 THRU -4 Cam Repair
Figure 601

CRANK - REPAIR 4-1

254A1154–1

1. General

A. This procedure has the data necessary to repair and refinish the crank (20).

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

C. Refer to IPL Figure 1 for item numbers.

D. General repair details:

(1) Material: Aluminum alloy

2. Crank 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

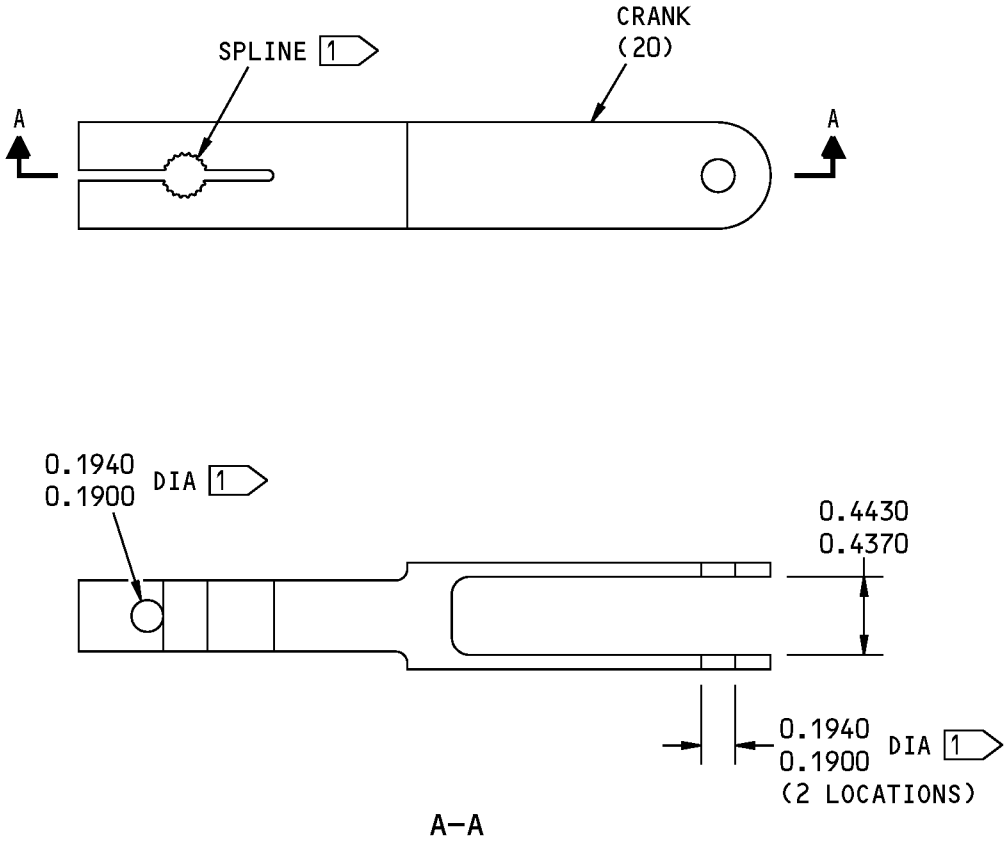
C. Procedure (REPAIR 4-1, Figure 601)

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) Put a finish on the crank (20).

(a) Boric acid/sulfuric acid anodize (F-17.31). Apply primer, C00259 (F-20.03).

1) Obey the flagnote 1 in REPAIR 4-1, Figure 601.



1 NO PRIMER IN THE HOLES.

BREAK ALL SHARP EDGES

ITEM NUMBERS REFER TO IPL FIG. 1

ALL DIMENSIONS ARE IN INCHES

254A1154-1 Crank Repair
Figure 601

ASSEMBLY

1. General

A. This procedure has the data necessary to assemble the switch pack assembly.

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

C. Refer to IPL Figure 1 and IPL Figure 2 for item numbers.

2. Assembly

A. Consumable Materials

NOTE: Equivalent substitutes may be used.

Reference	Description	Specification
C00308	Compound - Corrosion Preventive, Petrolatum Hot Application	MIL-C-11796

B. References

Reference	Title
PRECISION MECHANISM CORP. 22-32-01	Autothrottle Switchpack Assembly
SOPM 20-50-01	BOLT AND NUT INSTALLATION
SOPM 20-60-04	MISCELLANEOUS MATERIALS

C. Procedure (254A1150-1, -2, -7 thru -10) (IPL Figure 1)

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

(1) Use standard industry procedures and the steps shown below to assemble the plate assemblies (45, 95, 110), the switches (140, 145, 160, 165), and the wire bundles (135, 155).

(a) Position the clamps (75, 80) on the wire bundles (135, 155), near the end of the heat-shrink tubing.

(b) Attach the clamps (75, 80) to the plate (105) with the bolt (60), the washer (65A), and the nut (70).

(c) Apply a layer of corrosion preventive compound, C00308 on the threads of the screws (85A).

(d) Attach the switches (140, 145, 160, 165) to the plates (55, 105, 125) with the screws (85A) and the washers (90).

(2) Assemble the plate assemblies (45, 95, 110) with the cam (130), the spacers (30, 35), the bolts (25), and the nuts (40).

NOTE: Make sure the cam rotates freely.

(3) Torque the nuts (40). The wrench flats twist off at the proper torque value.

(4) Align the missing tooth on the cam (130) with the corresponding one on the crank (20), and install the bolt (5), the washer (10A), and the nut (15).

NOTE: Make sure crank (20) is installed in the proper orientation shown in ASSEMBLY, Figure 701.

(5) Install and adjust the switches (140, 145, 160, 165).

(a) Make sure that the screws (85A) are loose.

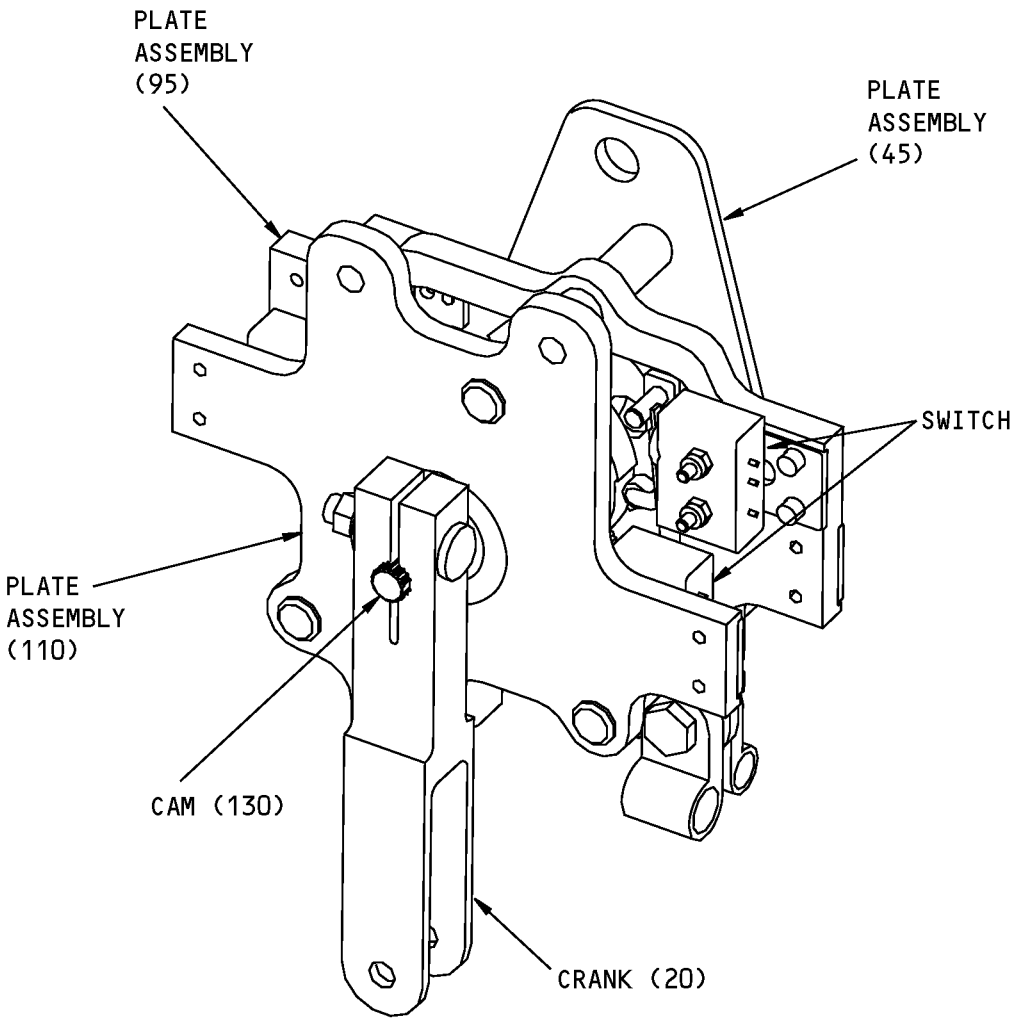
(b) Rotate the cam (130) until the largest radius is under the switch roller.

(c) Push the switch in toward the cam until the switch operates.

1) Push the switch in toward the cam 0.005-0.010 inch more.

(d) Torque the screws (85A).

(e) Verify that the switch operates when the cam rotates.



Assembly Details
Figure 701

D. Procedure (254A1150-11, -12) (IPL Figure 2)

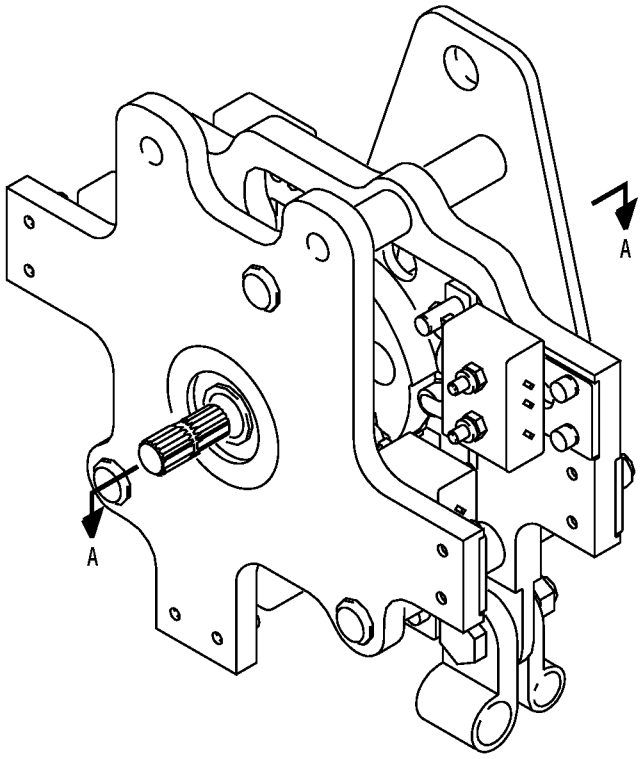
NOTE: For bolt and nut installation, refer to SOPM 20-50-01.

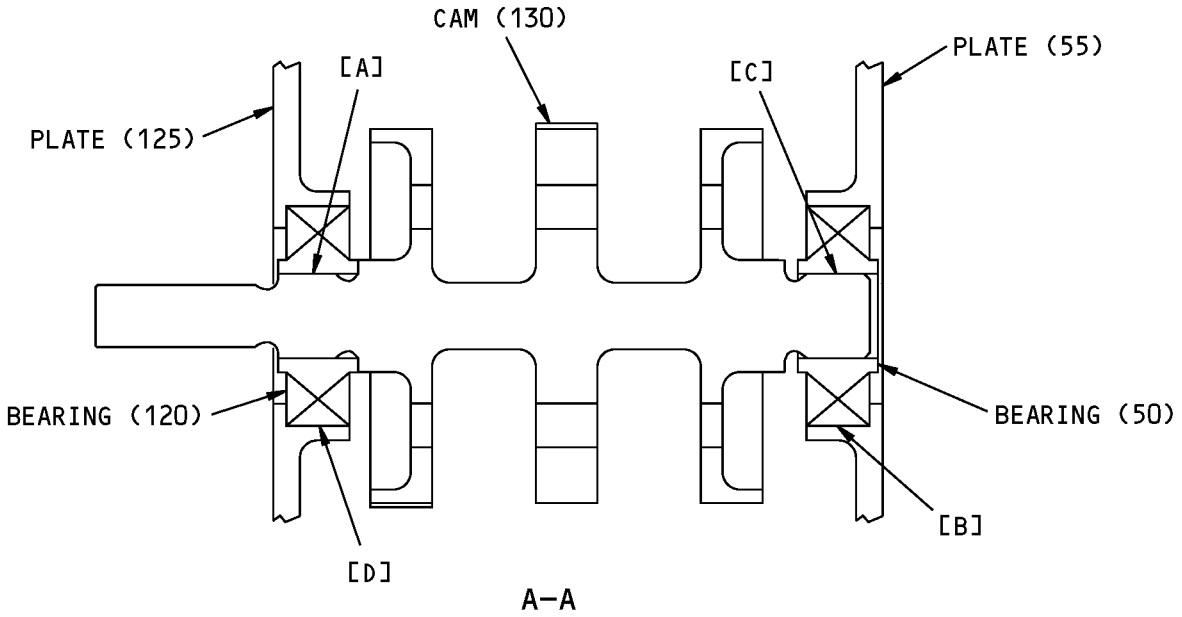
(1) Refer to PRECISION MECHANISM CORP. 22-32-01 for information on assembly of the cam switch assembly (25), including whether or not assembly is applicable.

(2) Align the missing tooth on the shaft of the cam switch assembly (25) with the corresponding one on the crank (20), and install the bolt (5), the washer (10), and the nut (15).

NOTE: Make sure crank (20) is installed in the proper orientation shown in IPL Figure 2.

FITS AND CLEARANCES





ITEM NUMBERS REFER TO IPL FIG. 1

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		DIMENSION		MAXIMUM CLEARANCE
		MIN	MAX	MIN	MAX	MIN	MAX	
[A]	ID 125	0.8125	0.8135	0.0000	0.0014			
	OD 120	0.8121	0.8125					
[B]	ID 55	0.8125	0.8135	0.0000	0.0014			
	OD 50	0.8121	0.8125					
[C]	ID 50	0.3122	0.3125	0.0001	0.0012			
	OD 130	0.3113	0.3121					
[D]	ID 120	0.3122	0.3125	0.0001	0.0012			
	OD 130	0.3113	0.3121					

* ALL DIMENSIONS ARE IN INCHES

Fits and Clearances
Figure 801 (Sheet 2 of 2)

(NOT APPLICABLE)

ILLUSTRATED PARTS LIST

1. Introduction

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

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

1 2 3 4 5 6 7

. Assembly

. Attaching parts for assembly

. . Detail parts for assembly

. . Subassembly

. . Attaching parts for subassembly

. . . Detail parts for subassembly

. . . Sub-subassembly

. . . Attaching parts for subassembly

. . . . . Details parts for sub-subassembly

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

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

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

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

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

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

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

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

H. Interchangeable Parts

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

VENDOR CODES

Code	Name
06725	AIR INDUSTRIES CORPORATION 12570 KNOTT STREET GARDEN GROVE, CALIFORNIA 92641-3932 FORMERLY AIR INDUSTRIES OF CALIF IN GARDENA, CALIF.
08127	PRECISION MECHANISMS CORP 50 BOND ST WESTBURY, NEW YORK 11590-5002 FORMERLY IN EAST NEADOW, NY
0PTK6	SPS TECHNOLOGIES INC AEROSPACE PRODUCTS DIV 5195 W 4700 SALT LAKE CITY, UTAH 94118 SEE V56878 SPS TECHNOLOGIES INC
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
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
5M902	ALCOA GLOBAL FASTENERS INC, DIV OF VOI-SHAN PRODUCTS 3000 W LOMITA BLVD TORRANCE, CALIFORNIA 90505-5103 FORMERLY FAIRCHILD INC INC FAIRCHILD AEROSPACE FASTENERS DIV
62554	SIMMONDS MECAERO FASTENERS INC 1734 SEQUOIA AVENUE ORANGE, CALIFORNIA 92668
73197	HI-SHEAR TECHNOLOGY CORP 2600 SKYPARK DRIVE TORRANCE, CALIFORNIA 90509
91929	HONEYWELL INC MICRO SWITCH DIV 11 WEST SPRING STREET FREEPORT, ILLINOIS 61032 FORMERLY MICRO SWITCH A DIV OF HONEYWELL FORMERLY V74059 AND V40228
92215	FAIRCHILD IND INC FAIRCHILD AEROSPACE FASTENER DIV 3010 W LOMITA BLVD TORRANCE, CALIFORNIA 90505-5102 FORMERLY VOI-SHAN IN CULVER CITY, CALIF

REFERENCE DESIGNATOR INDEX

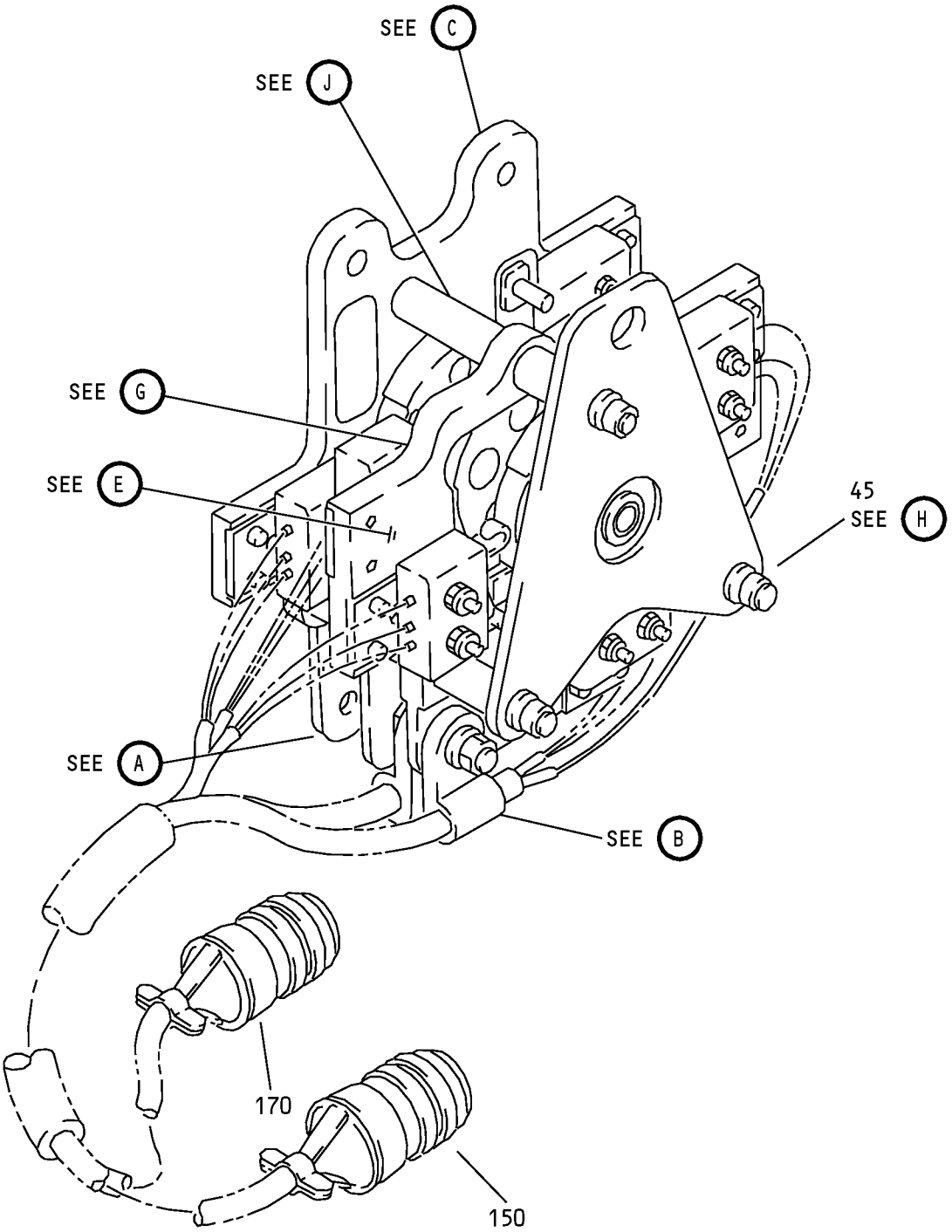
REFERENCE DESIGNATOR	PART NUMBER	FIG-ITEM
D11128P	BACC45FT16C24P	1-150
D11130P	BACC45FT14C15P	1-170
D11132P	BACC45FT16C24P6	1-150A
D11134P	BACC45FT14C15P6	1-170A
S1	39SE8	1-140
S2	39SE8	1-160
S3	39SE8	1-160
S4	39SE9	1-145
S5	39SE9	1-165
S6	39SE9	1-165
S7	39SE8	1-140
S8	39SE8	1-140
S9	39SE8	1-140

NUMERICAL INDEX

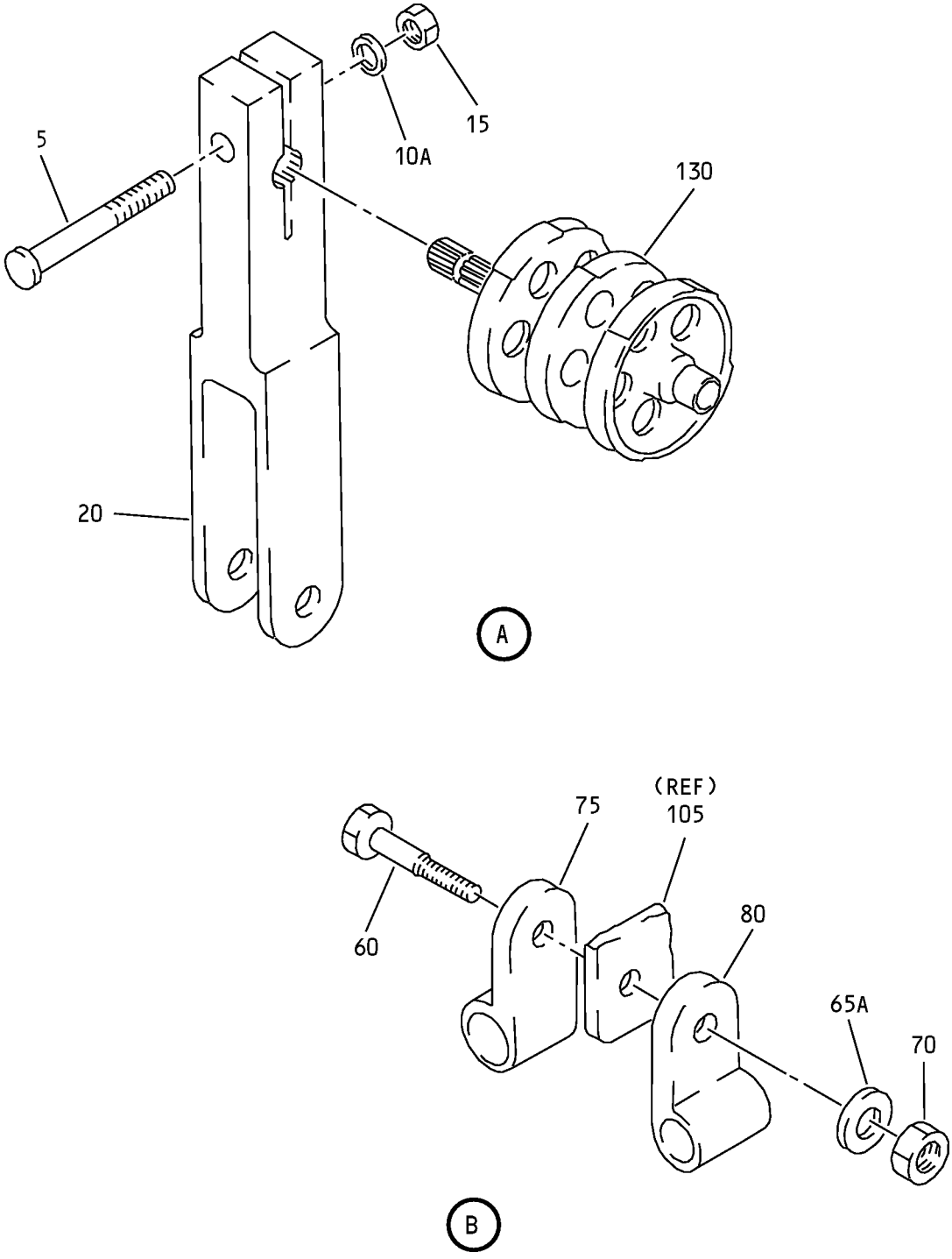
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
254A1150-1		1	1A	RF
254A1150-10		1	1F	RF
254A1150-11		2	1A	RF
254A1150-12		2	1B	RF
254A1150-2		1	1B	RF
254A1150-3		1	135	1
254A1150-4		1	155	1
254A1150-5		1	135A	1
254A1150-6		1	155A	1
254A1150-7		1	1C	RF
254A1150-8		1	1D	RF
254A1150-9		1	1E	RF
254A1151-1		1	110	1
254A1151-2		1	95	1
254A1151-3		1	45	1
254A1151-4		1	125	1
254A1151-5		1	105	1
254A1151-6		1	55	1
254A1152-1		1	130	1
254A1152-2		1	130A	1
254A1152-3		1	130B	1
254A1152-4		1	130C	1
254A1154-1		1	20	1
254A1154-2		1	20A	1
		2	20	1
39SE8		1	140	4
		1	160	2
39SE9		1	145	1
		1	165	2
BAC27DCT515		1	175	1
		2	30	1
BAC27DCT516		1	180	1
		2	30A	1
BAC27TCT0012		1	185	1

PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
BAC27TCT0013		1	190	1
BAC27TCT0014		1	195	1
BAC27TCT0015		1	200	1
BAC27TCT0016		1	205	1
BAC27TCT0017		1	210	1
BAC27TCT0031		1	215	1
BAC27TCT0032		1	220	1
BAC27TCT0033		1	225	1
BACB10FS5		1	50	1
		1	120	1
BACB30NT3K10		1	5A	1
		2	5	1
BACB30VT6K34		1	25	3
BACC10DK4		1	80	1
BACC10DK5		1	75	1
BACC30BL6		1	40	3
BACC45FT14C15P		1	170	1
BACC45FT14C15P6		1	170A	1
BACC45FT16C24P		1	150	1
BACC45FT16C24P6		1	150A	1
BACN10YR3CD		1	15	1
		1	70	1
		2	15	1
CS601-59		2	25	1
CS601-60		2	25A	1
H52732-3CD		1	15	1
		1	70	1
		2	15	1
HST10AG6-34		1	25	3
		1	25	3
		1	25	3
		1	25	3
HST79-6		1	40	3
		1	40	3
		1	40	3

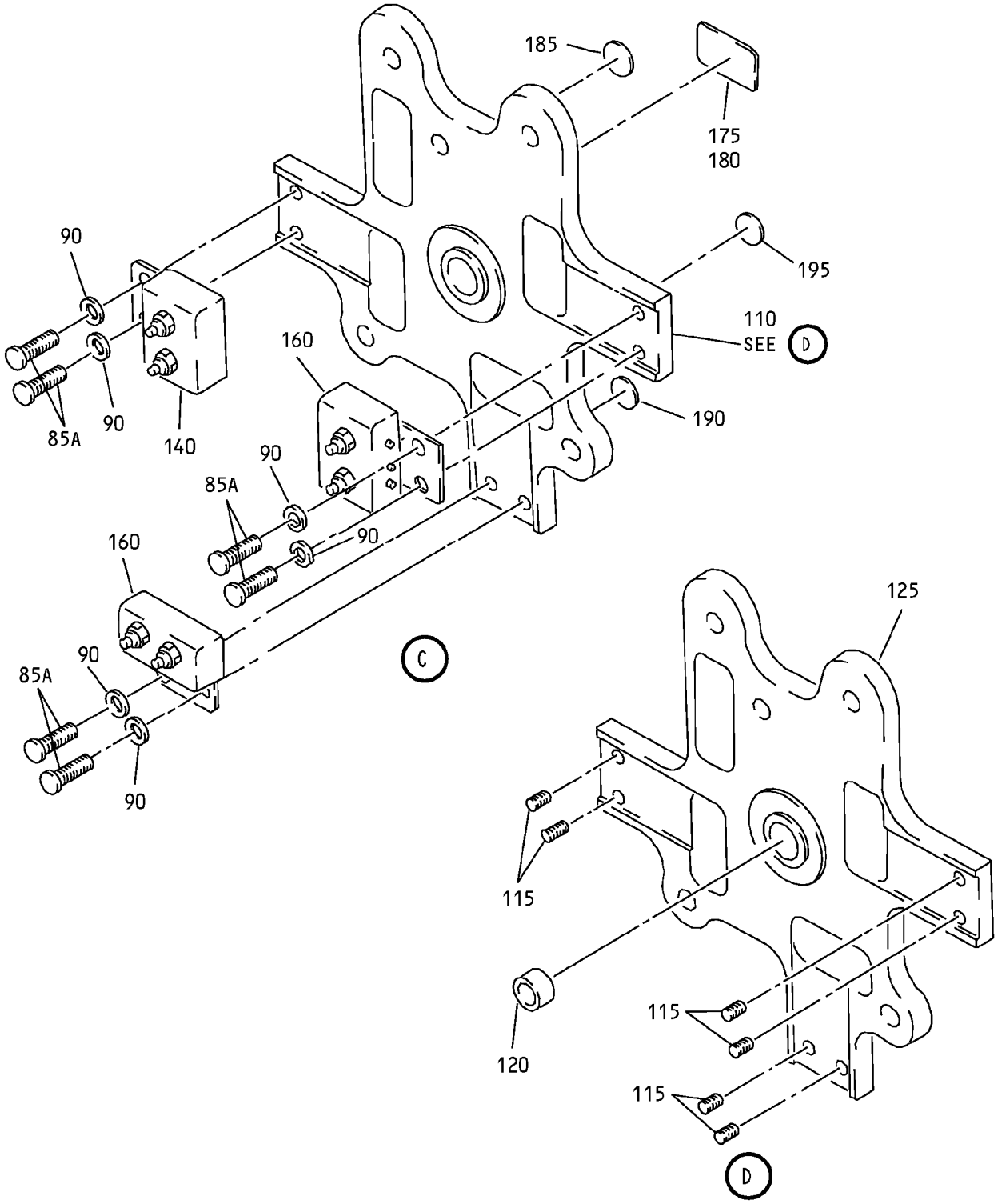
PART NUMBER	AIRLINE PART NUMBER	FIGURE	ITEM	UNITS PER ASSEMBLY
HST79CY6		1	40	3
MS21209C0210P		1	100	12
		1	115	6
NAS1149D0332J		1	10A	1
		1	65A	2
		2	10	1
NAS1352N02-3P		1	85A	18
NAS1801-3-11		1	60	1
NAS43DD3-40FC		1	35	3
NAS43DD3-64FC		1	30	3
NAS620-2		1	90	18
NAS623-3-10		1	5	1
PLH53CD		1	15	1
		1	70	1
		2	15	1



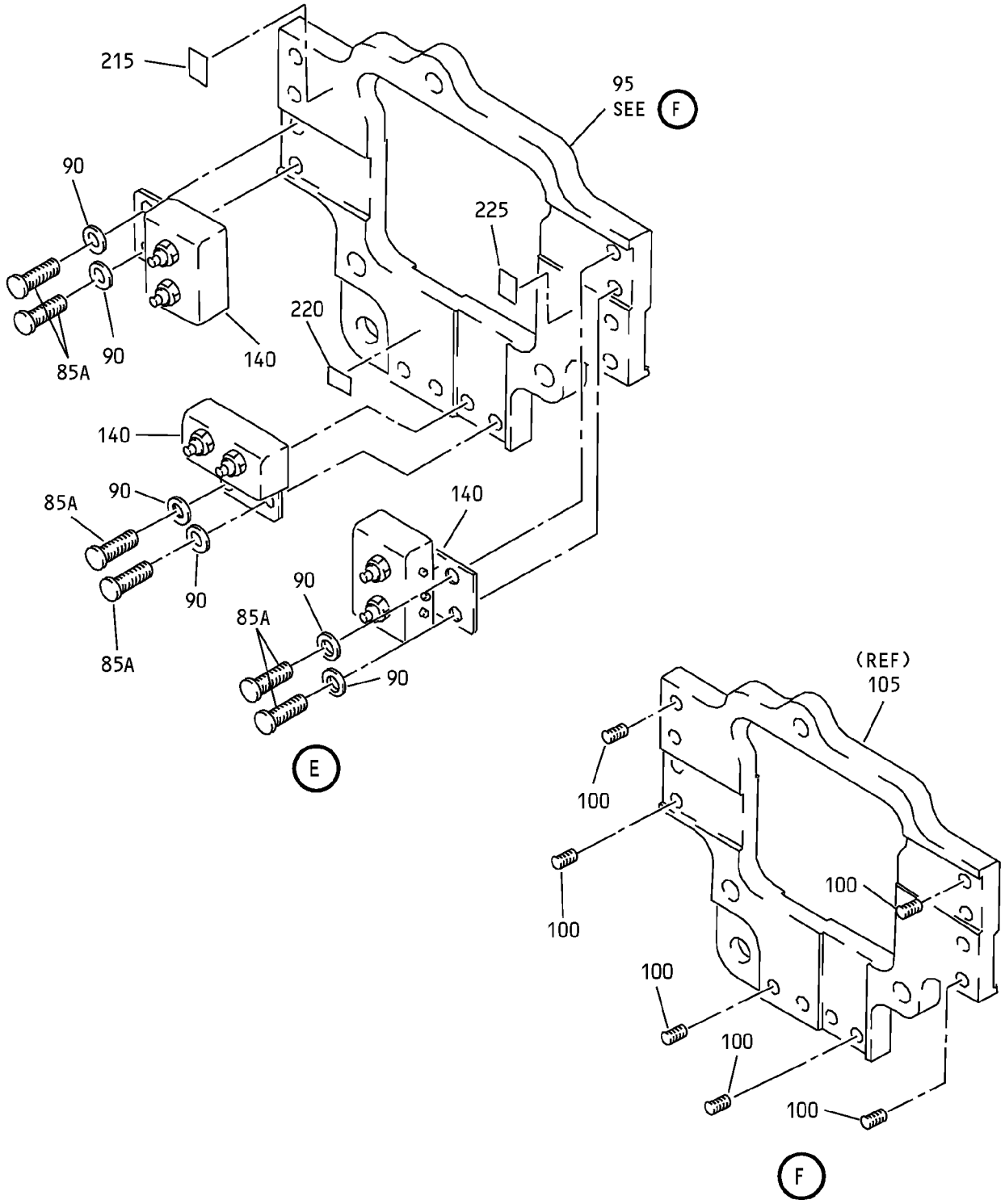
Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 1 of 6)



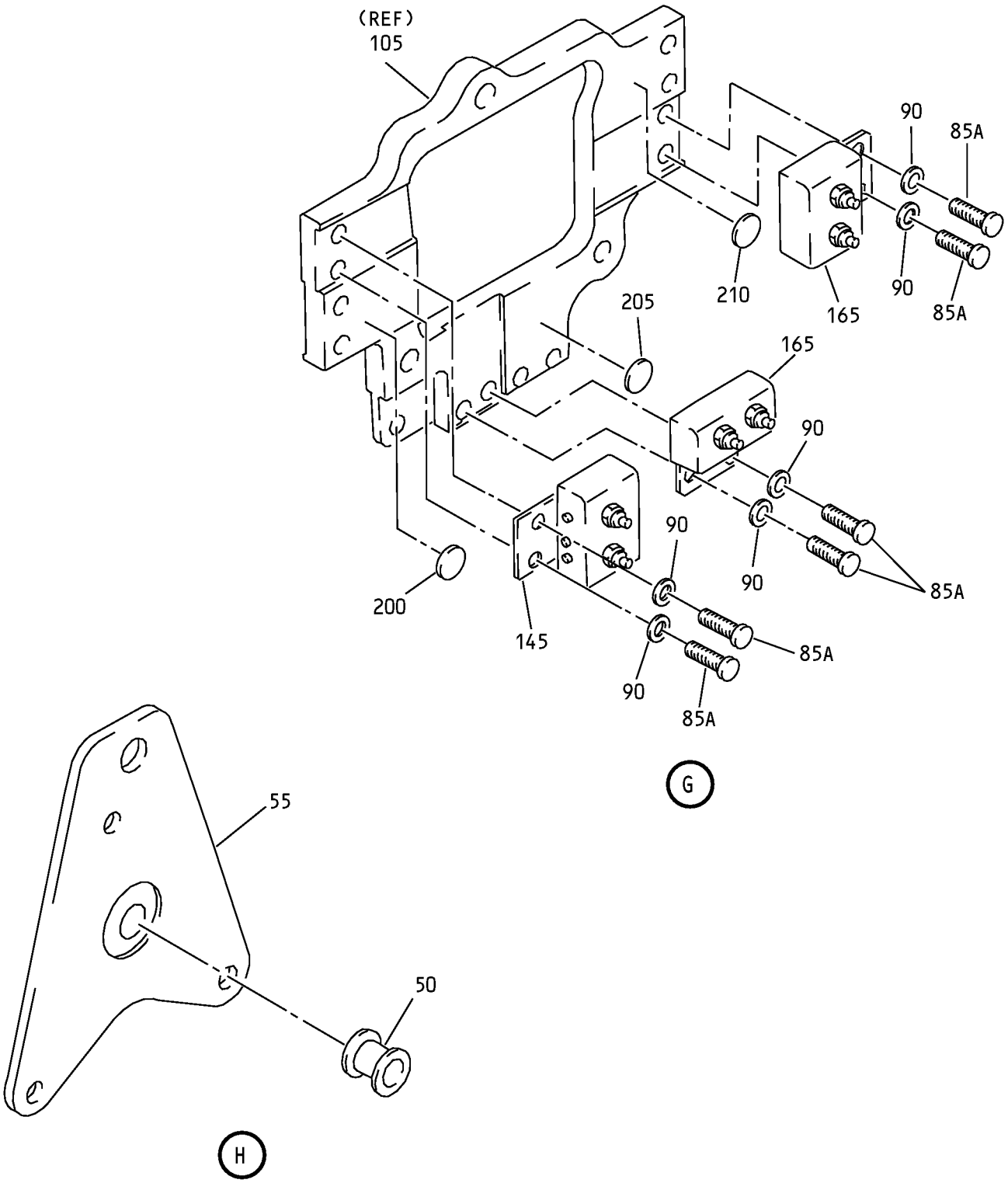
Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 2 of 6)



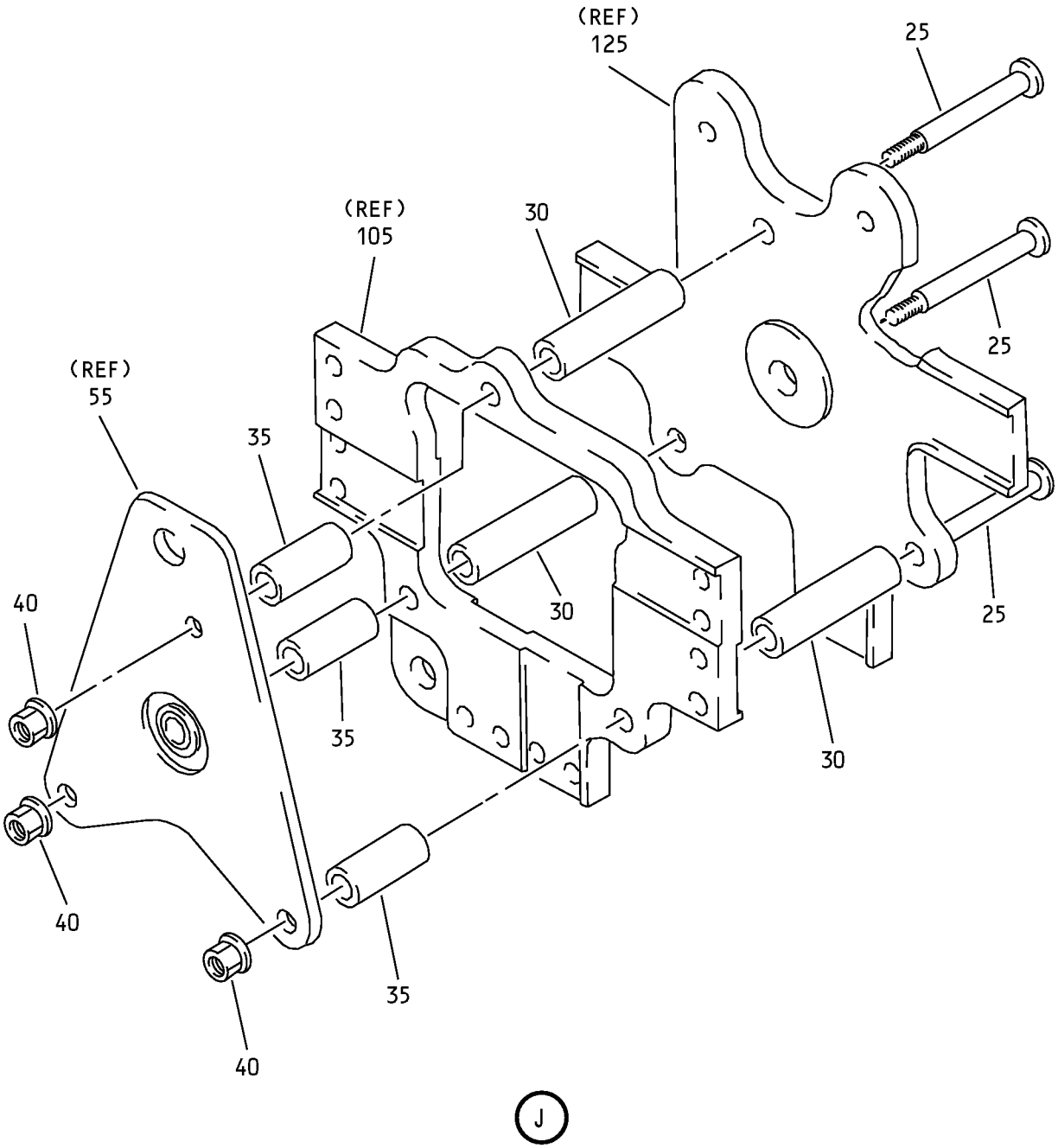
Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 3 of 6)



Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 4 of 6)



Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 5 of 6)



Autothrottle Switchpack Assembly
IPL Figure 1 (Sheet 6 of 6)

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
–1A	254A1150-1		SWITCHPACK ASSY-AUTO THROT	A	RF
–1B	254A1150-2		SWITCHPACK ASSY-AUTO THROT	B	RF
–1C	254A1150-7		SWITCHPACK ASSY-AUTO THROT	C	RF
–1D	254A1150-8		SWITCHPACK ASSY-AUTO THROT	D	RF
–1E	254A1150-9		SWITCHPACK ASSY-AUTO THROT	E	RF
–1F	254A1150-10		SWITCHPACK ASSY-AUTO THROT	F	RF
5	NAS623-3-10		. SCREW	A, B	1
–5A	BACB30NT3K10		. BOLT	C-F	1
10	NAS1149D0316J		DELETED		
10A	NAS1149D0332J		. WASHER		1
15	H52732-3CD		. NUT (V15653) (SPEC BACN10YR3CD) (OPT PLH53CD (V62554))		1
20	254A1154-1		. CRANK	A, B	1
–20A	254A1154-2		. CRANK	C-F	1
25	HST10AG6-34		. BOLT (V73197) (SPEC BACB30VT6K34) (OPT HST10AG6-34 (V0PTK6)) (OPT HST10AG6-34 (V06725)) (OPT HST10AG6-34 (V56878))		3
30	NAS43DD3-64FC		. SPACER		3
35	NAS43DD3-40FC		. SPACER		3
40	HST79CY6		. COLLAR (V73197) (SPEC BACC30BL6) (OPT HST79-6 (V56878)) (OPT HST79-6 (V92215)) (OPT HST79-6 (V5M902))		3
45	254A1151-3		. PLATE ASSY		1
50	BACB10FS5		. . BEARING		1
55	254A1151-6		. . PLATE		1
60	NAS1801-3-11		. SCREW		1
65	NAS620-10L		DELETED		

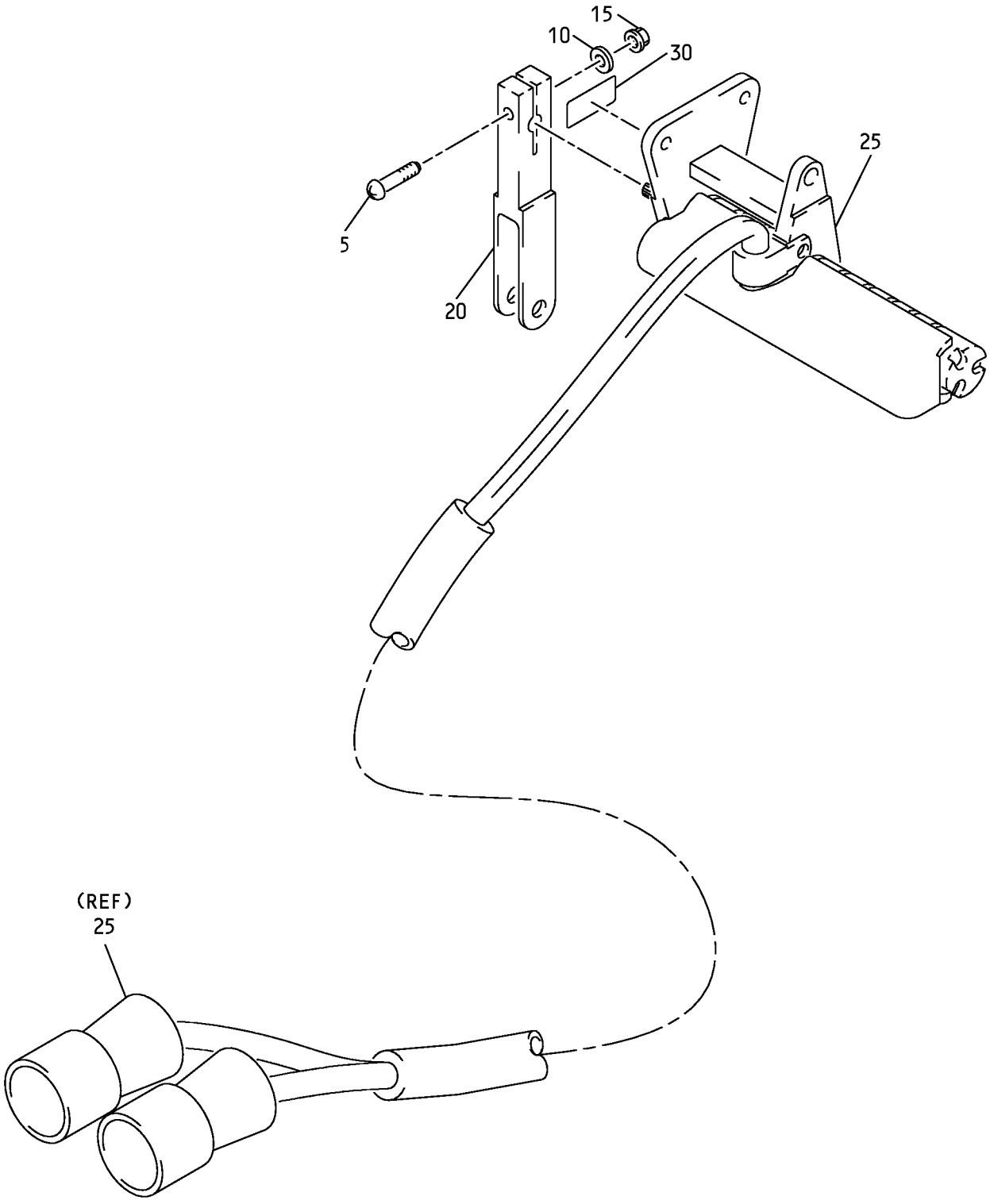
–Item not Illustrated

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
1–					
65A	NAS1149D0332J		. WASHER		2
70	H52732-3CD		. NUT (V15653) (SPEC BACN10YR3CD) (OPT PLH53CD (V62554))		1
75	BACC10DK5		. CLAMP		1
80	BACC10DK4		. CLAMP		1
85	NAS1352C02-3P		DELETED		
85A	NAS1352N02-3P		. SCREW		18
90	NAS620-2		. WASHER		18
95	254A1151-2		. PLATE ASSY		1
100	MS21209C0210P		. . INSERT		12
105	254A1151-5		. . PLATE		1
110	254A1151-1		. PLATE ASSY		1
115	MS21209C0210P		. . INSERT		6
120	BACB10FS5		. . BEARING		1
125	254A1151-4		. . PLATE		1
130	254A1152-1		. CAM (OPT ITEM 130A)	A, B	1
–130A	254A1152-2		. CAM (OPT ITEM 130)	A, B	1
–130B	254A1152-3		. CAM	C, D	1
–130C	254A1152-4		. CAM	E, F	1
–135	254A1150-3		. WIRE BUNDLE ASSY	A, C, E	1
–135A	254A1150-5		. WIRE BUNDLE ASSY	B, D, F	1
140	39SE8		. . SWITCH (V91929) (S1, S7, S8, S9)		4
145	39SE9		. . SWITCH (V91929) (S4)		1
150	BACC45FT16C24P		. . CONNECTOR (D11128P)	A, C, E	1
–150A	BACC45FT16C24P6		. . CONNECTOR (D11132P)	B, D, F	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–					
–155	254A1150-4		. WIRE BUNDLE ASSY	A, C, E	1
–155A	254A1150-6		. WIRE BUNDLE ASSY	B, D, F	1
160	39SE8		. . SWITCH (V91929) (S2, S3)		2
165	39SE9		. . SWITCH (V91929) (S5, S6)		2
170	BACC45FT14C15P		. . CONNECTOR (D11130P)	A, C, E	1
–170A	BACC45FT14C15P6		. . CONNECTOR (D11134P)	B, D, F	1
175	BAC27DCT515		. DECAL-M01766	A, C, E	1
180	BAC27DCT516		. DECAL-M01767	B, D, F	1
185	BAC27TCT0012		. DECAL-S1		1
190	BAC27TCT0013		. DECAL-S2		1
195	BAC27TCT0014		. DECAL-S3		1
200	BAC27TCT0015		. DECAL-S4		1
205	BAC27TCT0016		. DECAL-S5		1
210	BAC27TCT0017		. DECAL-S6		1
215	BAC27TCT0031		. DECAL-S7		1
220	BAC27TCT0032		. DECAL-S8		1
225	BAC27TCT0033		. DECAL-S9		1

–Item not Illustrated



Autothrottle Switchpack Assembly
IPL Figure 2

FIG/ ITEM	PART NUMBER	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USAGE CODE	UNITS PER ASSY
2–					
–1A	254A1150-11		SWITCHPACK ASSY-AUTO THROT	G	RF
–1B	254A1150-12		SWITCHPACK ASSY-AUTO THROT	H	RF
5	BACB30NT3K10		. BOLT	G, H	1
10	NAS1149D0332J		. WASHER	G, H	1
15	PLH53CD		. NUT (V62554) (SPEC BACN10YR3CD) (OPT H52732-3CD (V15653))	G, H	1
20	254A1154-2		. CRANK	G, H	1
25	CS601-59		. SWITCH ASSY-CAM (V08127)	G	1
–25A	CS601-60		. SWITCH ASSY-CAM (V08127)	H	1
30	BAC27DCT515		. DECAL-M01766	G	1
–30A	BAC27DCT516		. DECAL-M01767	H	1

–Item not Illustrated