P U B L I C A T I O N  T R A N S M I T T A L

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DATER Oct.31/02

# V2500-A1/A5/D5 PROPULSION SYSTEMS SERVICE BULLETIN



This document transmits Revision 3 to Service Bulletin EV2500-72-0190

Document History

| Service Bulletin Revision Status | | Supplement Revision Status |
|---|---|---|
| Initial Issue | Jan.27/94 | |
| Revision 1 | Apr.30/94 | |
| Revision 2 | Sep.26/96 | |

Bulletin Revision 3

| Remove | Incorporate | Reason for change |
|---|---|---|
| Pages 1 to 20 of the Service Bulletin | Pages 1 to 21 of the Service Bulletin | Category changed to Code 4. SB updated to latest format. |
| | Pages 1 to 4 of Appendix 1 | Category changed to Code 4. SB updated to latest format. |

V2500-ENG-72-0190



CHECK THAT ALL PREVIOUS TRANSMITTALS HAVE BEEN INCORPORATED
If any have not been received please advise Publication Services, Rolls-Royce plc, Derby, England

LIST OF EFFECTIVE PAGES

The effective pages to this Service Bulletin following incorporation of Revision 3 are as follows:

| | Page | Revision Number | Revision Date |
|---|---|---|---|
| | Bulletin | | |
| R | 1 | 3 | Oct.31/02 |
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| R | 20 | 3 | Oct.31/02 |
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| | Appendix 1 | | |
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| R | 2 | 3 | Oct.31/02 |
| R | 3 | 3 | Oct.31/02 |
| R | 4 | 3 | Oct.31/02 |

# ENGINE - HP TURBINE ROTOR AND STATOR ASSEMBLY - INTRODUCE A NEW STAGE 1 HPT AIR SEAL AND A NEW NO. 4 BEARING REAR COOLING DUCT ASSEMBLY



## 1. Planning Information

### A. Effectivity

R (1) Airbus A319

R V2522-A5, V2524-A5, V2527M-A5 Engine Serial Nos V10001 thru V10079

R (2) Airbus A320

R V2500-A1 Engine Serial Nos V0001 thru V0361

R V2527-A5, V2527E-A5 Engine Serial Nos V10001 thru V10079

R (3) Airbus A321

R V2530-A5 Engine Serial Nos V10001 thru V10079

R (4) Boeing MD-90

R V2525-D5, V2528-D5 Engine Serial Nos V20001 thru V20006

### R B. Concurrent Requirements

R None.

### C. Reason

(1) Condition

It is possible that unwanted oil can collect in the area between the Stage 1 HPT Air Seal and the Stage 1 HPT Turbine Hub.

(2) Background

It was found that the unwanted oil will not drain from the area unless there was a modification to the Stage 1 HPT Air Seal, the No. 4 Bearing Seal Support Assembly, the No. 4 Bearing Rear Cooling Duct Assembly, and the No. 4 Bearing Strainer Element Assembly.

(3) Objective

To provide a parts configuration with features that let the unwanted oil drain more quickly.

The Stage 1 HPT Air Seal features include: Removal of the front knife-edge, additional drain holes, an elongated cooling air hole and a damper groove with a decreased wall height.

The No. 4 Bearing Rear Cooling Duct Assembly features include: Removal of the debris deflector and the lip adjacent to the Stage 1 Turbine Seal.

(4) Substantiation

Analysis of structural durability, performance, and part life verify configuration design integrity.

(5) Effects of Bulletin on Workshop Procedures:

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

(6) Supplemental Information

None.

D. Description

(1) Improve the features of the parts listed so that more of the unwanted oil will drain from the area between the air seal and the Stage 1 Hub. See Figure 1. The affected parts are:

(a) Stage 1 HPT Air Seal for V2500-A5 and V2500-D5 Engines only.

(b) No. 4 Bearing Rear Cooling Duct Assembly for all V2500 Engine models.

(2) For effect on declared life, see the Engine Manual, 5-0-01, Group A Parts Lives.

E. 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 Models listed.

R The 'compliance' statement and the procedures described in this Service
R Bulletin have been shown to comply with the applicable Federal Aviation
R Regulations and are FAA-APPROVED for the Engine Models listed.

F. Compliance

R Category Code 4.

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

G. Manpower

Estimated Manhours to incorporate the full intent of this Bulletin:

(1) In service

Not applicable

(2) At overhaul

(a) To do a modification of the Stage 1 HPT Air Seal

2 hours 10 minutes

(b) To identify the Stage 1 HPT Air Seal

5 minutes

(c) To do a modification of the No.4 Bearing Rear Cooling Duct Assembly

58 minutes

(d) To identify the No.4 Bearing Rear Cooling Duct Assembly

2 minutes

R Total: 3 hours 15 minutes

NOTE: The parts affected by this Service Bulletin are accessible at overhaul.

H. Material - Price and Availability

R Modification kit is not required.

R See Material Information section for prices and availability of future spares.

I. Tooling - Price and Availability

R Special tools are not required.

J. Weight and Balance

(1) Weight change

None

(2) Moment arm

No effect

(3) Datum

Engine front mount centreline (Power Plant Station (PPS) 100)

K. Electrical Load Data

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

R L. Software Accomplishment Summary

R Not applicable.

R See Vendor Supplier Service Bulletin.

M. References

R (1) IAE Service Bulletins:

R V2500-ENG-72-0146 - Engine - HP Turbine Rotor and Stator Assembly -
R Provide a New Stage 1 HPT Blade.

V2500-ENG-72-0180 - Engine - HP Turbine Rotor and Stator Assembly - Introduce a New First Stage Turbine Outer Air Seal.

R (2) V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, 2IA, 2IB, 3IA, 3IB,
R 6IA, 6IB, 7IA, 7IB), Chapter/Section 72-43-30, 72-45-10 and 72-45-13.

R (3) V2500 Standard Practices/Processes Manual.

R (4) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-43-30, 72-45-10 and
R 72-45-13.

R (5) V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-43-30, 72-45-10 and
R 72-45-13.

R (6) Internal Reference Nos - 93VA124, 93VA124C, 93VA124-01.

R (7) ATA Locator - 72-00-00.

N. Other Publications Affected

R (1) V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, 2IA, 2IB, 3IA, 3IB, 6IA, 6IB, 7IA, 7IB), Chapter/Section 72-43-30, 72-45-10 and 72-45-13 to add the new parts.

R (2) V2500 Engine Manuals (E-V2500-1IA, 3IA), Chapter/Section 72-43-30, 72-45-10 and 72-45-13, Cleaning, Inspection and Repair, to add the new parts.

R O. Interchangeability of Parts

R Old and new parts are directly interchangeable.

R P. Information in the Appendix

R Alternate Accomplishment Instructions (No)

R Progression Charts (Yes)

R Added Data (Yes)

R Revision to Table of Limits (No)

R Inspection Procedures (No)

2. Material Information

R A. Material Price and Availability

R (1) There is no new material cost to do this Service Bulletin when the part
R modification procedure is used.

R (2) Part prices were not available at the time of Service Bulletin
R publication. Contact IAE's Spare Parts Sales Department for firm
R quotations.

R (3) There is no kit provided to do this Service Bulletin.

R (4) Part availability information is provided in material data Instructions -
R Disposition.

R

R B. Industry Support Program

R Not applicable.

R

C. Parts affected by this bulletin:

R For V2500-A1, V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5,
R V2525-D5, V2528-D5 Engines

72-43-30

| FIG ITEM NO. | NEW PART NO. | QTY | PART TITLE | MAT | OLD PART NO. | INSTR DISP |
|---|---|---|---|---|---|---|
| 01010 | 2A3078-01 | 1 | ..Duct Assembly - Cooling, - No.4 Bearing, Rear | | 2A1205-01 | (S1)(1D) (A)(B)(I) |

R For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5,
R V2528-D5 Engines which have not incorporated SB V2500-ENG-72-0180:

72-45-10

| FIG ITEM NO. | NEW PART NO. | QTY | PART TITLE | MAT | OLD PART NO. | INSTR DISP |
|---|---|---|---|---|---|---|
| R 01010 | 2A8421-001 | 1 | ..Turbine Rotor - Stage 1, - Assembly | | 2A8421 | (S1)(C) (E)(I) |

R

72-45-13

| FIG ITEM NO. | NEW PART NO. | QTY | PART TITLE | MAT | OLD PART NO. | INSTR DISP |
|---|---|---|---|---|---|---|
| 01020 | 2A3069 | 1 | ...Seal - Air, HPT Stage 1 | - | 2A1352 | (S1)(2D) (E)(G)(I) |

R For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2525-D5,
R V2528-D5 Engines which have incorporated SB V2500-ENG-72-0180:

72-45-10

| FIG ITEM NO. | NEW PART NO. | QTY | PART TITLE | MAT | OLD PART NO. | INSTR DISP |
|---|---|---|---|---|---|---|
| 01010 | 2A8821 | 1 | ..Turbine Rotor - Stage 1, Assembly | - | 2A8721 | (S1)(F) (E)(I) |

72-45-13

| FIG ITEM NO. | NEW PART NO. | QTY | PART TITLE | MAT | OLD PART NO. | INSTR DISP |
|---|---|---|---|---|---|---|
| 01020 | 2A3069 | 1 | ...Seal - Air, HPT Stage 1 | - | 2A3032 | (S1)(3D) (E)(G)(I) |

D. Instructions disposition codes:

R Part Modification Conditions:

(S1) The old part and the new part are directly interchangeable.

(1D) You can obtain the new part by modification of the old part and identification to the new part number.

(2D) You can obtain the new part by modification of the old part and identification to the new part number. Part life is limited to 8000 cycles if V2500-ENG-72-0190 is not done before 5500 cycles. Part life is 15000 cycles if V2500-ENG-72-0190 is done before 5500 cycles.

(3D) You can obtain the new part by modification of the old part and identification to the new part number. Part life is limited to 8000 cycles if V2500-ENG-72-0180 is not done before 5500 cycles. Part life is 15000 cycles if V2500-ENG-72-0180 is done before 5500 cycles.

R Spare Parts Availability:

(A) The new part will be available approximately 7/94.

(B) The old part will continue to be supplied until the supply is exhausted (for the V2500-A1 and V2500-A5 models).

(C) The new part is obtained by identification in the field and is not supplied by spares.

R (E) The old part will continue to be supplied for use at other locations.

(F) The new part will be supplied on a lead time quotation basis only.

(G) The new part is currently available.

R Cleaning, Inspection and Repair Information:

R (I) The cleaning, inspection and repair requirements are the same for the old
R and new part. The applicable engine manuals will be revised.

R E. Other Material Information Data

R Not applicable.

3. Accomplishment Instructions

A. The Source Demonstration requirements of this rework mean that any facility not authorized to accomplish the rework either utilize the Authorized Repair Vendors listed below or contact IAE Technical Services to determine if a qualification program can be initiated at their facility.

IAE - INTERNATIONAL AERO ENGINES AG

Corporate Center II

628 Hebron Ave.

Glastonbury, CT 06033-2595 USA

NOTE: The Source Demonstration Information applies only to the modification of the 2A1352 and 2A3032 Stage 1 HPT Air Seals.

B. Authorized Rework Vendors for the bulletin are listed below:

Beacon Industries INC.

R 85 Grandby St.

R Bloomfield Ct. 06002

R USA

C. The designation by IAE of an authorized rework vendor indicates that the vendor has demonstrated the necessary capability to enable it to carry out the listed rework. However, IAE makes no warranties of representations concerning the qualifications or quality standards of the vendors to carry out the rework, and accepts no responsibility whatsoever for any work that may be carried out by a rework vendor, other than when IAE is listed as the vendor. Authorized rework vendors do not act as agents or representatives of IAE.

D. Rework Instructions

For Engines which do not incorporate V2500-ENG-72-0180.

(1) Do a modification to the 2A1352 Stage 1 HPT Air Seal (See Reference (2), Chapter/Section 72-45-13, Figure/Item No. 01-020) and identify as follows:

NOTE: See Material Information, Disposition (2D), for limits of modified parts.

| PROCEDURE | RELATED DATA |
|---|---|
| (a) Set-up and machine to the dimensions specified | Refer to Figures 2 and 3. |

| | |
|---|---|
| (b) Machine to remove the front knife edge seal. Finish as specified | Refer to Figure 3. See Reference (3), Control No./TASK No. 70-35-09-350-501. |
| (c) Machine two holes at the locations given. Hold to the dimensions and finish specified | Refer to Figure 3. See Reference (3), Control No./TASK No. 70-35-09-350-501. |
| (d) Machine to remove the debris discourager. Hold to the dimensions and finish specified | Refer to Figure 3. See Reference (3), Control No./TASK No. 70-35-09-350-501. |
| (e) Machine 18 slots E at the hole locations specified | |
| (f) Machine to install the slots as shown to the dimensions specified | |
| (g) Finish the slots as necessary | Refer to the procedure given in Reference (3), Control No./TASK No. 70-35-19-350-501. |
| (h) Fluorescent penetrant inspect by SPOP 82. No cracks are permitted | Refer to the procedure given in Reference (3), Control No./TASK No. 70-23-03-230-501 or Control No./TASK No. 70-23-08-230-501. |
| (i) Do a check of the static unbalance at 900 RPM | Refer to Figure 3. |
| (j) Make a mark to show the location of the heavy point by the procedure specified. Use CoMat 06-072 Dye | See Reference (3), Control No./TASK No. 70-09-00-400-501. |
| (k) Mark the new part number adjacent to the old part number. Use the vibration peen method | See Reference (3), Control No./TASK No. 70-09-00-400-501. Refer to Figure 3. |

| Old Part No. | New Part No. |
|---|---|
| 2A1352 | 2A3069 |

Printed in Great Britain

E. Rework Instructions

For Engines which incorporate V2500-ENG-72-0180.

(1) Do a modification to the 2A3032 Stage 1 HPT Air Seal (See Reference (2), Chapter/Section 72-45-13, Figure/Item No. 01-020) and identify as follows:

NOTE: See Material Information, Disposition (3D), for limits of modified parts.

| PROCEDURE | RELATED DATA |
|---|---|
| (a) Set-up and machine to the dimensions specified | Refer to Figures 2 and 3. |
| (b) Machine to remove the debris deflector. Hold to the dimensions and finish as specified | Refer to Figure 3. See Reference (3), Control No./TASK No. 70-35-09-350-501. |
| (c) Machine to install the slots as shown | |
| (d) Finish the slots as necessary | Refer to the procedure given in Reference (3), Control No./TASK No. 70-35-19-350-501. |
| (e) Fluorescent penetrant inspect by SPOP 82. No cracks are permitted | Refer to the procedure given in Reference (3), Control No./TASK No. 70-23-03-230-501 or Control No./TASK No. 70-23-08-230-501. |
| (f) Do a check of the static unbalance at 900 RPM | Refer to Figure 3. |
| (g) Make a mark to show the location of the heavy point by the procedure specified. Use CoMat 06-072 Dye | See Reference (3), Control No./TASK No. 70-09-00-400-501. |
| (h) Mark the new part number adjacent to the old part number. Use the vibration peen method | See Reference (3), Control No./TASK No. 70-09-00-400-501. Refer to Figure 3.<br>Old Part No. — New Part No.<br>2A3032 — 2A3069 |

F. Rework Instructions

For all V2500 Engines

(1) Do a modification to the 2A1205-01 No.4 Bearing Rear Cooling Duct Assembly (See Reference (2), Chapter/Section 72-43-30, Figure/Item No. 01-010) and identify as follows:

| PROCEDURE | RELATED DATA |
|---|---|
| (a) Set-up and machine to the dimensions specified | Refer to Figures 4 and 5. |
| (b) Machine to remove the debris deflector | |
| (c) Machine to remove the lip | |
| (d) Fluorescent penetrant inspect by SPOP 62. No cracks are permitted | Refer to the procedure given in Reference (3), Control No./TASK No. 70-23-01-230-501. |
| (e) Mark the new part number adjacent to the old part number. Use the vibration peen method | See Reference (3), Control No./TASK No. 70-09-00-400-501. Refer to Figure 5. |

| Old Part No. | New Part No. |
|---|---|
| 2A1205-01 | 2A3078-01 |

G. Assembly Instructions (V2500-A1 Engines)

(1) Install the 2A3078-01 No.4 Bearing Rear Cooling Duct Assembly (1 off) by the instructions given in Reference (4), Chapter/Section 72-00-43, Installation. See Figure 7.

H. Assembly Instructions (V2500-A5 Engines)

(1) Install the 2A3069 Stage 1 HPT Air Seal (1 off) by the approved procedure given in Reference (4), Chapter/Section 72-45-10, Assembly. See Figure 2.

(2) Identify the Stage 1 HPT Rotor Assembly as 2A8421-001 or 2A8821, as applicable. Use the vibration peen method. Refer to the procedure specified in Reference (3), Chapter/Section 70-09-00, Marking of Parts.

(3) Install the 2A3078-01 No.4 Bearing Rear Cooling Duct Assembly (1 off) by the instructions given in Reference (4), Chapter/Section 72-00-43, Installation. See Figure 7.

I. Assembly Instructions (V2500-D5 Engines)

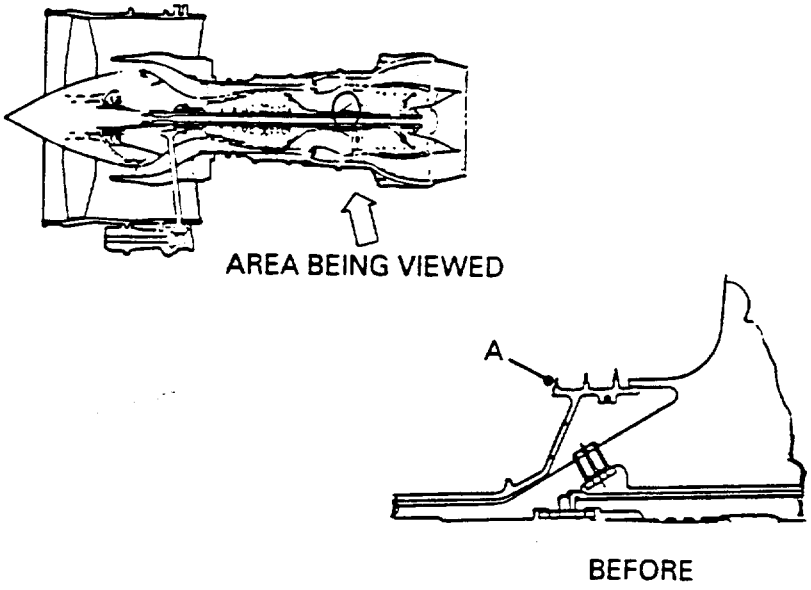
(1) Install the 2A3069 Stage 1 HPT Air Seal (1 off) by the approved procedure given in Reference (5), Chapter/Section 72-45-10, Assembly. See Figure 2.

(2) Identify the Stage 1 HPT Rotor Assembly as 2A8821. Use the vibration peen method. Refer to the procedure specified in Reference (3), Chapter/Section 70-09-00, Marking of Parts.

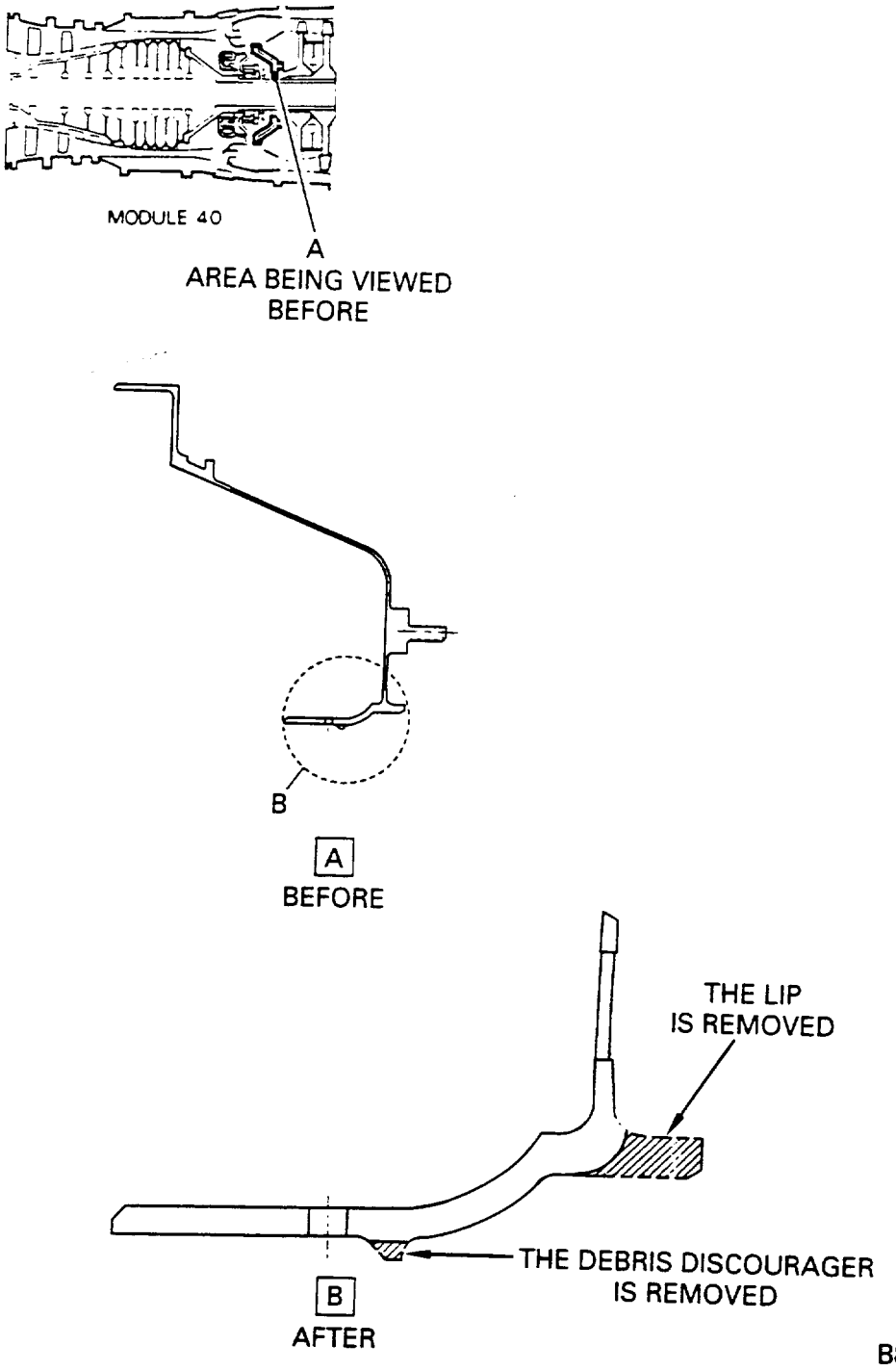
(3) Install the 2A3078-01 No.4 Bearing Rear Cooling Duct Assembly (1 off) by the instructions given in Reference (5), Chapter/Section 72-00-43, Installation. See Figure 7.

J. Recording Instructions

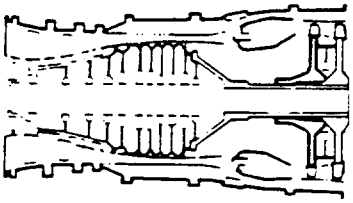
(1) A record of accomplishment is necessary.



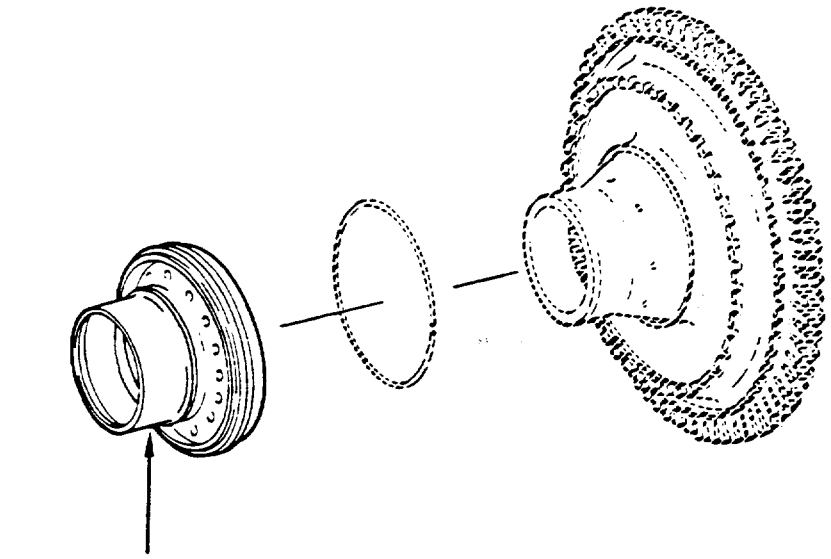

Before and After views of configuration changes that affect the High Pressure Turbine Rotor and Stator Assembly (Stage 1 HPT Air Seal)
Figure 1 (Sheet 1)




Before and After views of configuration changes that affect the High Pressure Turbine Rotor and Stator Assembly (No.4 Bearing Rear Cooling Duct assembly)
Figure 1 (Sheet 2)



MODULE 40

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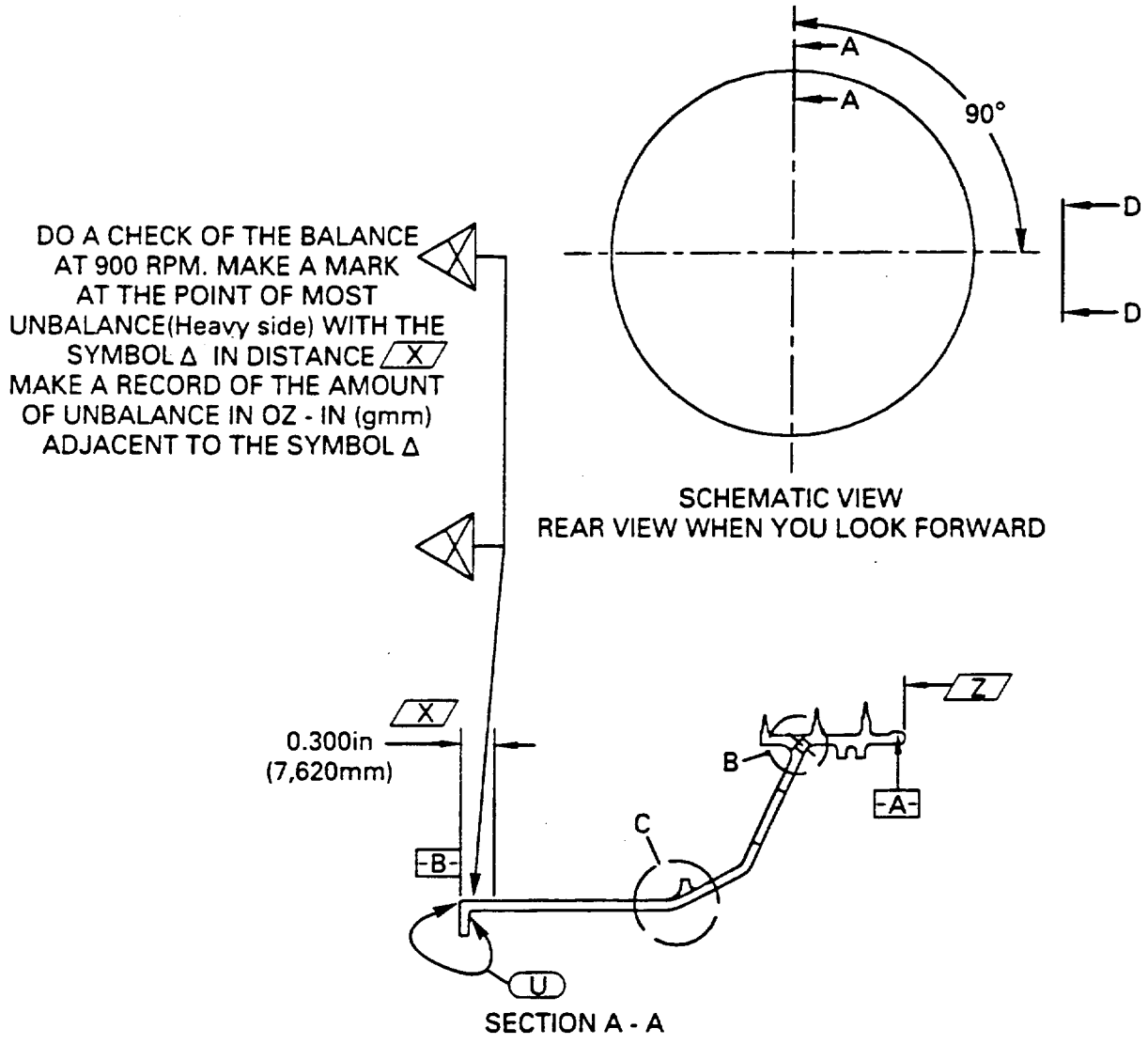
Location of the Stage 1 HPT Air Seal
Figure 2



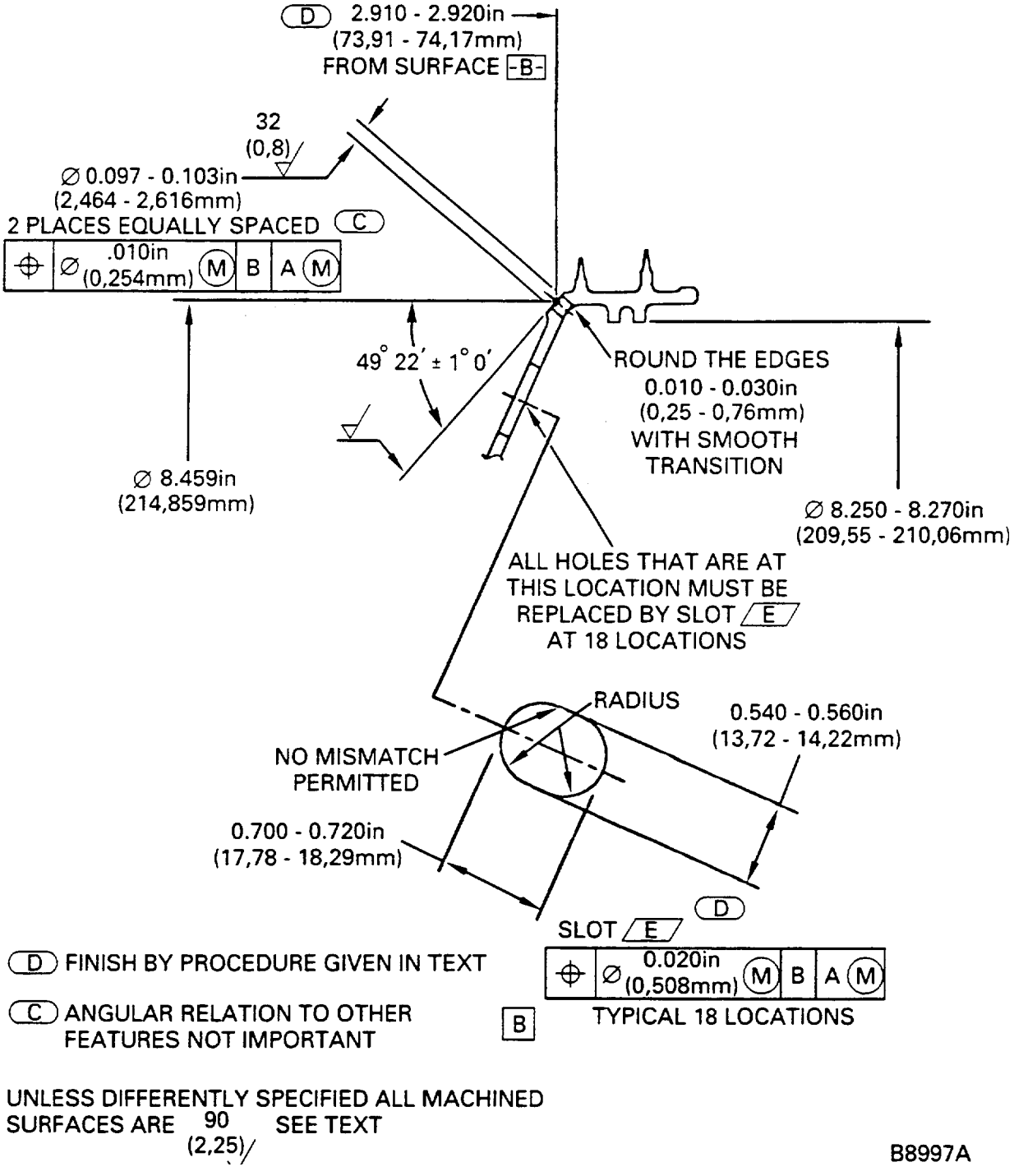

(U) ELECTRICAL CONTACT IS PERMITTED ONLY IN THIS AREA NO BURNS PITS OR SELECTIVE ATTACK PERMITTED

MAKE A MARK TO SHOW THE PART NUMBER SEE TEXT

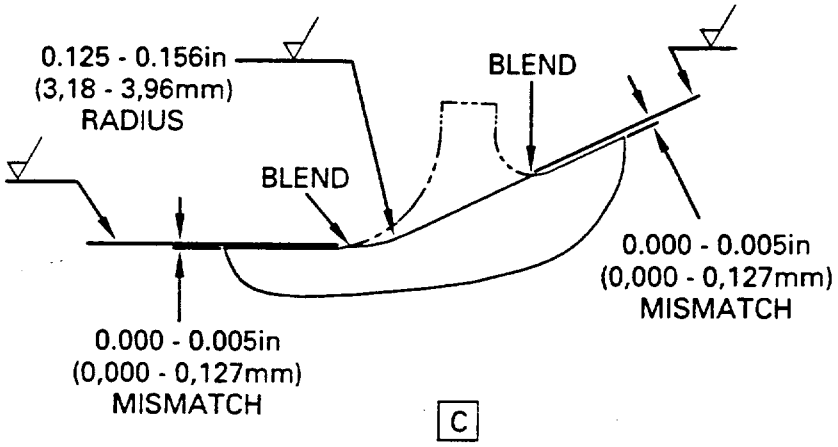
UNLESS DIFFERENTLY SPECIFIED ALL MACHINED SURFACES ARE 90 (2,25)/ SEE TEXT

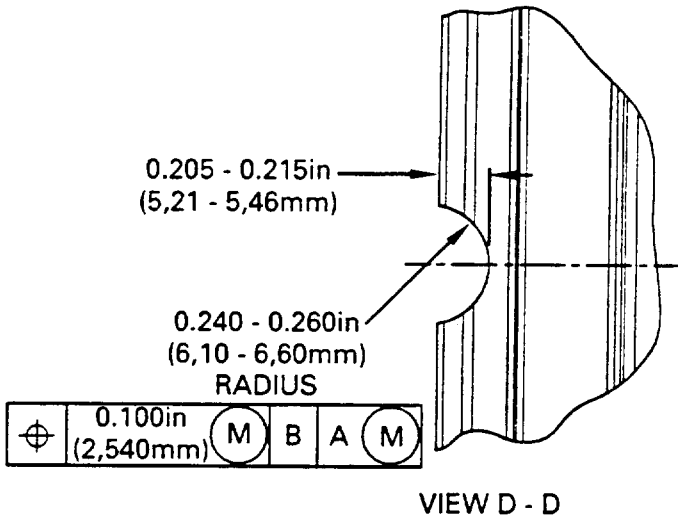
B8996

Modification of the Stage 1 HPT Air Seal
Figure 3 (Sheet 1)




Modification of the Stage 1 HPT Air Seal
Figure 3 (Sheet 2)

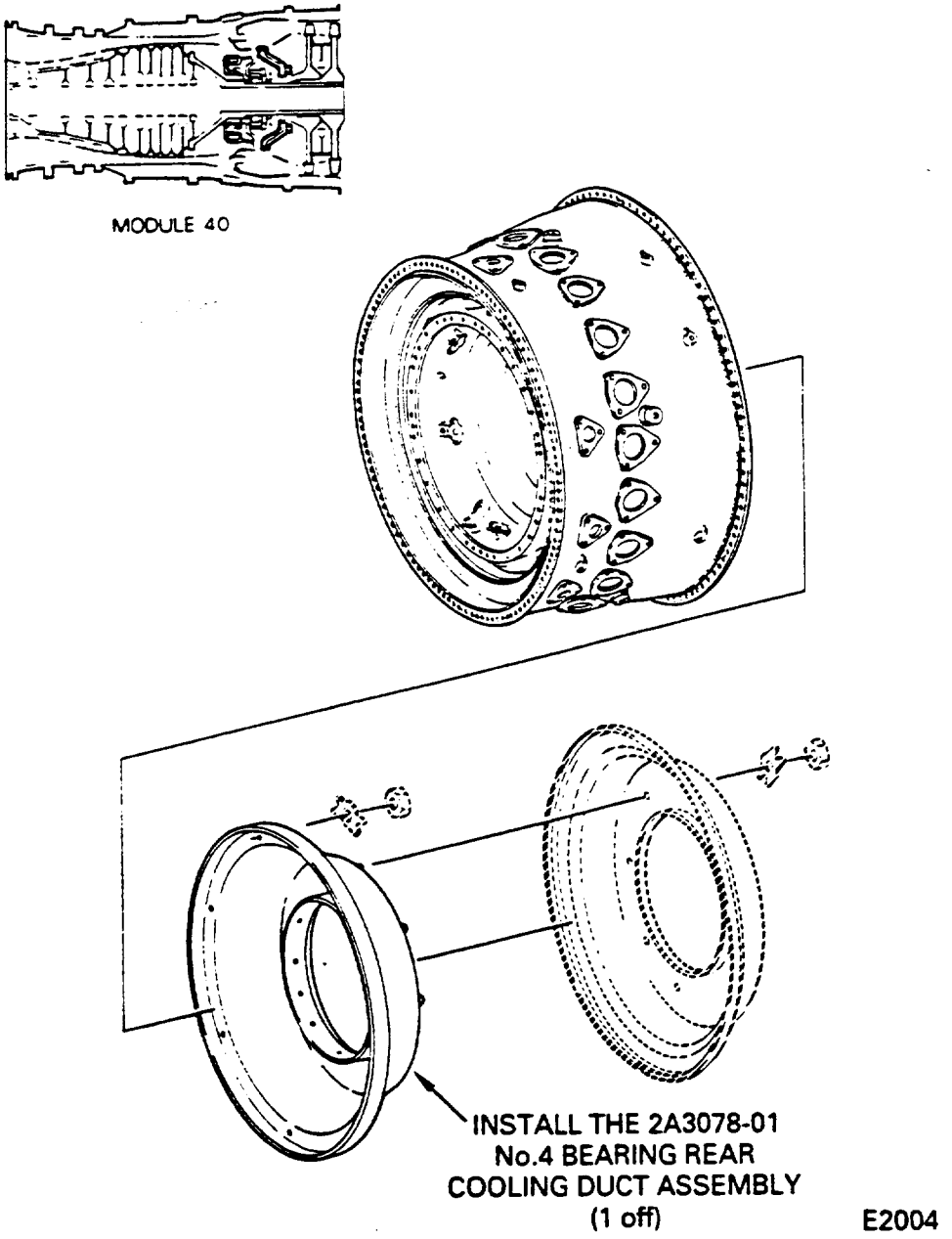


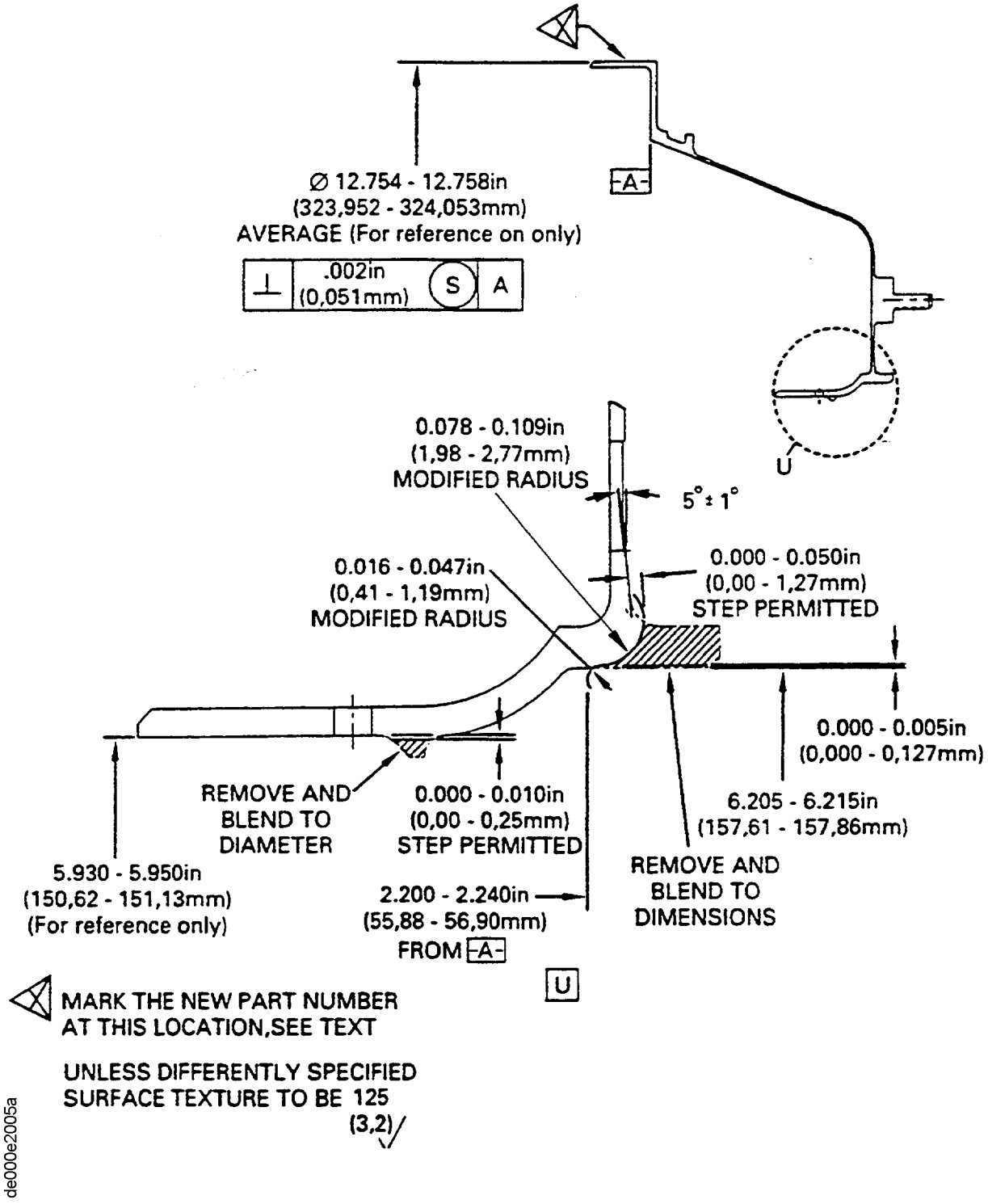

UNLESS DIFFERENTLY SPECIFIED
ALL MACHINED SURFACES ARE 90 (2,25)
SEE TEXT

B8998

Modification of the Stage 1 HPT Air Seal
Figure 3 (Sheet 3)




Location of the No.4 Bearing Rear Cooling Duct Assembly
Figure 4



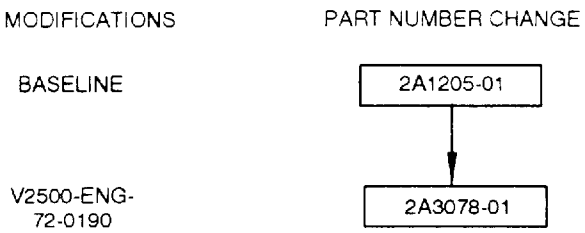

Modification of the No.4 Bearing Rear Cooling Duct Assembly
Figure 5

## APPENDIX 1

R Parts Progression to Show the Changed Part in Relation to Other Parts

R Added Data

R Number values shown in parenthesis adjacent to US values are Systeme Internationale
R equivalents.

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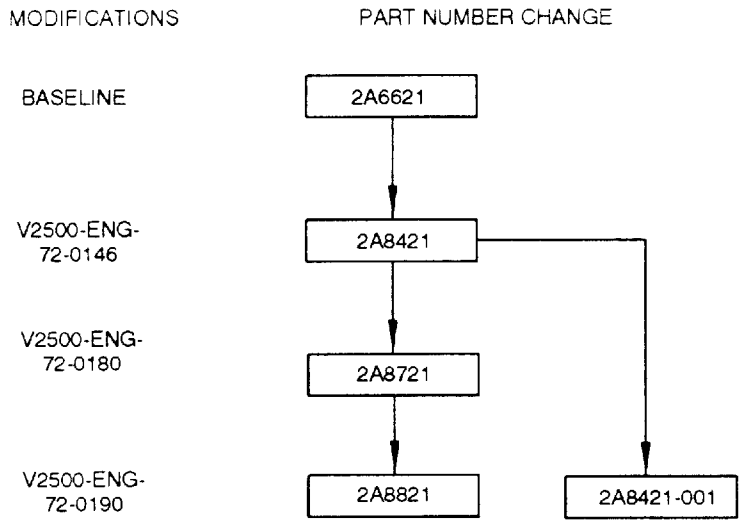
R Family Tree - Duct Assembly - Cooling No. 4 Bearing Rear. Ref. Catalog Sequence No. 72-43-30 Fig. 01 item 010

R Figure 6

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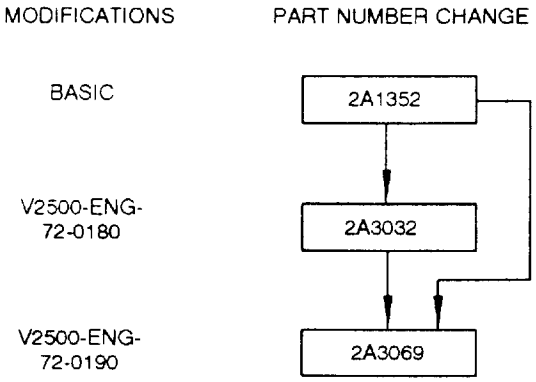
R Family Tree - Stage 1 Turbine Rotor Assembly for A5/D5. Ref. Catalog Sequence No. 72-45-10 Fig. 01 Item 010

R Figure 7

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R Family Tree - Seal - Air, HPT Stage 1 for A5/D5. Ref. Catalog Sequence No. 72-45-13
Fig. 01 Item 020
R Figure 8