



ENGINE - MAIN GEARBOX ASSEMBLY - INCORPORATE A PMA DRIVE GEAR ASSEMBLY WITH DECREASED
PINION TOOTH THICKNESS - CATEGORY CODE 4 - MOD.ENG-72-0048

1. Planning Information

A. Effectivity

- (1) Aircraft: Airbus A320
- (2) Engine: V2500-A1 Engines Serial No.s V0014 through V0112

B. Reason

(1) Condition

PMA drive gear assembly wear caused by loss of teeth clearance in operation can occur. To eliminate this problem the backlash is to be increased by reducing the tooth thickness of the gear, the existing oil nozzle is to be revised and a target hole added.

(2) Background

Engine development testing has shown that this condition could occur.

(3) Objective

To prevent the early wear of the PMA drive gear.

(4) Substantiation

Testing of the revised standard has proven the required PMA drive gear versus drive gear correct backlash.

(5) Effects of Bulletin on:

Removal/Installation	Affected
Disassembly/Assembly	Affected
Cleaning	Affected
Inspection/Check	Affected
Repair	Affected
Testing	Not affected

(6) Supplementary Information:

None

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**C. Description**

The PMA drive gear with the reduced tooth thickness, the PMA housing with larger hole and the revised oil nozzle are put in place of the old parts.

D. Approval

The Part Number changes and/or part modifications described in Section 2 and 3 of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the Engine Model listed.

E. Compliance

Category Code 4

Accomplish at the first visit of an engine or module to a maintenance base capable of compliance with the accomplishment instructions regardless of the planned maintenance action or the reason for engine removal.

F. Manpower

Estimated man-hours to incorporate the full intent of this Bulletin:

Venue	Estimated man-hours
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(1) In service.....	TOTAL... 1 hour 30 minutes
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G. Material – Price and Availability

(1) Modification Kit not required. Part supplied as single line item.

H. Tooling – Price and Availability

Tool No.	Qty	Description	Function	Avail.
1R18002	1	Wrench	Remove/Install the tube	(1)
1F10227	1	Drift	Install PMA drive gear	(1)
3F10362	1	Drill mask	Drill the PMA drive housing	(1)

(1) Shows that the Tool Design Aperture Cards are available at this time from IAE.

I. Weight and Balance

(1) Weight change	None
(2) Moment arm	No effect

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(3) Datum Engine front mount centerline

J. Electrical Load Data

This Service Bulletin has no effect on the aircraft electrical load.

K. References

(1) Internal Reference No.

EC89VF013

EC89VF013A

EC89VF013B

EC89VF013C

EC89VF014

(2) Other References

IAE V2500 Service Bulletin Number

V2500-ENG-0043 (Engine - Main Gearbox Assembly - Inspect the
Dedicated Alternator Drive Gear).

V2500-ENG-72-0070 (Incorporate a Layshaft Extension Gear and PMA Drive Gear
with Increased Face Width).

V2500 Aircraft Maintenance Manual, 79-23-51, Removal/Installation

V2500 Aircraft Maintenance Manual, 71-13-00, Maintenance Practices

V2500 Aircraft Maintenance Manual, 12-13-79, Servicing

V2500 Aircraft Maintenance Manual, 73-22-38, Removal/Installation

V2500 Engine Manual, 72-60-33, Disassembly/Assembly

L. Other Publications Affected

(1) The V2500 Engine Illustrated Parts Catalog, 72-60-33.

(2) The V2500 Engine Manual, 72-60-10, Installation

(3) The V2500 Engine Manual, 72-60-33, Inspection/Check.

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2. Accomplishment Instructions

A. Prerequisite Instructions

WARNING: ALL ELECTRICAL POWER SUPPLY FROM THE ENGINE MUST BE DISCONNECTED.

- (1) Disconnected the power supply from the engine by opening all applicable circuit breakers.
- (2) Open the fan cowl panels to gain access to the gearbox, refer to Aircraft Maintenance Manual, 71-13-00.

WARNING: DO NOT GET ENGINE OIL ON YOUR SKIN FOR A LONG TIME. THE OIL IS POISONOUS AND CAN GO THROUGH YOUR SKIN AND IN TO YOUR BODY.

NOTE: Position a container to catch the oil spill during the removal of the tubes and accessories.

- (3) Rework the 4A0053 or 4A1100 Main Gearbox Assembly.

NOTE: Do the steps (a) thru (g) only for the engine PRE SBE 72-0055.

(a) Disconnect the 5A8773 and 5A9153 tubes. Ref Figure 1.

- (i) Disconnect the 5A8773 tube from the 5A9187 tube. Use the wrench IAE1R18002 1 off.
 - (ii) Disconnect the 5A9153 tube from the 5A9081 tube. Use the wrench IAE1R18002 1 off.
 - (iii) Remove the three 4W0170 bolts which attach the 5A8773 tube from the ACOC.
 - (iv) Remove the three 4W0170 bolts or AS21516 bolts which attach the 5A9153 tube from the ACOC.
 - (v) Remove the 4W0001 nut, 5W1086 washer and 4W0105 bolt which safety the pipe at clip position 0220.
 - (vi) Remove the (75-32-49,11-156) nut, (75-32-59,11-150) washer and (75-32-59,11-149) bolt which safety the pipe clips at clip position 1031.
- (b) Remove the three 4W0165 bolts which attach the 5A9187 tube to the oil pressure filter (See Figure 2).
- (c) Loosen the 4W0103 bolt which safety the clip of the 5A9081 and 4B7200 tubes at position 0333 (See Figure 2).

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- (d) Remove the 4W0103 and 4W0130 bolts from the clips securing the 5A9187 and 5A9081 tubes at clip position 0334 and 0200 (See Figure 2).
- (e) Remove the dedicated alternator stator, refer to Aircraft Maintenance Manual, 73-22-38.
- (f) Remove the 4B0179 tube. Ref Figure 3.
 - (i) Cut and remove the lockwire and disconnect the tube from the gearbox casing and from the PMA drive gear assembly.
 - (ii) Remove the tube.
- (g) Remove the PMA drive gear assembly. Ref Figure 3.
 - (i) Remove the three 4W0002 nuts which attach the PMA drive gear assembly to the PMA drive housing.
 - (ii) Pull the pipe cluster forward until the 4P7230 bracket disengages from the studs.
 - (iii) Disengage the flange of the PMA drive gear assembly from the PMA drive housing.
 - (iv) Move the tube cluster against the fan casing. Put a plastic or wood wedge below the tube cluster to keep the tube in position.
 - (v) Catch the two legs of the 4P7230 bracket with two pairs of pliers. Move the bracket away from the flange of the PMA drive gear assembly.
 - (vi) Remove the PMA drive gear assembly from the gearbox.
 - (vii) Remove and discard the two AS3209-151 and AS3209-114 packings from the PMA drive gear assembly.
- (h) Remove the PMA drive gear assembly, Post SBE 72-0055. Ref Figure 9.
 - (i) Cut and remove the lockwire and disconnect the 4B0179 tube from the gearbox casing and from the PMA drive gear assembly. Remove the tube.
 - (ii) Remove the two 4W0002 nuts and disconnect the 4P7171 bracket from the 4B7172 bracket.
 - (iii) Remove the three 4W0002 nuts which attach the PMA drive gear assembly to the PMA drive housing
 - (iv) Remove the PMA drive gear assembly and the 4P7171 bracket from the gearbox.

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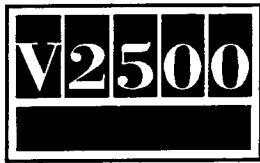


- (v) Remove and discard the two AS3209-151 and AS3209-114 packings from the PMA drive gear assembly.
- (i) Remove the 4B0143 PMA drive housing assembly. Ref Figure 5.
- (i) Remove the two 4W0002 nuts and MS9321-10 washers which attach the housing to the gearbox.
- NOTE: Hold the layshaft extension gear in position during the removal of the housing.
- (ii) Remove the old 4B0143 PMA drive housing assembly with the outer race of the roller bearing from the gearbox.
- (iii) Remove and discard the AS3209-154 packing from the housing.
- (iv) Make sure that the layshaft extension gear stay in position.
- (v) Remove the three 4W0002 nuts and remove the 4T0053 roller bearing outer race from the housing.
- (j) Remove the 4P0240 oil nozzle from the gearbox. Ref Figure 8.
- (i) Remove the 4W0002 nut and CU37148 washer which attach the oil nozzle to the gearbox.
- (ii) Remove the 4P0240 oil nozzle from the right of the PMA pad on the gearbox.
- (iii) Remove and discard AS3209-113 and AS3209-110 packings from the oil nozzle.

B. Rework Instructions

- (1) Drill an oil passage on 4B0143 PMA drive housing assembly.

Procedure	Supplementary Information
(a) Install the housing on IAE1F10362 drill mask and safety with the bolts and nut.	Refer to Figure 6.
(b) Attach the drill mask to a bench vise.	
(c) Drill an hole through the housing.	Use an electrical hand drill with a 0.3937 in. (10 mm) drill.



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- | | | |
|--|--------------------------------|-------------------|
| (d) Smooth the bole. | Use a fine abrasive paper | |
| (e) Do a crack test. | Refer to the SPM TASK 70-23-05 | |
| (f) Apply the chromate conversion coating to the surface of the holes. | Refer to the SPM TASK 70-38-02 | |
| (g) Renumber by the vibro-peen adjacent to the old part number on the housing. | Old P/N
4B0143 | New P/N
4B0292 |

- (2) Disassemble the 4A0268 PMA drive gear assembly.

NOTE: Disassemble only the drive gear 4B0147 if it is not required the PMA support assy 4B0253, rework by machining. Refer to SB.ENG-72-0070 Par. 2.B. (8).

Procedure

Supplementary Information

- | | |
|--|---|
| (a) Disassemble the PMA drive gear assembly. | Refer to Engine Manual TASK 72-60-33-040-001. |
| (b) Discard 4B0147 drive gear. | |

- (3) Reduce the diameter of the manifold of 4B0253 PMA support assembly.

Procedure

Supplementary Information

- | | | |
|---|--|-------------------|
| (a) Reduce the diameter of the support to obtain the dimension specified. | Refer to Figure 7.
Clean up edges of grooves and chamfers, where necessary. | |
| (b) Renumber by the vibro-peen adjacent to the existing part number. | Old P/N
4B0253 | New P/N
4B0289 |

- (4) Assemble 4A0284 PMA drive gear assembly.

NOTE: If only the drive gear 4B0147 has been removed, install the new drive gear 4B0293. Refer to SBE 72-0070 Par.2.b.(9).

Procedure

Supplementary Information

- | | |
|---|---|
| (a) Assemble the PMA drive gear assembly. | Refer to Engine Manual TASK 72-60-33-440-001. |
|---|---|

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- (b) Install the new 4B0293 drive gear. Install in place of the old 4B0147 drive gear.

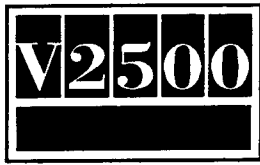
(c) Renumber by the vibro-peen adjacent to the existing part number	Old P/N	New P/N
	4B0268	4B0284

C. Assembly Instruction

- (1) Install the new 4P0291 oil nozzle on the gearbox. Ref Figure 8.
- (a) Install the new AS3209-113 and AS3209-110 packings on the oil nozzle.
 - (b) Install the 4P0291 oil nozzle on the seat near the PMA pad on the gearbox. Align the hole in the nozzle flange with the adjacent stud.
 - (c) Safety the oil nozzle with CU37148 washer and 4W0002 nut. Torque to 85 to 95 lbfin. (0,96 to 1,07 mdaN).
- (2) Install the 4B0292 PMA drive housing. Ref Figure 5.
- (a) Install the 4T0053 roller bearing outer race on the new housing. Install the three 4W0002 nuts and torque to 85 to 95 lbfin (0,95 to 1.07 mdaN).
 - (b) Install the new AS3209-154 packing on the housing.
 - (c) Make sure that the layshaft extension gear is correctly positioned in to the gearbox.
 - (d) Align the hole of the housing flange with the studs on the gearbox and the outer race with the inner race of the roller bearing installed on the gearshaft.
 - (e) Put the housing over the gearshaft and install in the seat on the gearbox.
 - (f) Install the two MS9321-10 washers and 4W0002 nuts on the two shorter studs. Torque to 85 to 95 lbfin (0,96 to 1.07 mdaN).
 - (g) Release again the two nuts. Torque these nuts only after the installation of the PMA drive gear assembly.

NOTE: Do the steps (3) thru (7) only for the engine pre SBE 72-0055.

- (3) Install the 4A0284 PMA drive gear assembly Ref Figure 4.



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- (a) Move the tube cluster against the fan casing. Put a plastic or wood wedge below the tube cluster to keep the tube in position.
- (b) Install the new AS3209-151 in to the groove of the mounting flange of the PMA drive gear assembly.
- (c) Install the new AS3209-114 in to the groove on the end of the manifold.
- (d) Catch the two legs of the 4P7230 bracket with two pairs of pliers. Move the bracket away from the PMA drive housing to permit the installation of the PMA drive gear assembly.
- (e) Align the PMA drive gear assembly with the studs and the manifold with the seat on the gearbox.

CAUTION: MAKE SURE THAT THE GEARS OF THE PMA DRIVE GEAR ASSEMBLY AND THE LAYSHAFT EXTENSION ARE CORRECTLY ENGAGED BEFORE THE USE OF THE DRIFT. DAMAGE TO THE PMA GEARS CAN OCCUR IF THE ENGAGEMENT IS FORCED.

- (f) Install the PMA drive gear assembly on the PMA drive housing. Carefully engage the gear of the PMA drive gear with the gear of the layshaft extension. Use the IAE1F10227 drift 1 off.
- (g) Remove the wedge from below the tube cluster.
- (h) Move the tube cluster forward and align the holes on the legs of the 4P7230 bracket with the upper studs which protrude from the PMA drive gear assembly.
- (i) Install the three 4W0002 nuts which safety the PMA drive gear assembly and the bracket to the PMA drive housing.
- (j) Torque the five nuts which attach the PMA drive housing and the PMA drive gear assembly. to 85 to 95 lbfin (0,96 to 1,07 mdaN).

Procedure		Supplementary Information	
(k)	Identify the main gearbox assembly part number (write down by a pencil on the gearbox casting)	Old P/N	New P/N
		4A0053	4A0800
		4A1100	4A1101

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- | | | | |
|-----|--|-----------------------------|------------------------------|
| (l) | Identify the module accessory gearbox part number written down on two plates:
one on the gearbox casting and the other one on the angle gearbox). Use two new blank plates and write on them by vibro-peen. | Old P/N
4A0504
4A1050 | New P/N
4A0700
4A1050A |
|-----|--|-----------------------------|------------------------------|
- (4) Install the 4B0179 tube. Ref Figure 4.
- (a) Put the tube between the PMA drive gear assembly and the gearbox and connect to the two oil nozzles.
- (b) Torque the two coupling nuts to 320 to 350 lbfin (3,62 to 3,96 mdaN). Safety with V02-326, lockwire.
- (5) Connect the 5A9187 tube to the oil pressure filter. Ref Figure 2.
- (a) Lubricate the new MS9966-13 packing with V10-039 engine oil and install on the flange of the tube.
- (b) Align the tube with the flange of the oil pressure filter and install the three 4W0165 bolts.
- (c) Torque the three bolts to 100 lbfin (1,13 mdaN).
- (6) Assemble the clip positions 0333 and 0334. Torque the bolts to 36 to 45 lbfin (0,4 to 0,5 mdaN). Ref Figure 2.
- (7) Connect the 5A8773 and 5A9153 tubes. Ref Figure 1.
- (a) Lubricate the two new AS43013-118 packing with V10-039 engine oil and install on the flange of the two tubes at ACOC end.
- (b) Align the 5A9153 tube with the 5A9081 tube and 5A8773 tube with the 5A9187 tube. Tighten the two coupling nuts by hand.
- (c) Align the 5A9153 tube with the flange of the ACOC and install the three 4W0170 or AS21516 bolts.
- (d) Align the 5A8773 tube with the flange of the ACOC and install the three 4W0170 bolts.
- (e) Assemble the clip positions 0220, 1031 and 0200. (See Figure 2
- (f) Torque the six bolt which safety the two tubes to the ACOC to 85 to 95 lbfin (0,96 to 1,07 mdaN).



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- (g) Torque to 478 to 513 lbfin (5,4 to 5,8 mdaN) the coupling nut which safety the 5A9153 tube with the 5A9081 tube. Use IAE1R18002 wrench 1 off. Safety with V02-126 lockwire.
 - (h) Torque to 478 to 513 lbfin (5,4 to 5,8 mdaN) the coupling nut which safety the 5A8773 tube with the 5A9187 tube. Use IAE1R18002 wrench 1 off. Safety with V02-126 lockwire.
 - (i) Torque to 36 to 45 lbfin (0,4 to 0,5 mdaN) the bolts at clip position 0220, 1031 and 0200.
- (8) Install the 4A0284 PMA drive gear assembly, Post SBE 72-0055. Ref Figure 9.
- (a) Install the new AS3209-151 packing in to the groove of the mounting flange of the PMA drive gear assembly.
 - (b) Install the new AS3209-114 packing in to the groove on the end of the manifold.
 - (c) Align the PMA drive gear assembly with the studs and the manifold with the seat on the gearbox.
- CAUTION: MAKE SURE THAT THE GEARS OF THE PMA DRIVE GEAR ASSEMBLY AND THE LAYSHAFT EXTENSION ARE CORRECTLY ENGAGED BEFORE THE USE OF THE DRIFT. DAMAGE TO THE PMA GEARS CAN OCCUR IF THE ENGAGEMENT IS FORCED.
- (d) Install the PMA drive gear assembly on the PMA drive housing. Carefully engage the gear of the PMA drive gear with the gear of the layshaft extension. Use the IAE1F10227 drift 1 off.
 - (e) Install the 4P7171 bracket on the two upper studs and on the bolts of the 4B7172 bracket.
 - (f) Install the three 4W0002 nuts which safety the PMA drive gear assembly and the bracket to the PMA drive housing.
 - (g) Torque the five nuts which attach the PMA drive housing and the PMA drive gear assembly, to 85 to 95 lbfin (0,96 to 1,07 mdaN).
 - (h) Install the two 4W0002 nuts which attach the 4P7171 and 4B7172 brackets together. Torque the nuts to 85 to 95 lbfin (0,96 to 1,07 mdaN)
- (9) Install the dedicated alternator stator. Refer to Aircraft Maintenance Manual, 73-22-38.
- (10) Reconnect the power supply.

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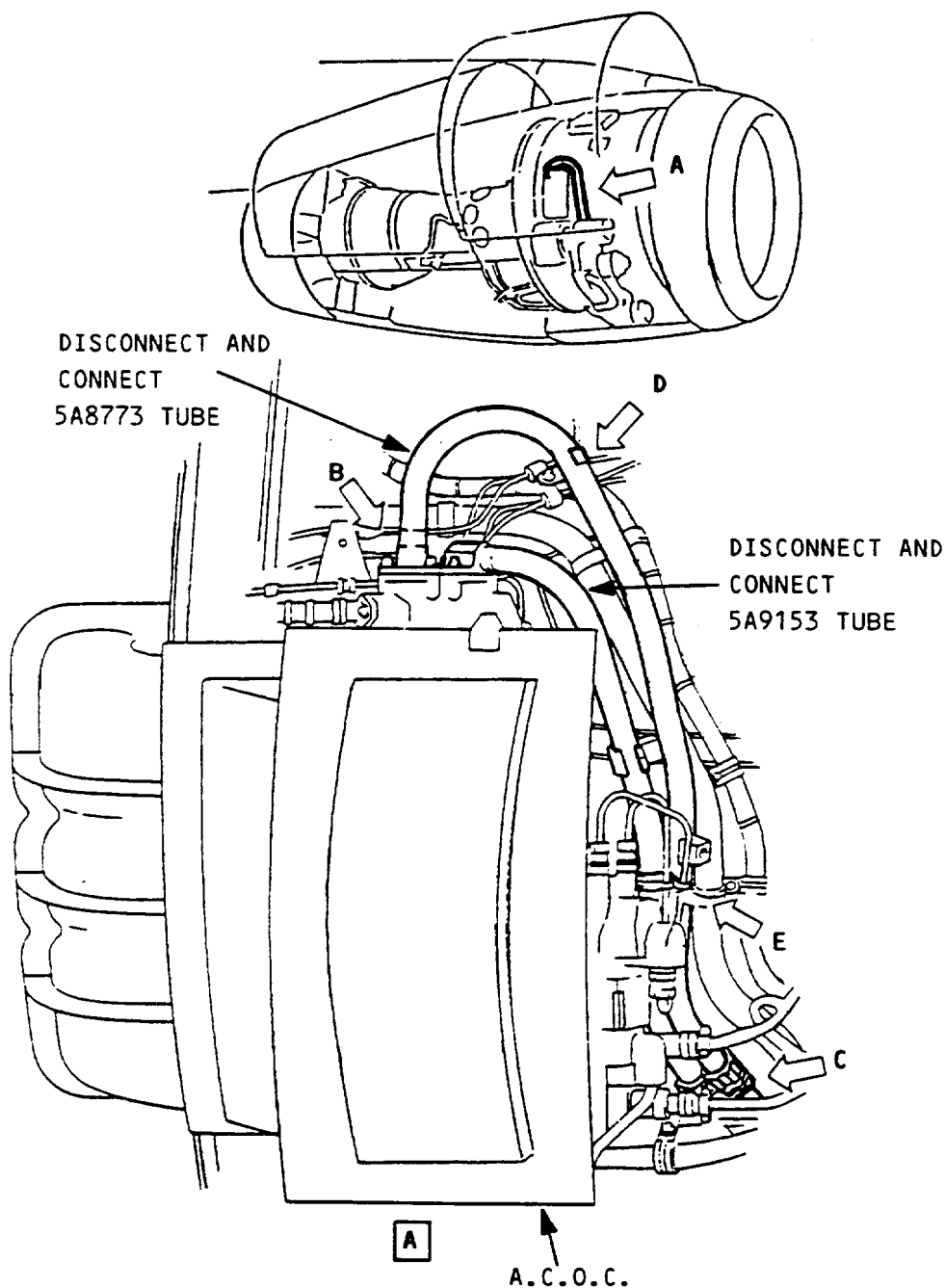
(11) Prime the engine oil system, refer to Aircraft Maintenance Manual, 12-13-79.

(12) Close the fan cowl panels, Refer to Aircraft Maintenance Manual, 71-13-00.

(13) Do a leak check of the engine oil system after the first ground run.

D. Recording Instructions

(1) A record of accomplishment is necessary.



Disconnect and Connect the Tube to the ACOC
Fig.1 (Sheet 1 of 2)



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REMOVE AND INSTALL

4W0170 BOLT

5A8773 TUBE

REMOVE AND

INSTALL

4W0170 BOLT OR

AS21516 BOLT

5A8773 TUBE

5A9153 TUBE

REMOVE AND
REPLACE
AS43013-118
SEALING RING

5A9153 TUBE

A.C.O.C

B

REMOVE AND
REPLACE
AS43013-118
SEALING RING

5A9081 TUBE

5A9187 TUBE

C

REMOVE AND
INSTALL

4W0105 BOLT

5W1086 WASHER

4W0001 NUT

E

CLIP POSITION 0220

CLIP POSITION 1031

D

REMOVE AND INSTALL

75-32-49-11-149 BOLT

75-32-49-11-150 WASHER

75-32-49-11-156 NUT

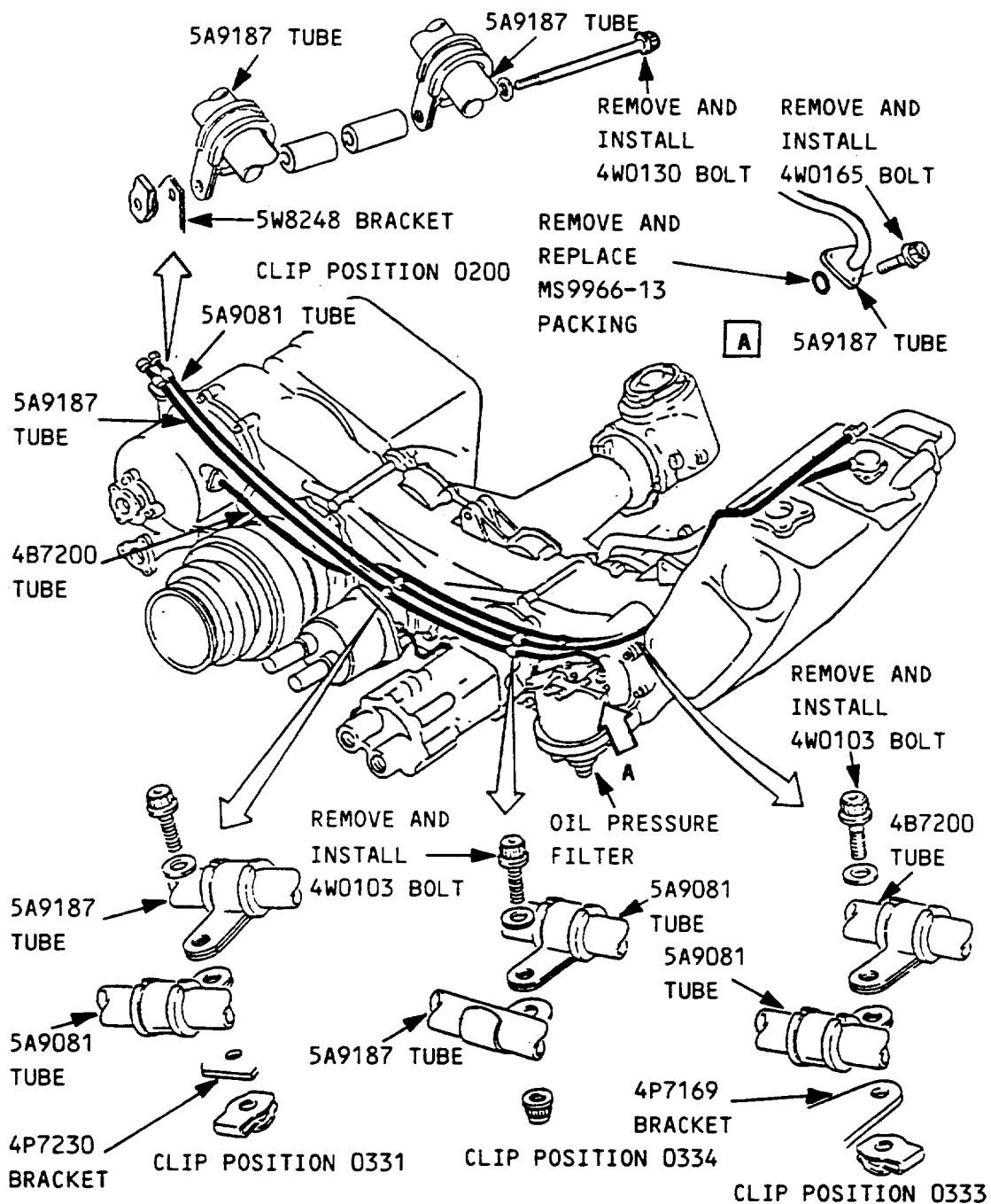
Disconnect and Connect the Tube to the ACOC
Fig.1 (Sheet 2 of 2)

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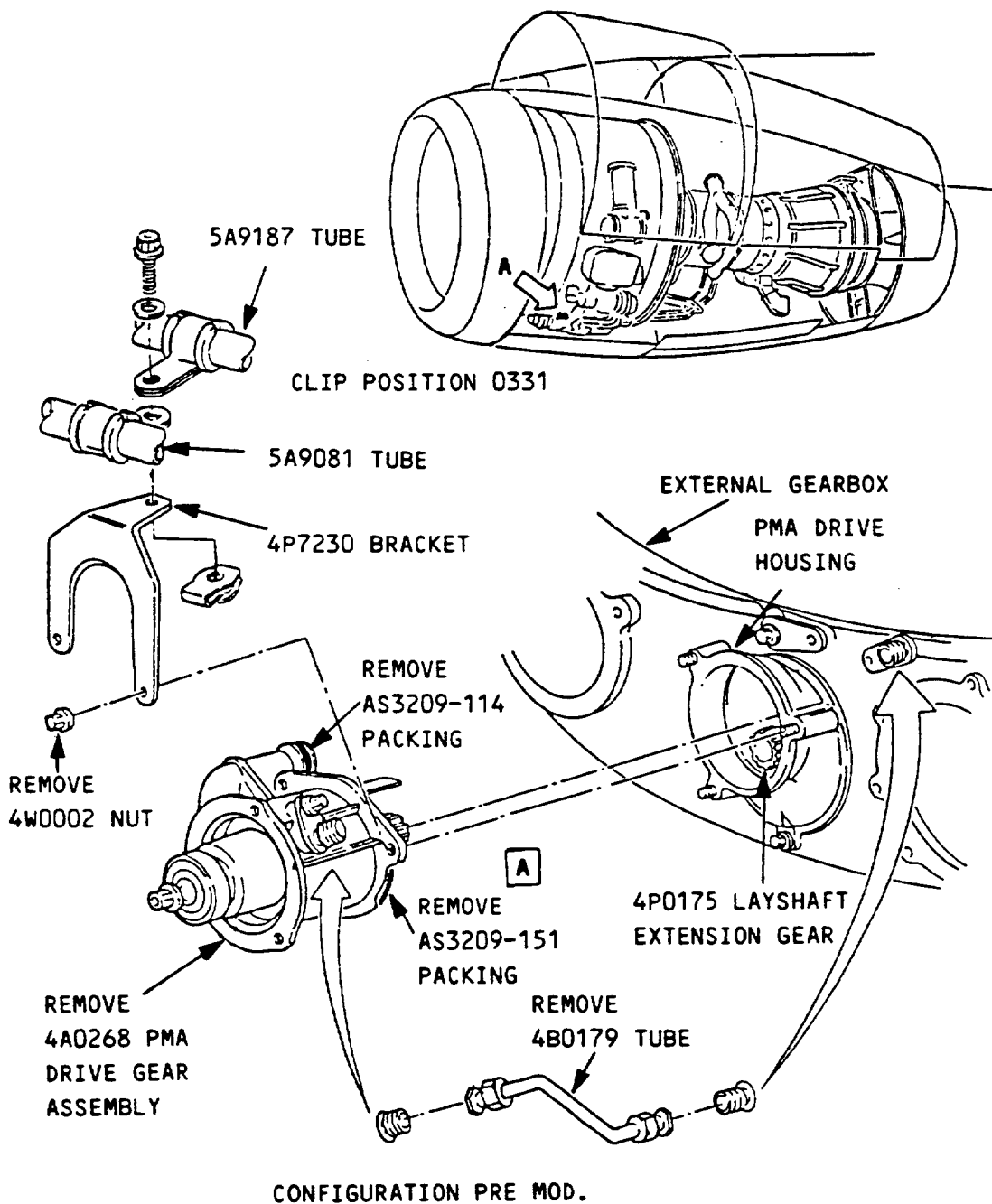


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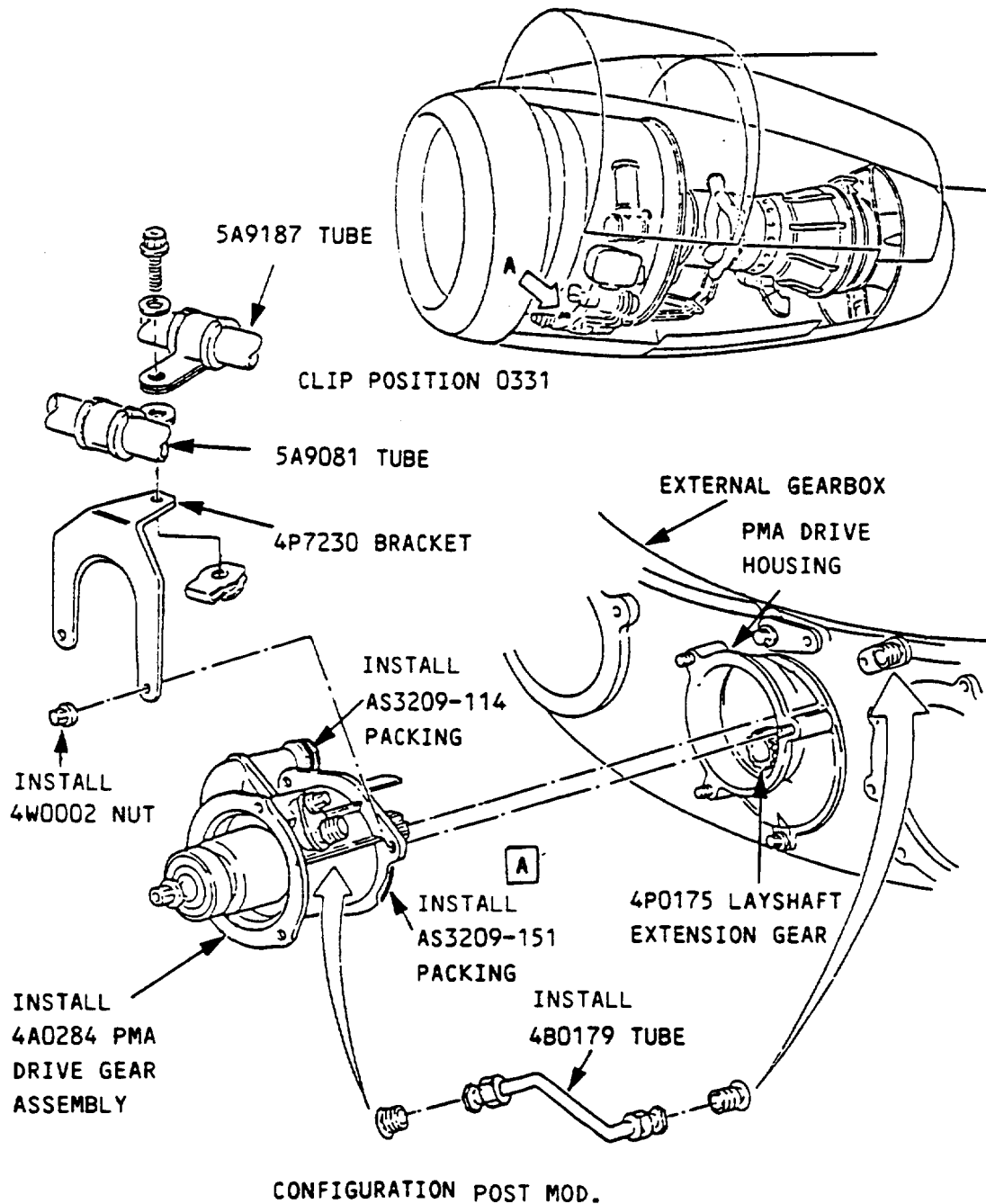
Clip Position
Fig.2

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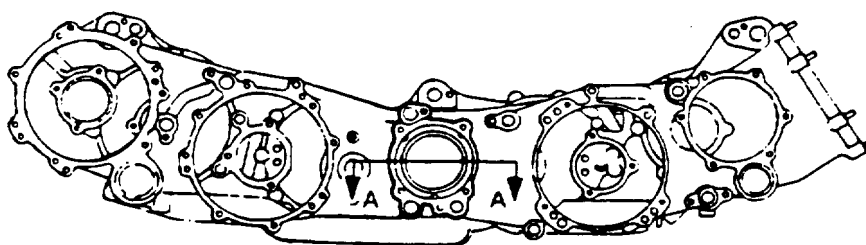
Removal of the PMA Drive Gear Assembly
Fig.3

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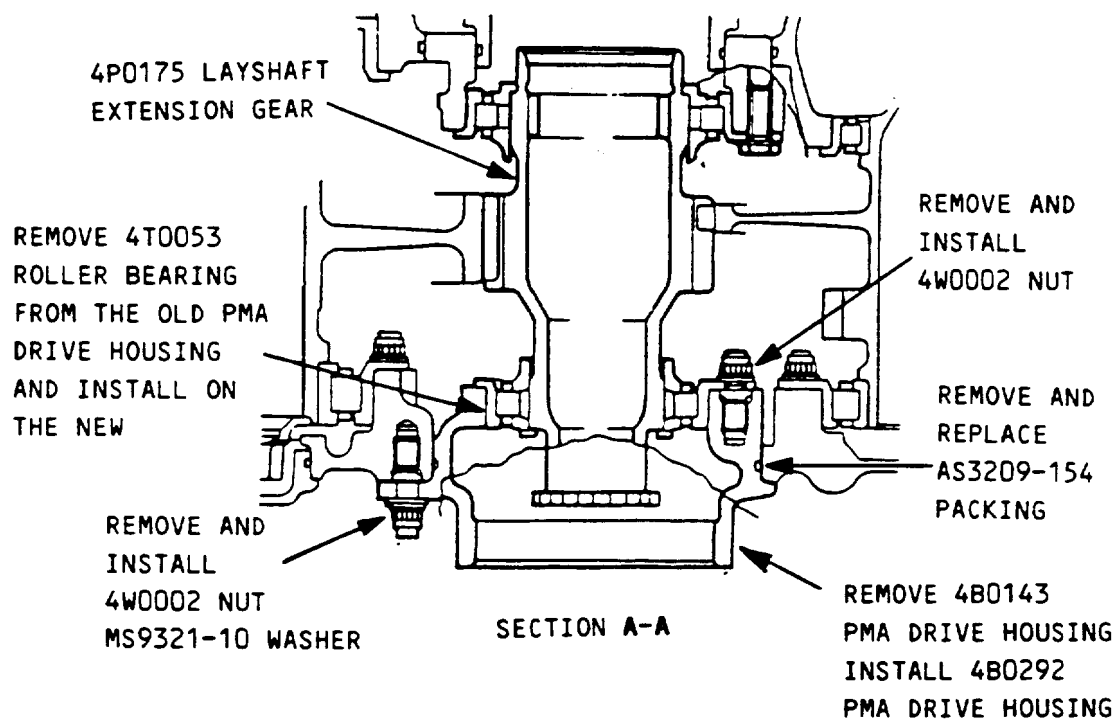


Installation of the PMA Drive Gear Assembly
Fig.4

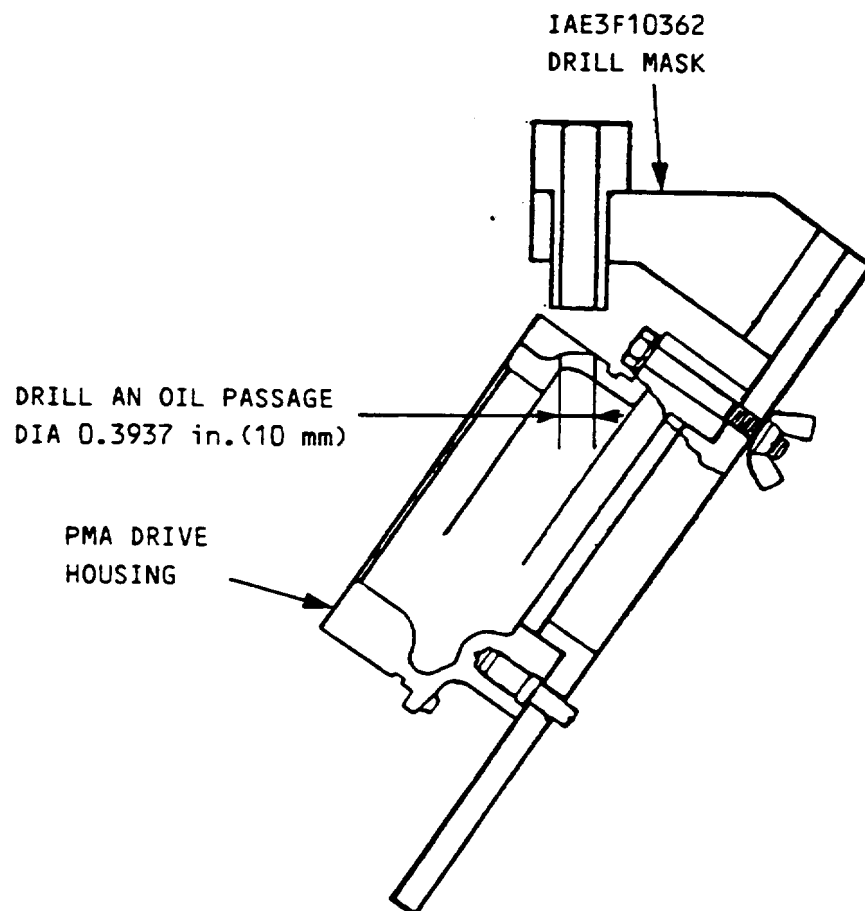
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GEARBOX FRONT VIEW

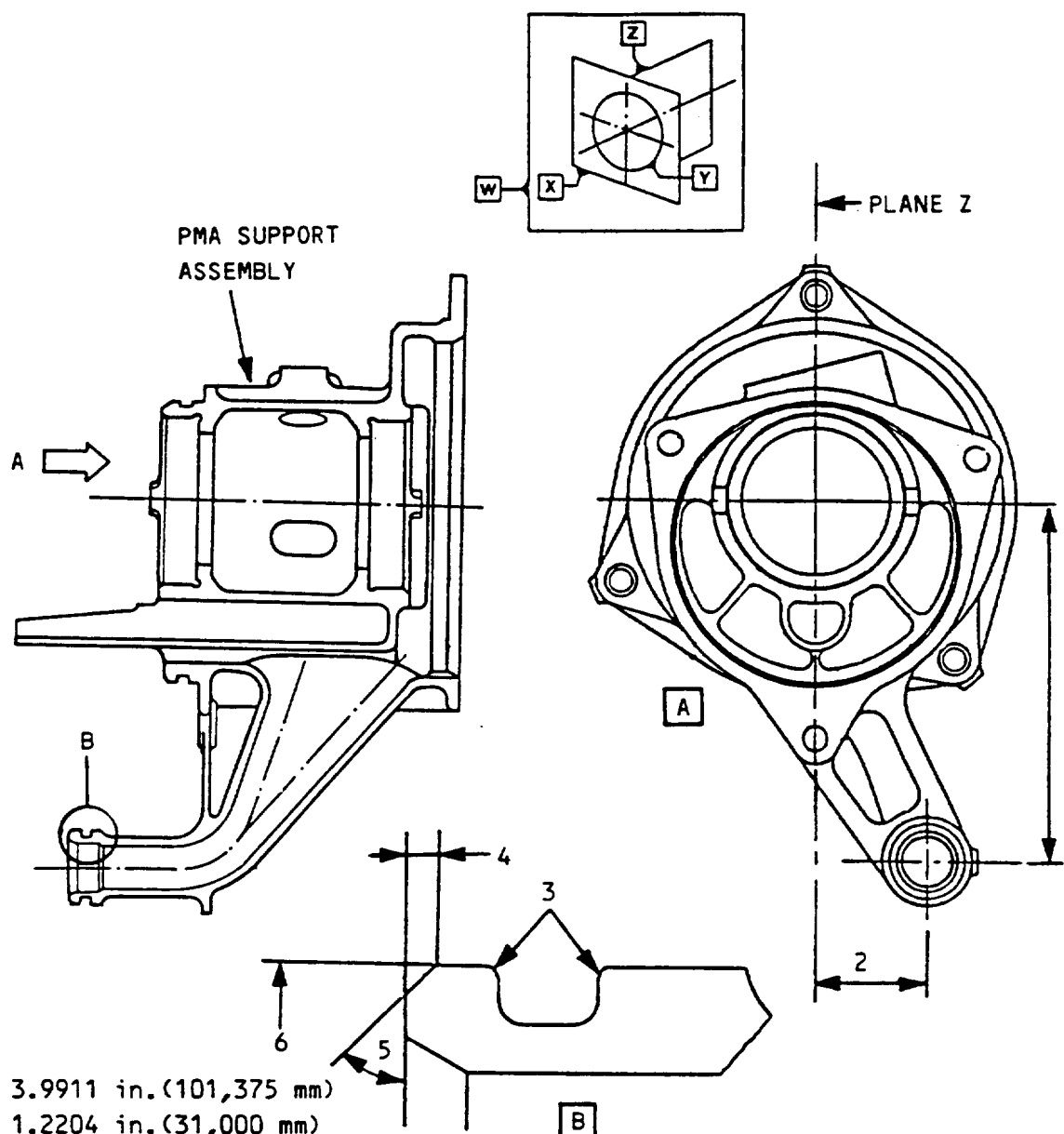
Removal and Installation of the PMA Drive Housing
Fig.5

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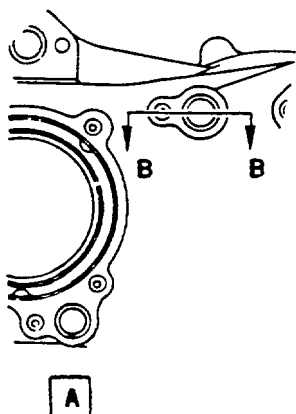
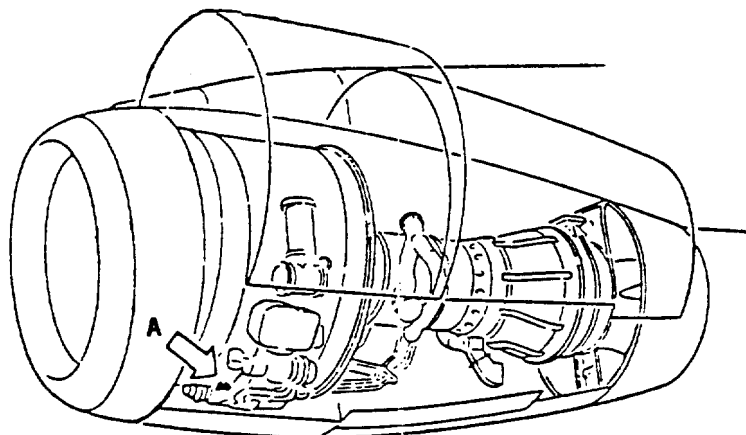
Drill an Oil Passage on the PMA Drive Housing
Fig.6



1. 3.9911 in. (101,375 mm)
2. 1.2204 in. (31,000 mm)
3. 0.0079 and 0.0236 in. (0,200 and 0,600 mm) RADIUS
4. 0.0315 and 0.0472 in. (0,800 and 1,200 mm)
5. 44° and 46° ANGLE
6. 0.8208 and 08188 in. (20,850 and 20,800 mm)

THE TRUE POSITION OF THE DIAMETER MUST BE WITHIN 0.002
(0,050 mm) FIR IN RELATION TO SYSTEM W

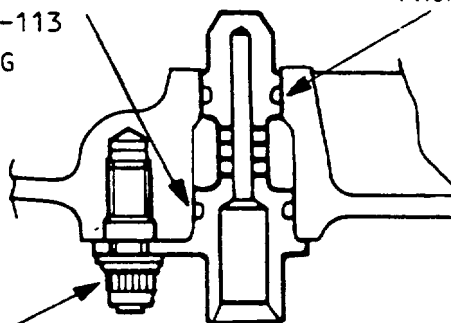
Machine the Diameter of the PMA Support Assembly
Fig.7



REMOVE AND
REPLACE
AS3209-113
PACKING

REMOVE AND
REPLACE
AS3209-110
PACKING

REMOVE AND
INSTALL
4W0002 NUT
CU37148 WASHER

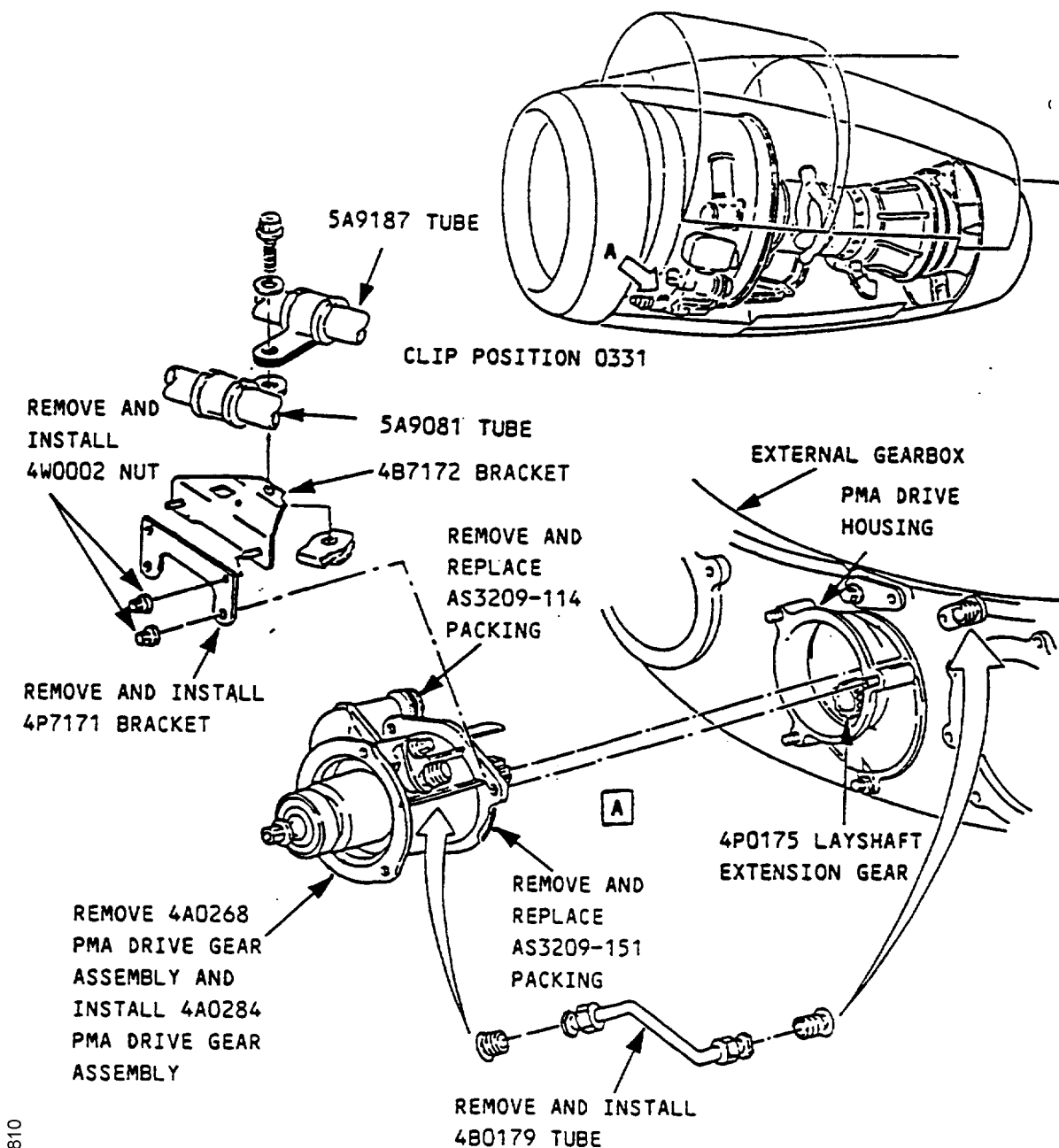


SECTION B-B

REMOVE
4P0240 OIL NOZZLE
INSTALL
4P0291 OIL NOZZLE

Removal and Installation of the Oil Nozzle
Fig.8

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Removal and installation of the PMA drive gear assembly (Post SBE 72-0055)
Fig.9



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3. Material Information

Applicability: For each V2500 Engine to incorporate this Bulletin.

A. Kits associated with this Bulletin

None

B. Parts affected by this Bulletin

New Part No. (ATA No.)	Qty	Est'd Unit Price (\$)	Keyword	Old Part No. (IPC No.)	Instructions Disposition
4A700 (72-60-00)	1	-	Module Accessory Gearbox	4A0504 (01-001)	(S1)(1D)(A)
or 4A1050B (72-60-00)	1		Module Accessory Gearbox	4A1050 (01-001)	(S1)(1D)(A)
4A0800 (72-60-10)	1		Main Gearbox Assembly	4A0504 (01-001)	(S1)(1D)(A)
or 4A1101 (72-60-10)	1	-	Main Gearbox Assembly	4A1100 (01-001)	(S1)(1D)(A)
4A0284 (72-60-33)	1	-	PMA Drive Gear Assembly	4A0268 01-001	(S1)(1D) (A)(B)
4B0289 (72-60-33)	1	-	PMA Support Assembly	4B0253 (01-420)	(S2)(1D) (A)(B)
4B0293 (72-60-33)	1	-	PMA Drive Gear	4B0147 (01-120)	(S1) (A)(B)
4P0291 (72-60-10)	1	-	Nozzle	4P0240 01-280	(S1) (A)(B)
4B0292 (72-60-24)	1	-	PMA Drive Housing Assembly	4B0143 01-180	(S1)(1D) (A)(B)
- (79-21-49)	1	-	Sealing Ring	AS43013- 118 01-498	(C)

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- (79-21-49)	1	-	Sealing Ring	AS43013- 118 02-096	(C)
- (79-21-49)	1	-	Packing	MS9966-13 01-096	(C)
- 72-60-10	1	-	Packing	AS3209-114 (01-650)	(C)
- 72-60-10	1	-	Packing	AS3209-151 01-645	(C)
- 72-60-10	1	-	Packing	AS3209-154 01-685	(C)
- 72-60-10	1	-	Packing	AS3209-113 01-295	(C)
- 72-60-10	1	-	Packing	AS3209-110 01-300	(C)
- 73-22-38	1	-	Packing	AS43013- 152	(C)
- 72-60-00	1	-	Plate	01-110 4T0215 01-260	(C)
- 72-60-00	1	-	Plate	4P0260 02-222	(C)

C. Instructions/Disposition Code Statements:

- (S1) Old and new parts coded (S1) are directly interchangeable.
- (S2) Old parts coded (S2) are physically and functionally interchangeable with new parts coded (S1). However, the benefits of the bulletin will not be realized when using old parts coded (S2) with new parts coded (S1).
- (1D) New part number may be obtained by rework and reidentification.
- (A) New parts is currently available.
- (B) Old part will no longer be available.
- (C) These expendable parts are required for assembly of the new configuration.

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International Aero Engines

SERVICE BULLETIN

NOTE: The estimated 1993 Unit Prices shown are provided for planning purposes only and do not constitute a firm quotation. Contact IAE's Spare Parts Sales Department for information concerning firm prices.

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