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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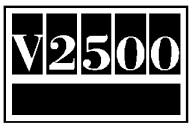

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DATER Jul.15/02

V2500-A5 PROPULSION SYSTEMS SERVICE BULLETIN

This document transmits Revision 3 to Service Bulletin EV2500-72-0399

Document History

Service Bulletin Revision Status		Supplement Revision Status
Initial Issue	May 15/01	
Revision 1	Jul.12/01	
Revision 2	Oct.11/01	

Bulletin Revision 3

Remove	Incorporate	Reason for change
All pages of the Service Bulletin	Pages 1 to 24 of the Service Bulletin	To revise Effectivity.

V2500-ENG-72-0399

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	Jul.15/02
R	2	3	Jul.15/02
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ENGINE - PROVIDE A NEW 2ND STAGE TURBINE ROTOR BLADE RETENTION CONFIGURATION

1. Planning Information

A. Effectivity

(1) Airbus A319

V2522-A5, V2524-A5, V2527M-A5 Engine Serial No. V10001 thru V11032, V11034 thru V11058, but including V11060, V11062, V11064, V11066, V11068, V11070,
R V11074, V11076, V11080 and V11202

(2) Airbus A320

(a) V2500-A1 Engine Serial No. V0001 thru V0361

(b) V2527-A5, V2527E-A5 Engine Serial No. V10001 thru V11032, V11034 thru V11058, but including V11060, V11062, V11064, V11066, V11068, V11070,
R V11074, V11076, V11080 and V11202

(3) Airbus A321

V2530-A5, V2533-A5 Engine Serial No. V10001 thru V11032, V11034 thru V11058, but including V11060, V11062, V11064, V11066, V11068, V11070,
R V11074, V11076, V11080 and V11202

(4) Boeing Longbeach Division MD90

V2525-D5, V2528-D5 Engine Serial No. V20001 thru V20285

(5) ATA Locator 72-45-00

B. Concurrent Requirements

For the V2500-A1 incorporate this Service Bulletin at the same time or after Reference 1 Service Bulletin No V2500-ENG-72-0075.

C. Reason

(1) Problem:

Retainer wing to tab transition fillet has exhibited Low Cycle Fatigue (LCF) characteristics below operating requirements.

(2) Background:

The unsupported front of the Blade Lock Retainer places a large bending stress on the Retainer in the vicinity of the transition fillet. This can lead to shorter operating capabilities than required and undesirable High Pressure Turbine/Low Pressure Turbine (HPT/LPT) rotor damage.

(3) Objective:

Redesign Retainer and Lock to reduce stress levels. Change Retainer material to AMS5599 to increase yield and ultimate strength and ductility. Redesign lock with increased fillet and a more balanced design to eliminate a possible propagation mode.

(4) Substantiation:

Stress analysis has shown sufficient decrease in stress levels from current Retainer to redesign Retainer to eliminate possible fractures.

(5) Effects of Bulletin on:

Operation:

None

Maintenance:

None

Overhaul:

None

Repair Schemes:

None

Interchangeability:

None

Fits and Clearances:

None

(6) Supplemental Information

None

D. Description

In 2nd Stage Turbine Rotor Assembly replace old Blade Lock and Retainer with new Blade Lock and Retainer.

E. Compliance

Category 5

Accomplish when the engine is disassembled sufficiently to afford access to the affected subassembly (i.e., modules, accessories, components, build groups) and to all affected spare subassemblies.

F. Approval Data

The part number changes and/or part modifications specified in the Accomplishment Instructions and Material Information Sections of this Service Bulletin have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model (s) given.

G. Manpower

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

In Service

Not applicable

At overhaul

1 hour

H. Weight and Balance

(1) Weight Change

None

(2) Moment Arm

No effect

(3) Datum

Engine Front mount Centerline (Power Plant station (PPS) 100)

I. Electrical Load Data

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

J. Software Accomplishment Summary

Not applicable

K. References

(1) IAE V2500 Service Bulletin V2500-ENG-72-0075 Engine - Introduce Recontoured Stage 1 And 2 Turbine Rotor Hubs.

(2) IAE V2500 Service Bulletin V2500-ENG-72-0222 Engine - HP Turbine Rotor And Stator Assembly Introduce A New Stage 2 Turbine Blade Lock Retainer.

(3) IAE V2500 Service Bulletin V2500-ENG-72-0145 Engine - HP Turbine Rotor And Stator Assembly - Provide New Stage 2 Turbine Rotor Hub With Increased Front Snap Diameter.

(4) IAE V2500 Service Bulletin V2500-ENG-72-0187 Engine - HP Turbine Rotor And Stator Assembly - Provide A New Stage 2 Turbine Blade (For Various Model Parts Commonality).

(5) IAE V2500 Service Bulletin V2500-ENG-72-0327 Engine - High Pressure Turbine Rotor And Stator Assembly - Introduce New Rotating Parts With Potential For Increased Cyclic Life.

(6) V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, S-V2500-2IA, S-V2500-2IB, S-V2500-3IA, S-V2500-3IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, and S-V2500-7IB), Chapter/Section 72-45-30 and 72-45-33.

(7) V2500 Engine Manual (E-V2500-1IA), Chapter/Section 72-45-30 and 72-45-33.

(8) V2500 Engine Manual (E-V2500-3IA), Chapter/Section 72-45-30 and 72-45-33.

(9) V2500 Standard Practices/Processes Manual, Chapter/Section 70-09-00

R (10) Internal references 00VC036, 00VC036-01, 00VC036-02, 00VC036-05,
R 00VC036-06, 00VC036-07

L. Other Publications Affected

(1) V2500 Engine Illustrated Parts Catalogs (S-V2500-1IA, S-V2500-2IA, S-V2500-2IB, S-V2500-3IA, S-V2500-3IB, S-V2500-5IA, S-V2500-5IB, S-V2500-6IA, S-V2500-6IB, S-V2500-7IA, and S-V2500-7IB), Chapter/Section 72-45-30 and 72-45-33.

(2) V2500 Engine Manuals (E-V2500-1IA and E-V2500-3IA), Chapter/Section 72-45-30 and 72-45-33 Cleaning, Inspection and Repair, to add the new part.

M. Interchangeability Of Parts

New parts are only interchangeable in complete sets.

N. Information In The Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Added Data (Yes)

Revision To Table Of Limits (No)

Inspection Procedures (No)

2. Material Information

A. Material - Price And Availability

(1) Part prices were not available at the time of Service Bulletin publication. Contact IAE's spare parts sales department for firm quotations.

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

B. Industry Support Program

Not applicable.

C. The Material Data That Follows Is For Each Engine.

NOTE: THE PRICES SHOWN ARE FOR ESTIMATING PURPOSES ONLY AND AS SUCH ARE GIVEN IN GOOD FAITH WITHOUT COMMERCIAL LIABILITY FOR ADVANCED PLANNING PURPOSES ONLY. REFER TO IAE SPARES AND/OR CURRENT PRICE CATALOG FOR CURRENT PRICES.

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

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN(ATA/IPC NO.)	Instr Disp
2A4032	1	*	.Turbine rotor assy stg 2	2A2422 (72-45-30 -01-010)	(1)(F)(N)
2A2522-001	1	*	.Turbine rotor assy stg 2	2A2522 72-45-30 -01-010)	(1) (N)
2A2822-001	1	*	.Turbine rotor assy stg 2	2A2822 (72-45-30 -01-010)	(1) (N)
2A4232	1	*	.Turbine rotor assy stg 2	2A2622 (72-45-30 -01-010)	(1) (F) (N)
-	2	21.28	.Retainer, turbine blade lock OR	2A3158 (72-45-33 -01-040)	(N)
-	2	21.28	Retainer, turbine blade lock	2A1638 (72-45-33 -01-040)	(N)
2A3546	4	*	Retainer, turbine blade lock	-	(A)

Printed in Great Britain

-	2	221.00	Lock, HPT stg 2	2A1097 (72-45-33 -01-060	(N)
2A3545	4	*	Lock, HPT stg 2	-	(A)

For V2533-A5 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN(ATA/IPC NO.)	Instr Disp
2A4032	1	*	.Turbine rotor assy stg 2	2A2422 (72-45-30 -01-010)	(1)(F)(N)
2A2822-001	1	*	.Turbine rotor assy stg 2	2A2822 72-45-30 -01-010)	(1) (N)
2A4232	1	*	.Turbine rotor assy stg 2	2A2622 (72-45-30 -01-010)	(1) (F) (N)
-	2	21.28	.Retainer, turbine blade lock OR	2A3158 (72-45-33 -01-040)	(N)
-	2	21.28	Retainer, turbine blade lock	2A1638 (72-45-33 -01-040)	(N)
2A3546	4	*	Retainer, turbine blade lock	-	(A)
-	2	221.00	Lock, HPT stg 2	2A1097 (72-45-33 -01-060	(N)
2A3545	4	*	Lock, HPT stg 2	-	(A)

D. Instructions/Disposition Code Statements:

(1) The new part can be obtained by modification of the old part as specified in the Accomplishment Instructions.

(A) The new part is available.

(F) The new part will be available on a Full Manufacturing lead time quote basis only.

(N) The old part is not available.

E. Re-identified Parts

Re-identified Parts Data

New PN	Keyword	Old PN
2A4032	Turbine, rotor assy, 2nd stage	2A2422
2A2522-001	Turbine, rotor assy, 2nd stage	2A2522
2A2822-001	Turbine, rotor assy, 2nd stage	2A2822
2A4232	Turbine, rotor assy, 2nd stage	2A2622

F. Necessary Tools

Special tools are required to accomplish this Service Bulletin.

Tool No.	Name	Manufacturer	Design Availability Date	Aperture Card Delivery Date
IAE 1P16479	Lock Retainer Installation Tool	IAE	May 2001	May 2001

The above reference information indicates when the PW design(s) will be available. The PW design aperture card(s) will be distributed to customers approximately 90 days thereafter. If necessary, an advance aperture card(s) (prior to the normal 90 day distribution) of the available design(s) may be obtained by contacting Pratt & Whitney at (860) 610-2662.

G. Other Material Information Data

Not Applicable.

3. Accomplishment Instructions

NOTE: THE TOOL P/N 1P16479 MUST BE USED FOR INSTALLATION OF THE RETAINER AND BLADE LOCK.

(1) Replace the two (2) current, 2nd Stage High Pressure Blade Lock Retainers and Turbine Blade Locks with four (4) new 2nd Stage High Pressure Blade Lock Retainers and Locks as follows:

(a) Select 4 slot locations 90 degrees apart for Retainer/Lock installation. (See Figure 1).

(b) Install 2nd Stage High Pressure Blade Lock Retainers, P/N 2A3546 four (4) off and Turbine Blade Locks, P/N 2A3545 four (4) off.

(i) Place Retainer P/N 2A3546 in one of the selected slots wing first, with the wing on the OD side of the slot (See Figure 2).

(ii) While holding the Retainer's position against the front surface, slide Lock PN 2A3545 into slot and guide the Retainer tab into the center of the lock.

(iii) Push the lock flush to the surface of the disk.

(c) Install Hold/Bend Fixture, P/N IAE 1P16479.

(i) Orient the top plate with the cutout facing away from the engine centerline as shown in Figure 3, Sheet 1.

(ii) Make sure that the legs are aligned to slide into the slots in the Retaining Plate.

(iii) With the top plate in place, turn the leg knobs to the right to secure tool to the Side Plate/Disk Assembly.

NOTE: IF THE LEGS DO NOT ENGAGE THE SIDE PLATE WHILE TIGHTENING, INCREASE THE EFFECTIVE LEG LENGTH BY TURNING THE KNOBS ONE OR TWO TURNS TO THE LEFT AND THEN TRY AGAIN.

(iv) When the top plate is properly secured, insert the lever arm into the slot by holding the lever arm parallel to the hub and turning the end into the slot counterclockwise. Once in the slot, slide lever arm to the left and straighten to the upright position, perpendicular to the hub as shown in Figure 3, Sheet 2.

(v) Use the lever arm to hold the Retainer/Lock Assembly up, such that the Retainer is accessible for bending. Make sure the tool is positioned approximately three-quarters of the way toward the lock assembly.

NOTE: IT MAY HELP TO ANGLE THE TIP OF THE ARM TOWARD ENGINE CENTER AND ROTATE IT UP AFTER YOU SEE THAT THE RETAINER STARTS COMING TOWARD YOU.

(vi) While holding the lever arm in place, loosen the thumbscrew on the collar and slide the collar's notch over the lever arm's hub.

(vii) Tighten the thumbscrew and make sure that the handle is securely held in place.

(d) Bend the Retainer.

(i) Center the slot of the bender on the Retainer's protruding tab as shown in Figure 4. Bend the Retainer away from the engine centerline 30 degrees to initiate the bend.

(ii) Use the angled end of the drift with a mallet to bend the tab three-quarters of the way to the surface of the HPT Retaining Plate as shown in Figure 4.

(iii) Flip the drift over and use the flat end to finish bending the Retainer to be sure it is perpendicular to the HPT Retaining Plate as shown in Figure 5.

NOTE: Fixture thumbscrew must remain tight during bend operation.

(e) Remove the Fixture.

(i) Loosen the thumbscrew on the collar while holding the handle of the lever arm.

(ii) Withdraw the collar from the lever arm and remove the lever arm from the HPT in reverse order of inserting.

(iii) Loosen the leg knobs one turn and withdraw from the slots.

(f) Inspect the assembly to be sure it meets requirements.

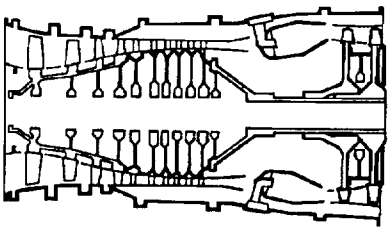
(i) Tab must be parallel to disk surface as shown in Figure 5, Sheet 2.

(ii) Measure the gap between the top of the lock and the inside surface of the Retainer tab. Requirement: Gap must be no greater than 0.035 (0.889 mm) as shown in Figure 5, Sheet 2.

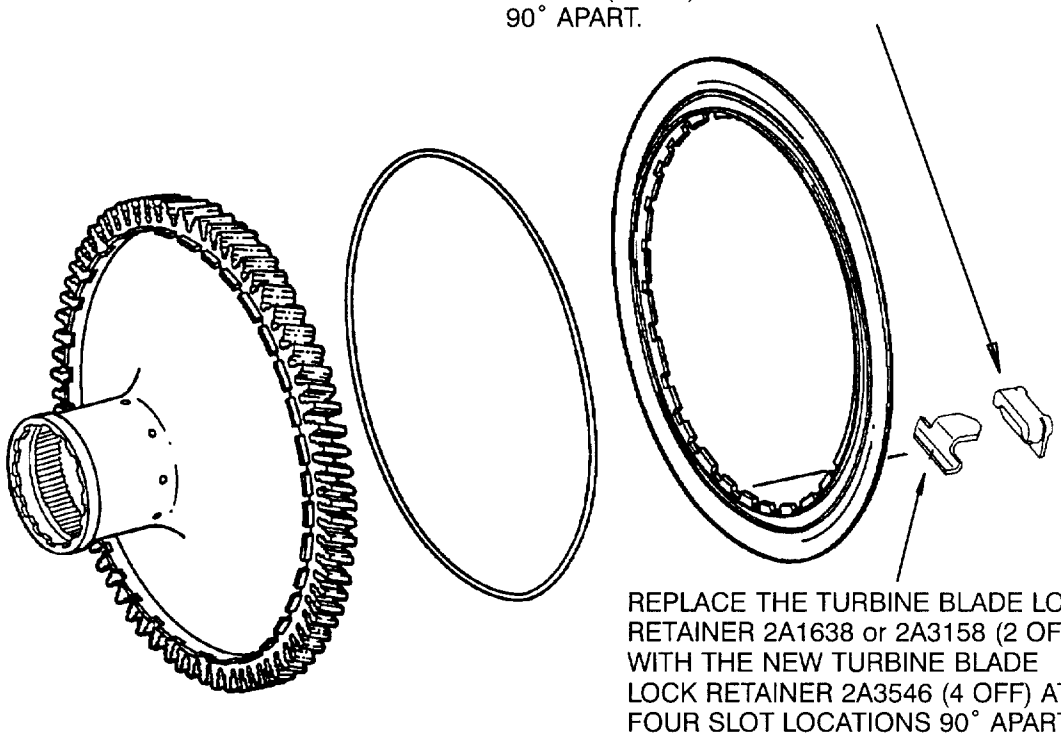
(iii) If the bend does not meet the requirement, remove the Retainer and discard it, repeat process with new Retainer. Do not try to fix the Retainer by unbending and repeating the process.

(g) Repeat procedure for the remaining selected slots until all 4 locations are properly installed.

(h) Identify the 2nd stage rotor and stator assembly, PN 2A2422, 2A2522, 2A2822, 2A2622 as PN 2A4032, 2A2522-001, 2A2822-001, 2A4232 respectively by the approved procedure in Reference 9, Chapter/Section 70-09-00 Marking of Parts. Marks the new identification adjacent to the old identification. Use the vibration peen method.



MODULE 40



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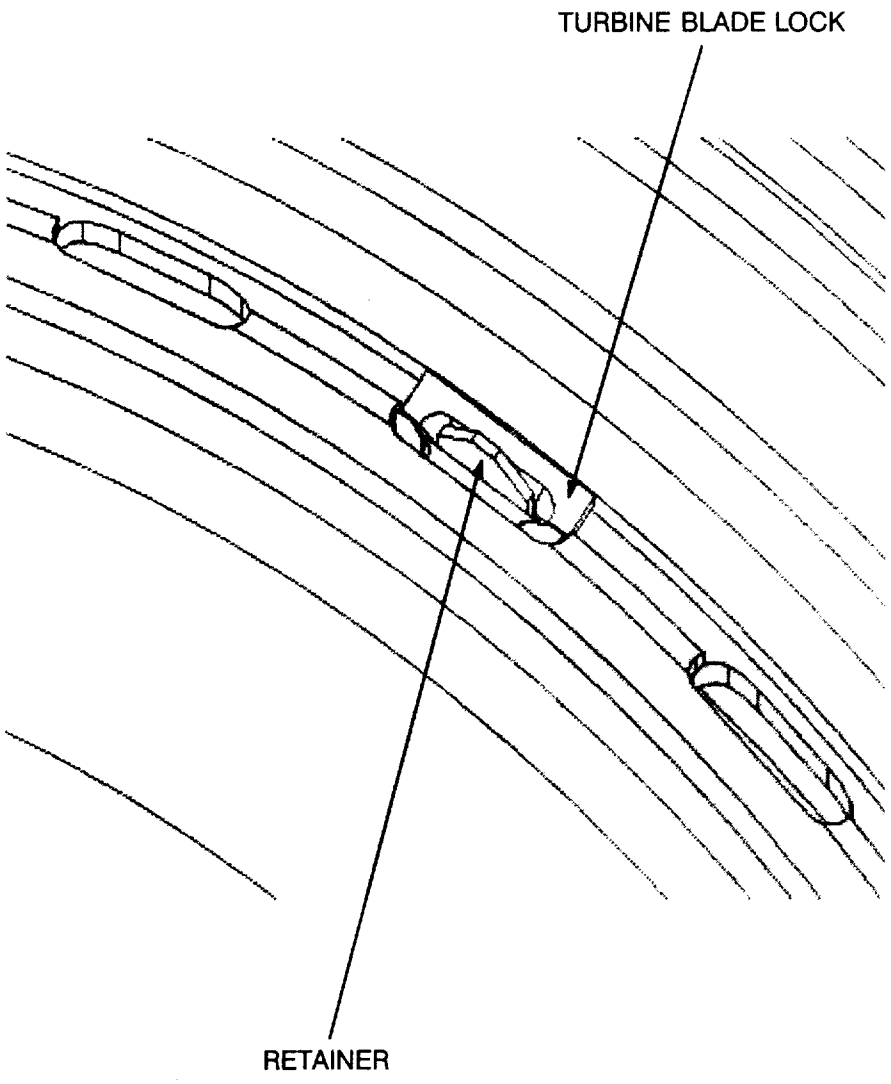
Location of the stage 2 turbine blade lock retainers
Fig 1



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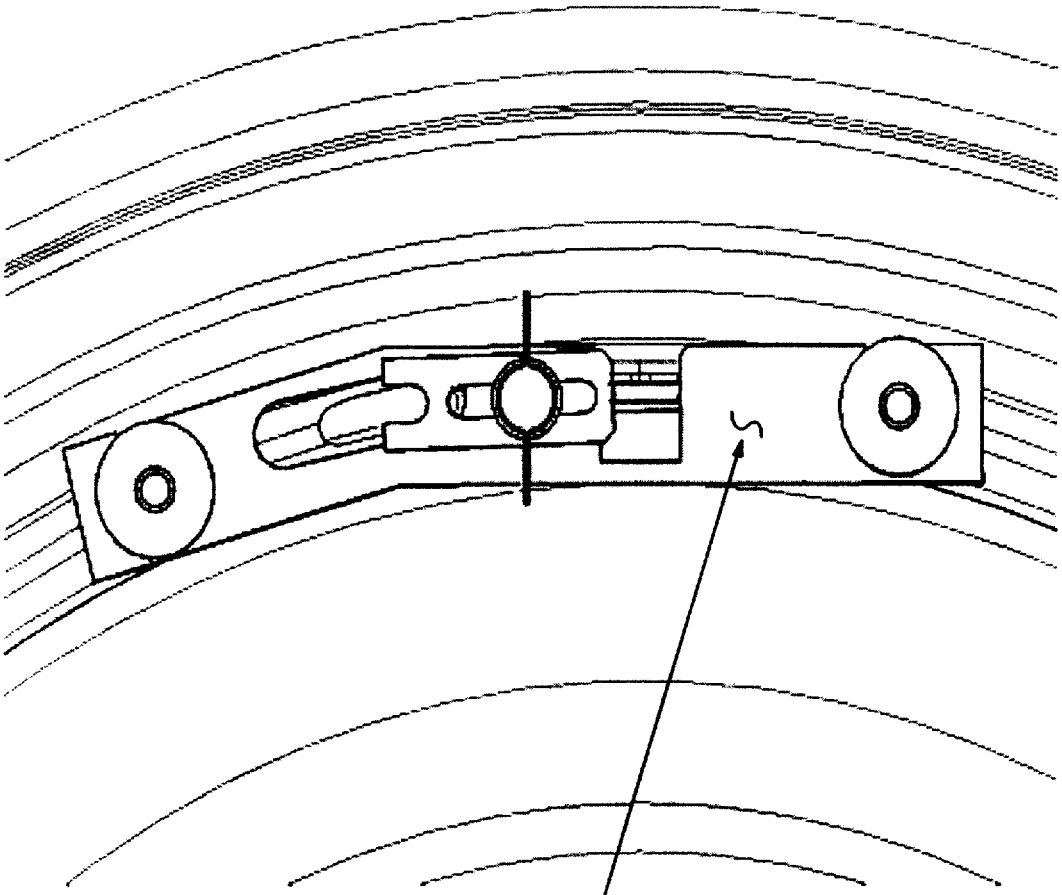
Lock/retainer assembly
Fig 2



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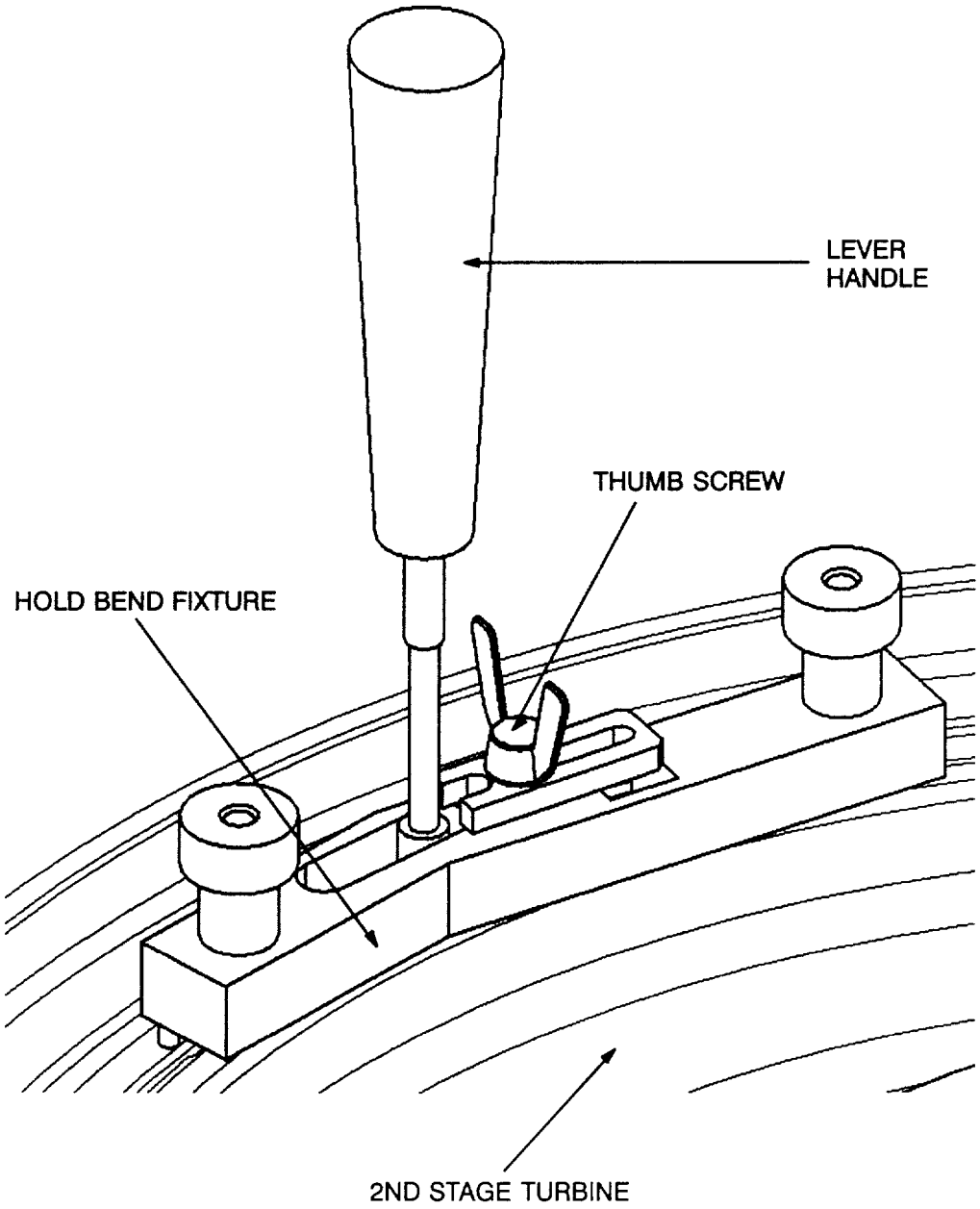
Fixture alignment
Fig 3 sheet 1



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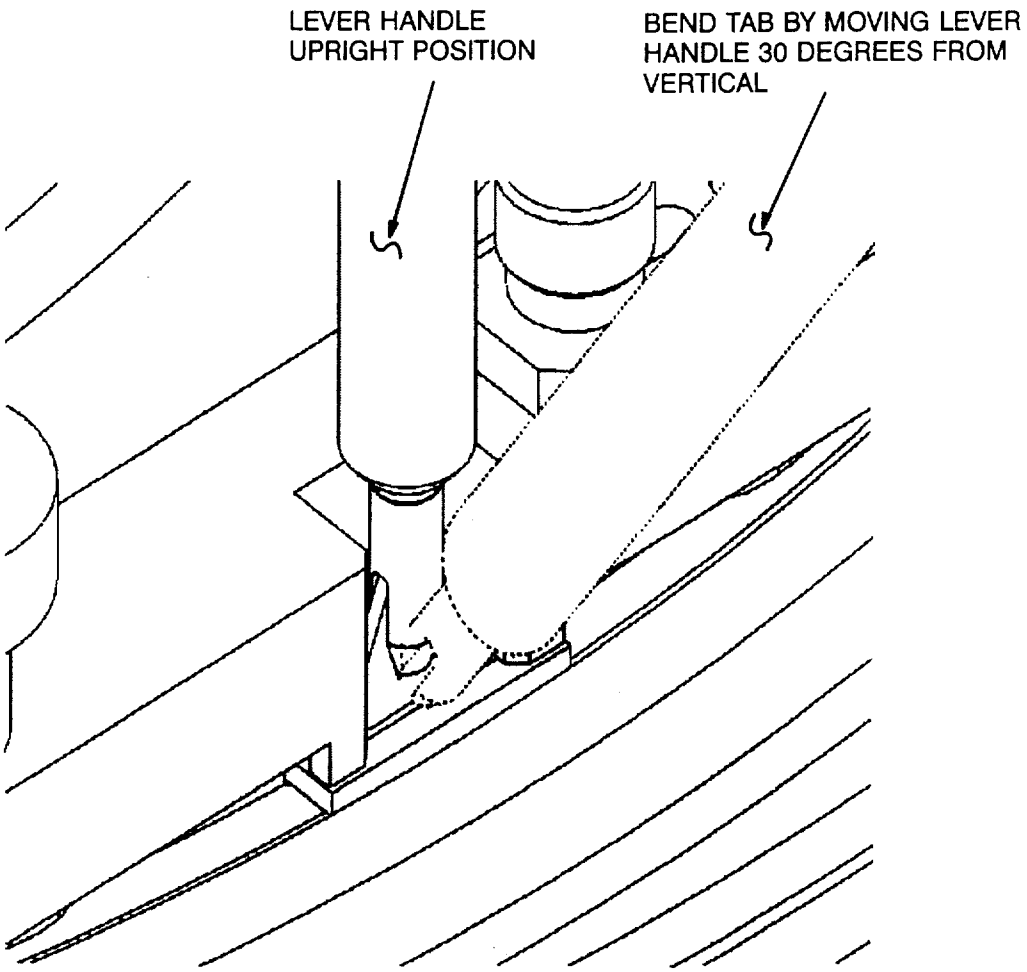
Fixture alignment
Fig 3 sheet 2



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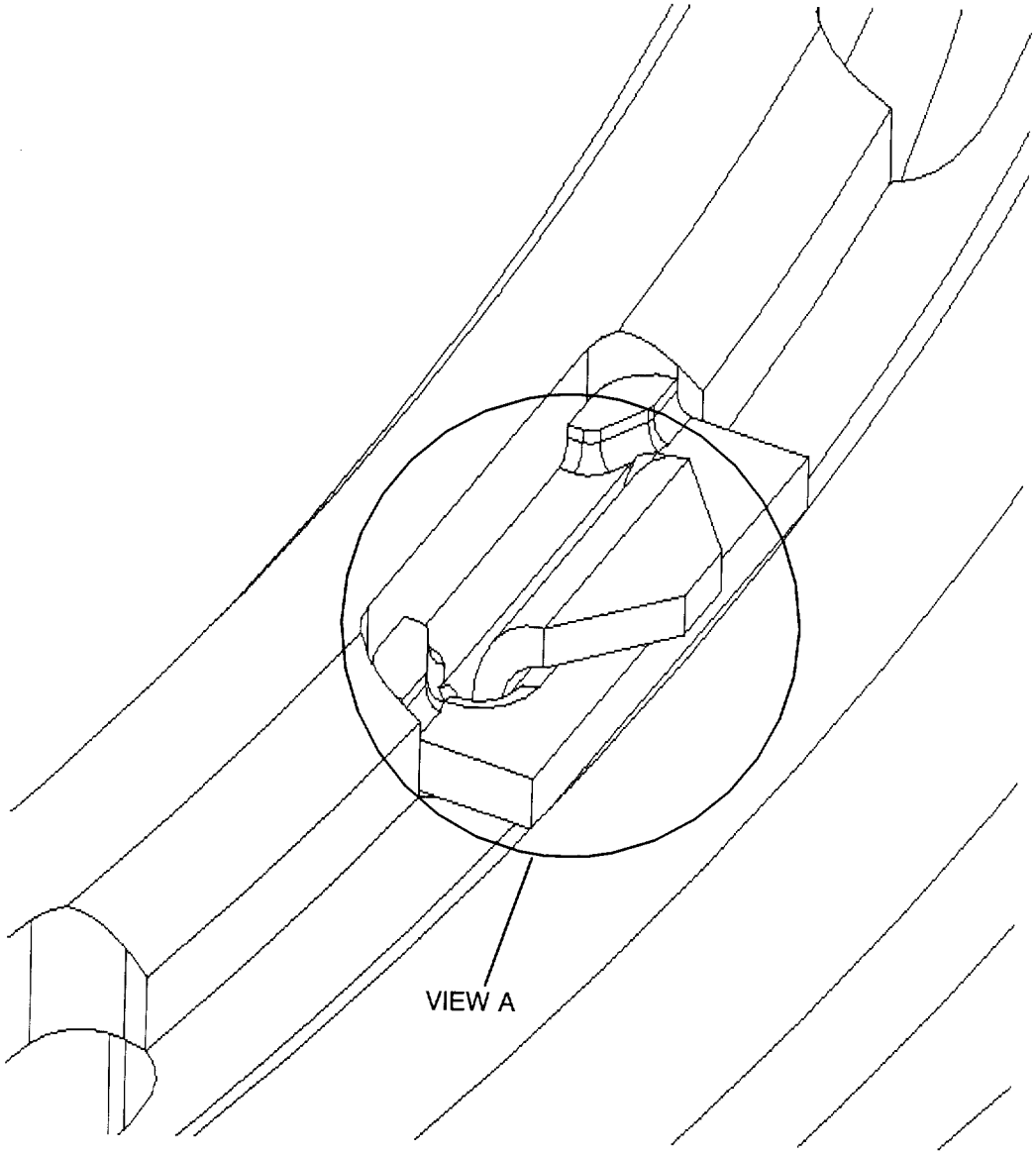
Bending retainer
Fig 4



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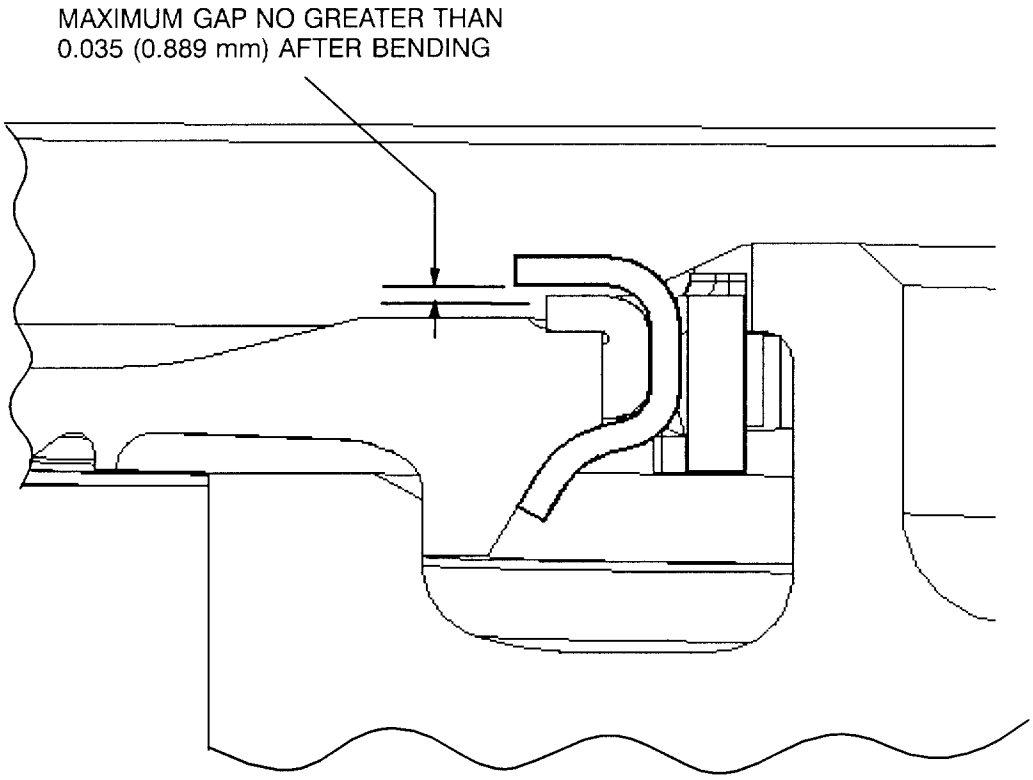
2nd stage turbine blade lock
Fig 5 sheet 1



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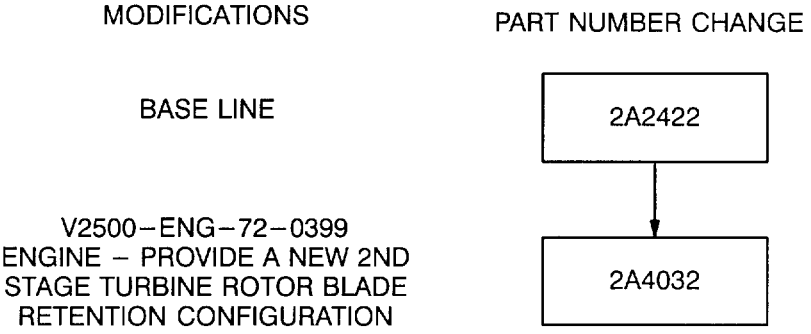
2nd stage turbine blade lock
Fig 5 sheet 2



E8386
PWH

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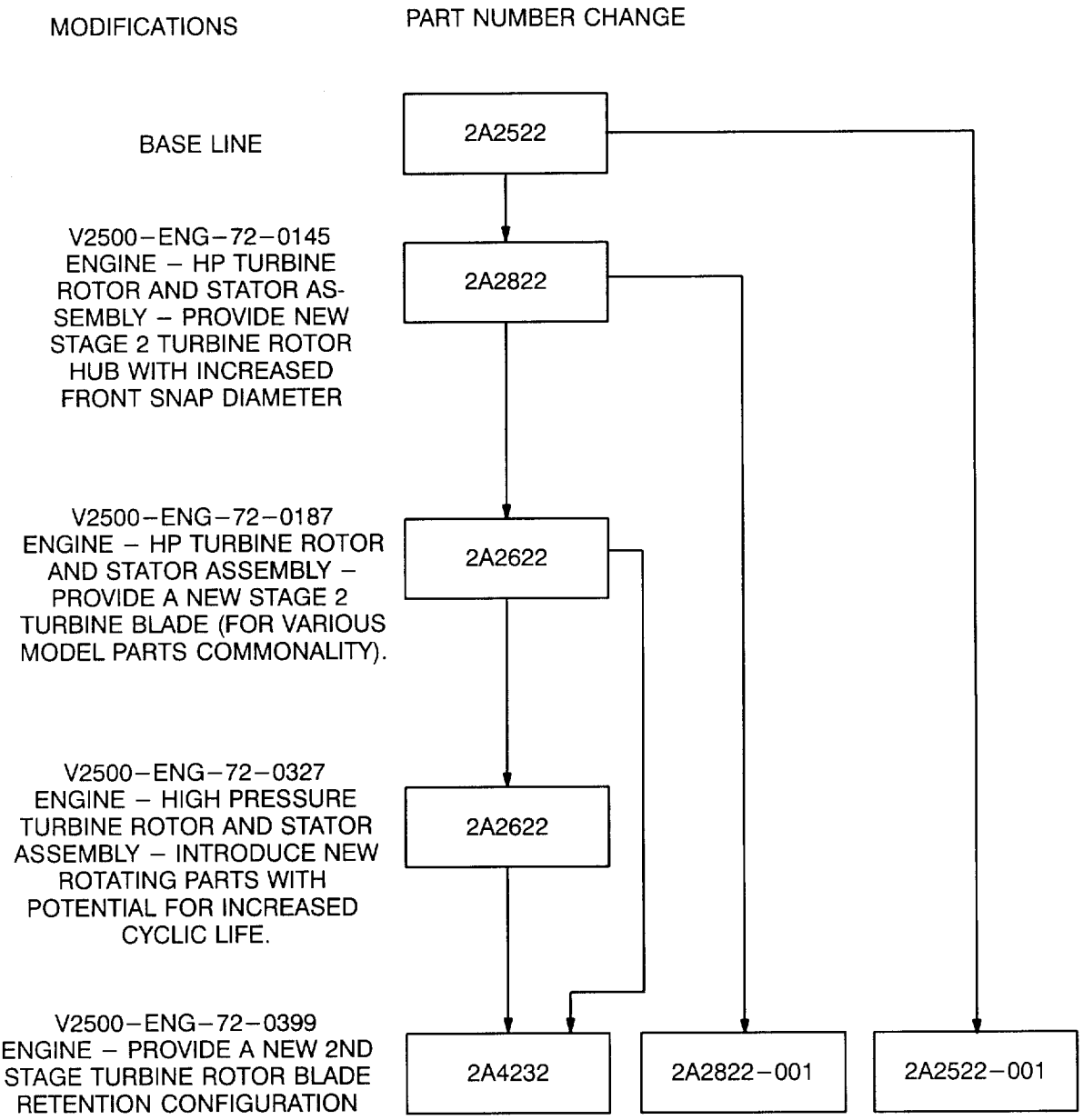
Family tree - of the 2nd stage turbine rotor assembly ref catalogue sequence no. 72-45-30. Fig 01 item 010 for V2500-A1 only
Fig 6



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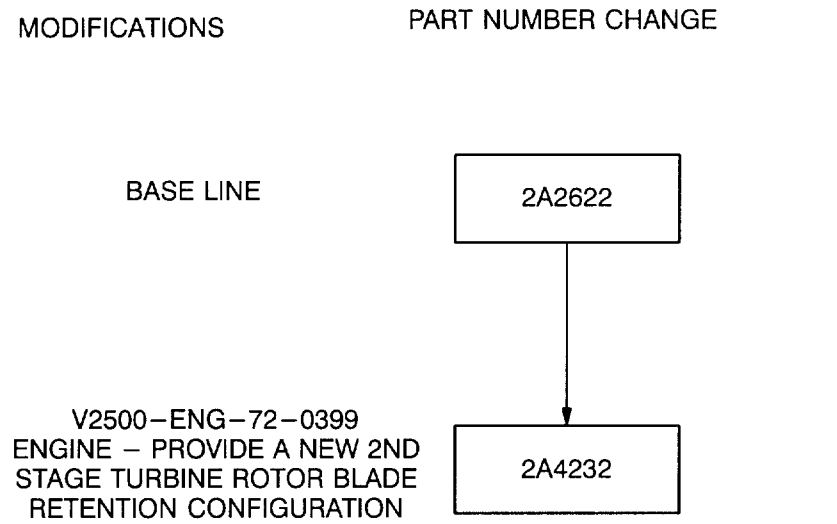
Family tree - of the 2nd stage turbine rotor assembly ref catalogue sequence no. 72-45-30. Fig 01 item 010 for V2500-A5 only
Fig 7



E8388
PWH

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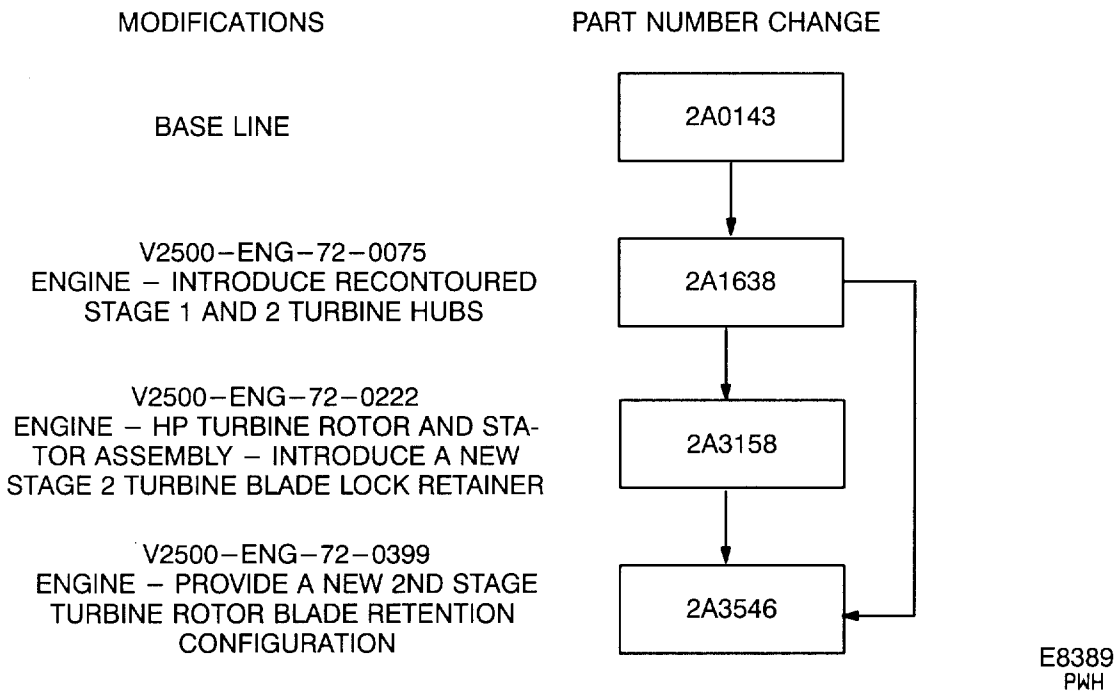
Family tree - of the 2nd stage turbine rotor assembly ref catalogue sequence no. 72-45-30. Fig 01 item 010 for V2500-D5 only
Fig 8



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Family tree - of the turbine blade lock retainer ref catalogue sequence no. 72-45-33. Fig 01 item 040 for V2500-A1 only
Fig 9

MODIFICATIONS	PART NUMBER CHANGE
BASE LINE	2A1638
V2500–ENG–72–0222 ENGINE – HP TURBINE ROTOR AND STATOR ASSEMBLY – INTRODUCE A NEW STAGE 2 TURBINE BLADE LOCK RETAINER	2A3158
V2500–ENG–72–0399 ENGINE – PROVIDE A NEW 2ND STAGE TURBINE ROTOR BLADE RETENTION CONFIGURATION	2A3546

E8390
PWH

ded0004132

Family tree – of the turbine blade lock retainer ref catalogue sequence no. 72-45-33. Fig 01 item 040 for V2500-A5/D5 only
Fig 10

MODIFICATIONS	PART NUMBER CHANGE
BASE LINE	2A1097
V2500-ENG-72-0399 ENGINE - PROVIDE A NEW 2ND STAGE TURBINE ROTOR BLADE RETENTION CONFIGURATION	2A3545

E8391
PWH

Added Data

*Number values shown in parenthesis adjacent to U.S.> values are systeme internationale equivalents.

ded0004133

Family tree - of the HPT 2nd stage lock ref catalogue sequence no. 72-45-33. Fig 01 item 060 for V2500-A1/A5/D5