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

RR-DERBY

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DATE: Aug.22/01

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

This document transmits the Initial Issue of Service Bulletin EV2500-72-0408

Bulletin Initial Issue

Remove	Incorporate	Reason for change
	Pages 1 to 18 of the Service Bulletin	Initital Issue

V2500-ENG-72-0408

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

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ENGINE - INTERNAL GEARBOX ASSEMBLY - FBC TROUBLESHOOTING AND TEARDOWN PROCEDURE - NON-MODIFICATION SERVICE BULLETIN

1. Planning Information

A. Effectivity

(1) Airbus A319

V2522-A5, V2524-A5, V2527M-A5 All Engines

(2) Airbus A320

(a) V2500-A1 All Engines

(b) V2527-A5, V2527E-A5 All Engines

(3) Airbus A321

V2530-A5, V2533-A5 All Engines

(4) Boeing Long Beach Division MD-90

V2525-D5, V2528-D5 All Engines

(5) ATA Location

72-32-00

B. Concurrent Requirements

None.

C. Reason

A number of engines have been removed from service for oil leakage from the front bearing compartment (FBC) that resulted in oil odour in the cabin of the aircraft. Various leakage paths from the FBC are possible. The leakage source can be isolated using a troubleshooting procedure.

The purpose of this Non-Modification Service Bulletin is as follows:

(1) Provides further engine troubleshooting following cabin odour event to determine root cause.

(2) On induction of module/engine for shop visit for reasons other than cabin odour:

To evaluate health of compartment and determine if module teardown is necessary.

(3) To gather further data on causes of cabin odor to support potential engineering change.

NOTE: Part A makes the assumption that all the necessary on wing engine and aircraft troubleshooting for cabin odour and oil loss has been performed.

D. Approval

The compliance statement at 1.C. and the procedures in Section 2 of this Non-Modification Service Bulletin, comply with the Federal Aviation Regulations and are FAA-APPROVED for the Engine Models listed.

E. Compliance

Category Code 5

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

F. Manpower

Estimated manhours to incorporate the full intent of this bulletin:

(1) In Service

(a) LPT blind cap inspection

0.5 hours

(2) At Overhaul

(a) Follow flowchart Appendix A, pass vacuum check (LPT removal)

5.0 hours

(3) At Overhaul

(a) Disassembly, inspection and assembly of the FBC

3 days

NOTE: The parts affected by this Service Bulletin are accessible at Maintenance and/or Overhaul.

G. Material - Price and Availability

None.

H. Tooling - Price and Availability

Tooling is required, as defined in the reference tasks in the following accomplished instructions.

I. Weight and Balance

(1) Weight Change

None

(2) Moment Arm

No effect

(3) Datum

Engine Front Mount Centreline (Power Plant Station PPS 100)

J. Electrical Load Data

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

K. Software Accomplishment Summary

Not affected.

See Vendor Supplier Service Bulletin.

L. References

(1) 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)

(2) Engine Manual (E-V2500-1IA).

(3) Engine Manual (E-V2500-3IA).

(4) All Operators Wire 1050, Issue 2.

(5) Internal Reference No.

IAE Engineering Change Number 01VC233

M. Other Publications Affected

None.

N. Interchangeability of Parts

None.

O. Information of the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (Yes)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

P. Industry Support Program

None.

2. Material Information

None.

3. Accomplishment Instructions

A. Pre-requisite Instructions

NOTE: Service Bulletin incorporation on engines installed on aircraft may be desirable and should be individually evaluated.

(1) On wing troubleshooting for the engine and aircraft to prevent unnecessary engine removal.

(2) If engine oil consumption is greater than 0.3 qts/hr, follow All Operators Wire 1050, Issue 2. See Reference (4).

(3) Is the number 5 bearing compartment LPT shaft blind cap leaking, determine after removal of the LPC spinner (AMM ATA 72-38-11, Page Block 401). If leakage found, replace seal and properly seat the blind cap (Airbus SIL21-029, Page Block 201, Environmental Control Systems decontamination procedure) (ATA 21-00-00).

B. Actions

(1) Follow Teardown Decision Flowchart in Figure 4 - Appendix A. The results of all inspections to be recorded in Appendix B - Table 1, Part 1 and returned to IAE Technical Services via PSCOMM through local IAE representatives.

(2) Front Bearing Compartment (FBC) teardown as required from flowchart in Figure 4 - Appendix A

NOTE: The FBC vacuum check limits defined in this NMSB are for diagnostic purposes only before disassembly of the FBC. The limits as defined in the EM at assembly are not affected (Ref. Step four (4) of Appendix A flowchart).

(3) Perform strip of FBC module in accordance with EM 72-32-00 in order to carry out specific actions listed below. The results of all inspections to be recorded in Appendix B - Table 1, Part 2 and returned to IAE Technical Services via PSCOMM through local IAE representatives.

(a) Take close up digital pictures at the following locations for any sign of oil staining or coking (See Figure 5 in Appendix C for more detail).

(i) Location No.1: Drain hole in HPC stub shaft (inside and outside).

(ii) Location No.2: Lab seal area both sides of case.

(iii) Location No.3: Hole exit to compressor area.

(iv) Location No.4: Carbon seal/sealing ring interface.

(v) Location No.5: Carbon seal sealing face.

(vi) Location No.7: HPC adjusting spacer/seal plate interface.

(b) Inspect drain hole at location No.6 from the engine cross section (See Figure 5) for blockage. If blocked, submit debris to IAE for analysis. Ensure drain hole is clear prior to reassembly (Pre SBE 72-0211 CMM 72-32-38-100-101, Post SBE 72-0211 EM 72-32-03-100-003). See Figure 1.

(c) Record breakaway torque for No.3 bearing nut per EM 72-32-20-040-001 (Record in Table 1).

(d) Inspect for sign of oil leakage through the seal plate inner diameter and axial HPC adjusting spacer at location No.7 from the engine cross section. See Figure 5.

(i) If any oil leakage is observed: Record in Table 1.

1. Inspect contact surfaces of spacer and shaft shoulder for deformation. Replace and/or repair part if deformation is found.

2. Verify for proper HPC adjusting spacer thickness per EM 72-32-20-440-001.

(e) Visually inspect the piston ring of the hydraulic seal for any damage or evidence of leakage at location No.8 from the engine cross section (See Figure 5), (EIPC 72-32-19, Fig.01 Items 100-200). If any oil leakage found:

(i) Take close up digital pictures of the piston ring and inside of the hydraulic seal, paying particular attention to any oil coking.

(ii) Disassemble piston ring of hydraulic seal and inspect for air gap in between runner and piston ring interface. Replace piston ring if gap is found. See Figure 3.

(iii) Inspect hydraulic seal per EM 72-32-19-200-001 (Record in Table 1).

(f) Perform No.3 carbon seal assembly leakage check per EM 72-32-25-440-001 (Record in Table 1).

(g) Inspect No.3 carbon seal per EM 72-32-25-200-001 and inspect No.3 seal plate per EM 72-32-25-200-008 (Record in Table 1).

(h) Check the No.3 compartment internal oil feed pressure restrictor (if present), take note of part number/condition (varnish, coking, etc.) and record in Table 1 the actual Part Number (CMM 72-32-36-404)

(i) Restrictor A5 Model: Part Number 5A1451

(ii) Restrictor A1 Model: Part Number 5A0261

NOTE: A1 Model with SB 79-0070, SB 79-0071 and SB 79-0073 incorporated for oil system pressure increased will have Part Number 5A1451 oil restrictor installed.

(i) Perform No.1 carbon seal assembly leakage check per EM 72-32-53-440-001 (Record in Table 1).

(j) Inspect No.1 carbon seal per EM 72-32-53-200-001 and inspect No.1 seal plate per EM 72-32-53-200-008 (Record in Table 1).

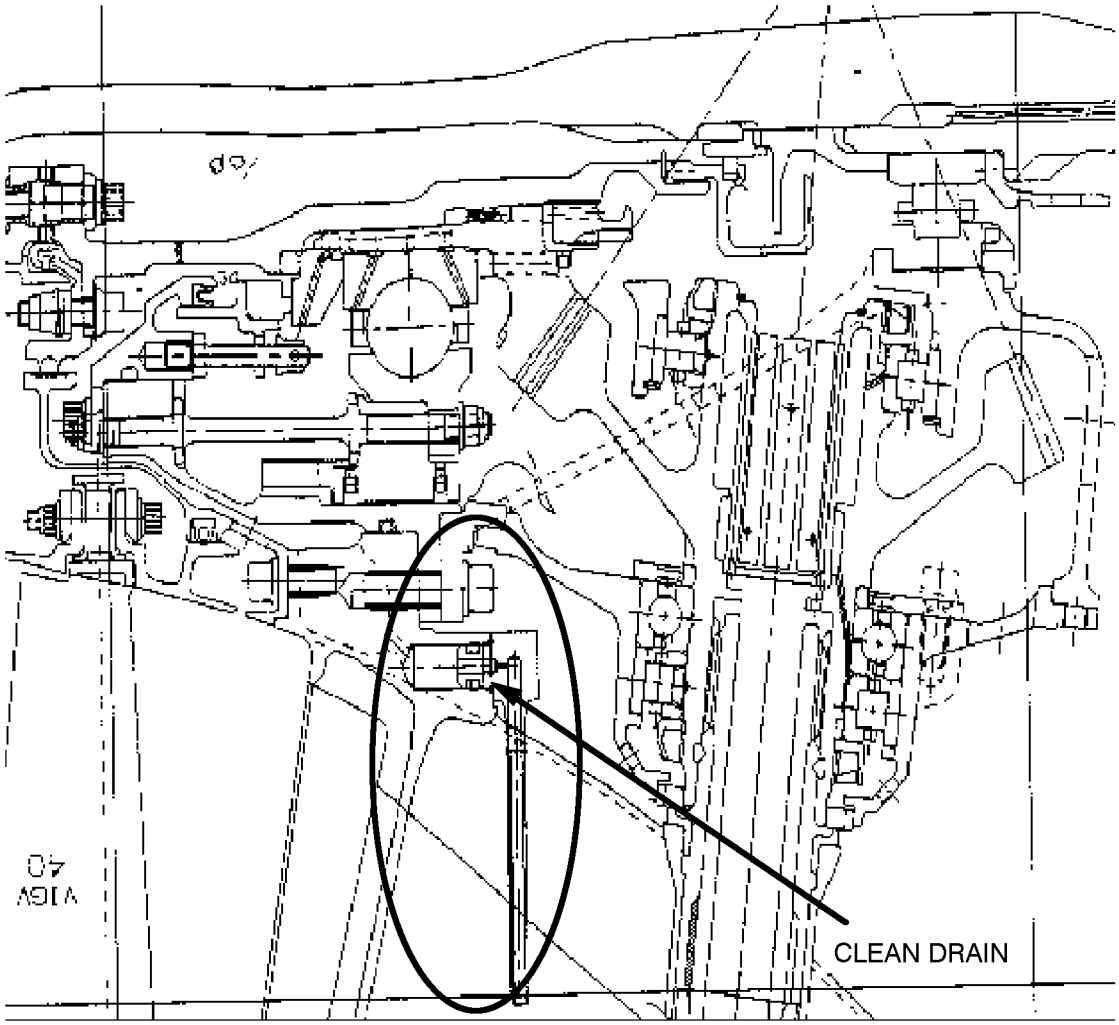
C. Address for Return of Parts/Debris

(1) All parts/debris for analysis to be returned F.A.O. Jenny Norris.

IAE Technical Services
SINA-75
Rolls Royce plc
Victory Road
P.O. Box 31
Derby
DE24 8BJ
ENGLAND

D. Recording Instructions

(1) A record of accomplishment is necessary.



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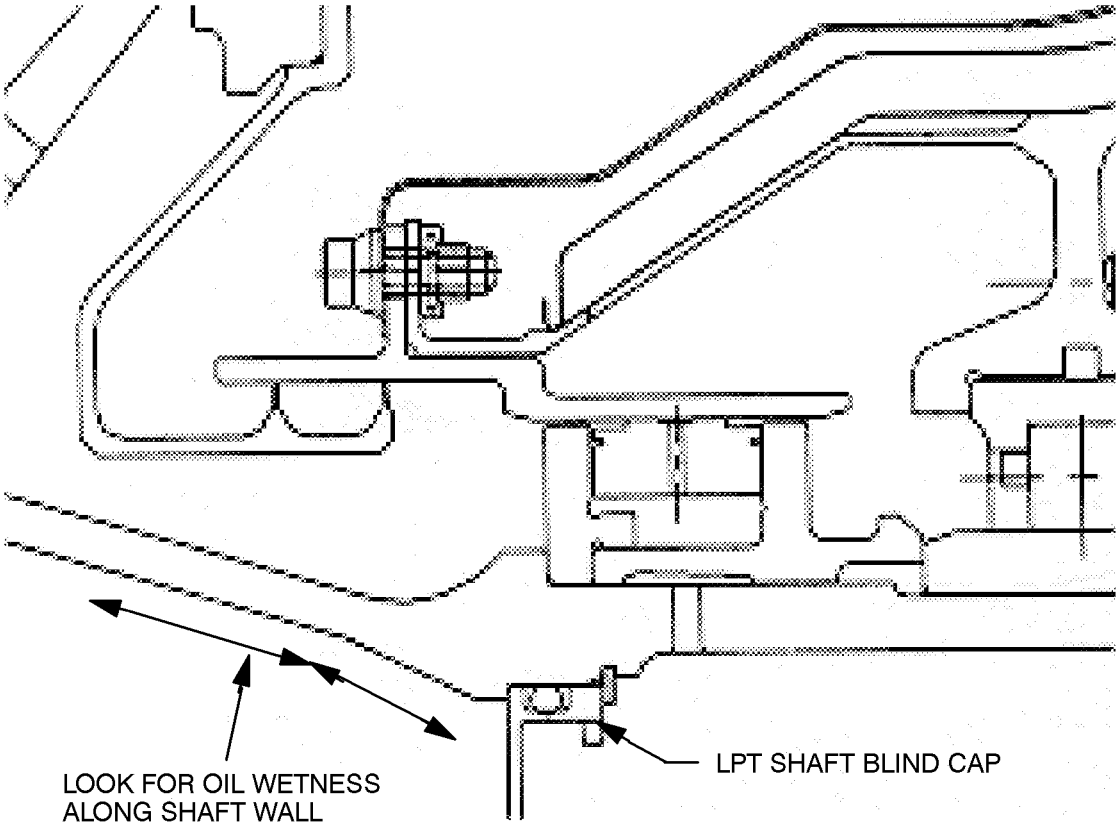
Intermediate case drain
Fig 1



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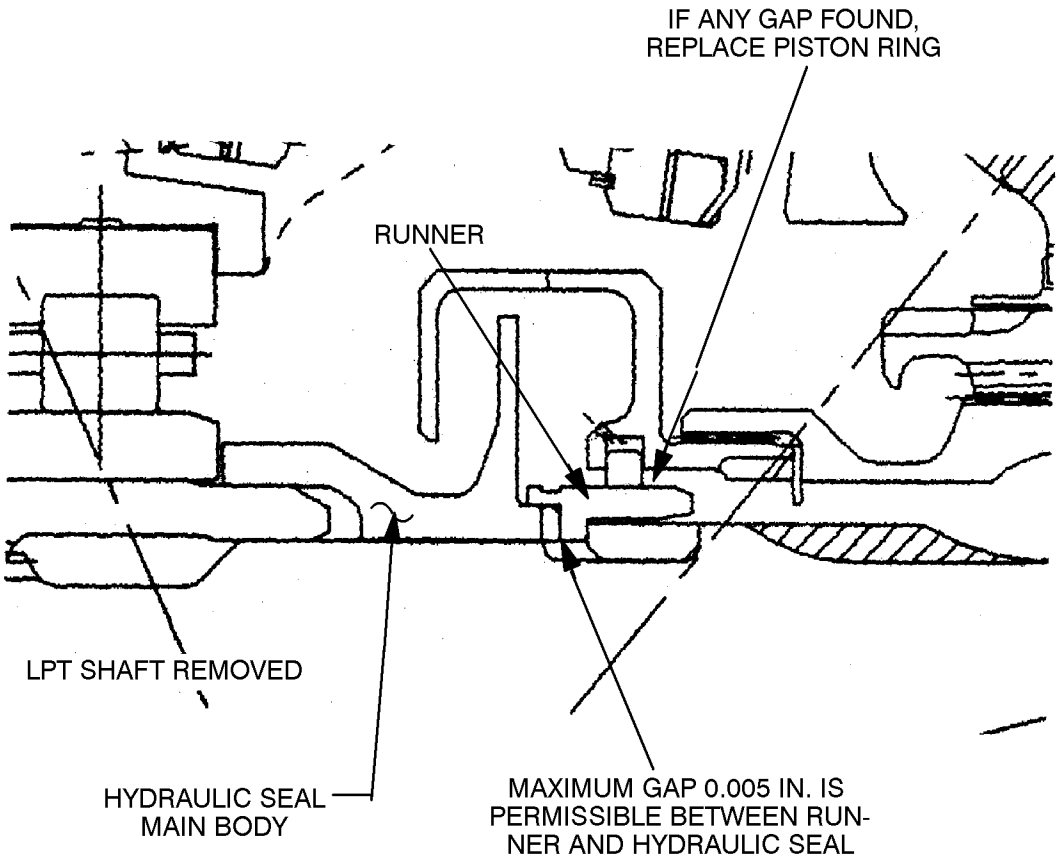
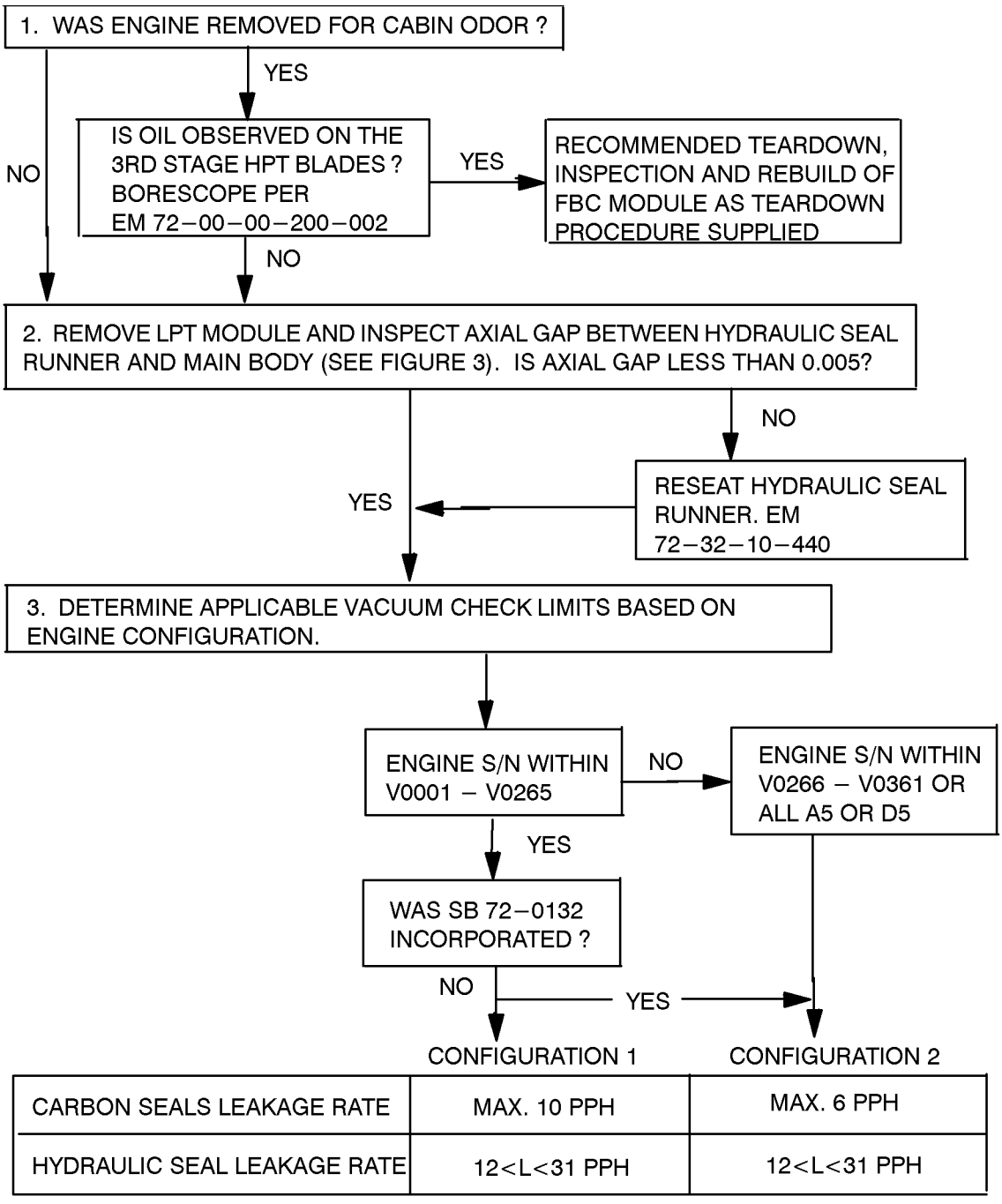
LPT shaft blind cap
Fig 2

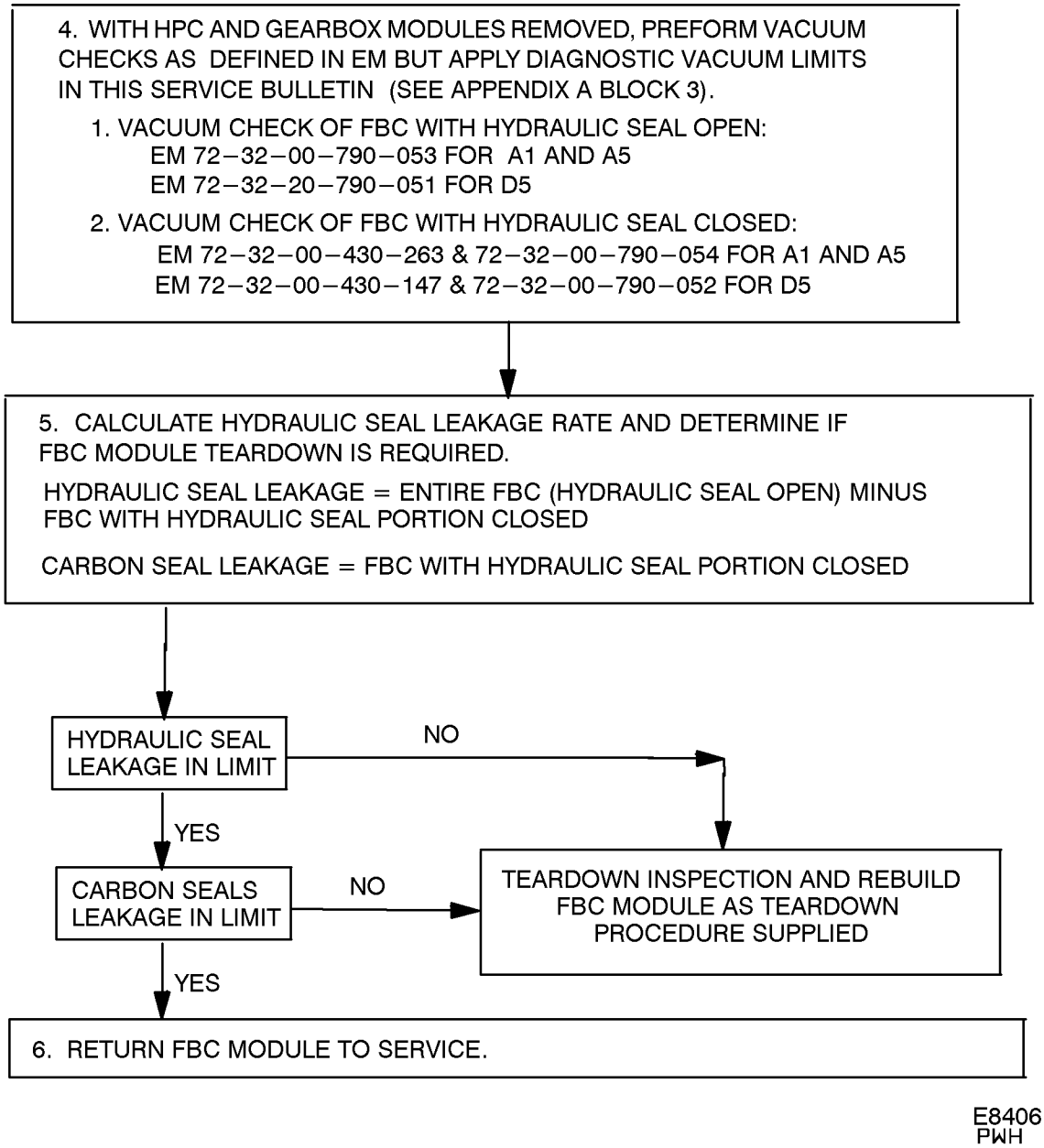


Hydraulic seal inspections for assembly problems
Fig 3



Teardown decision flowchart (Appendix A)
Fig 4 (sheet 1)

Table 2: FBC Vacuum check Leakage Rate Limits Without Gearbox Attached



Teardown decision flowchart (Appendix A)
Fig 4 (sheet 2)

APPENDIX B

APPENDIX B – Table 1 Inspection Data Sheet

Part 1: Flowchart Task for Section B – Actions

Task No.	Data Recording Measurements		Inspection Limit		Actual
1a	Configuration 1 or Engine 2?		N/A		
1b	Hydraulic seal runner axial gap		0.005in. (0,127 mm)		
1c	Front Compartment Vacuum Check (pph)		N/A		
1d	Carbon seals leakage rate (pph) (Hydraulic Seal Closed)		See Appendix A Figure 4		
1e	Hydraulic seal leakage rate (pph) (Entire FBC minus FBC with Hydraulic Seal closed)		See Appendix A Figure 4		

Part 2: Flowchart Task for Section B – Actions

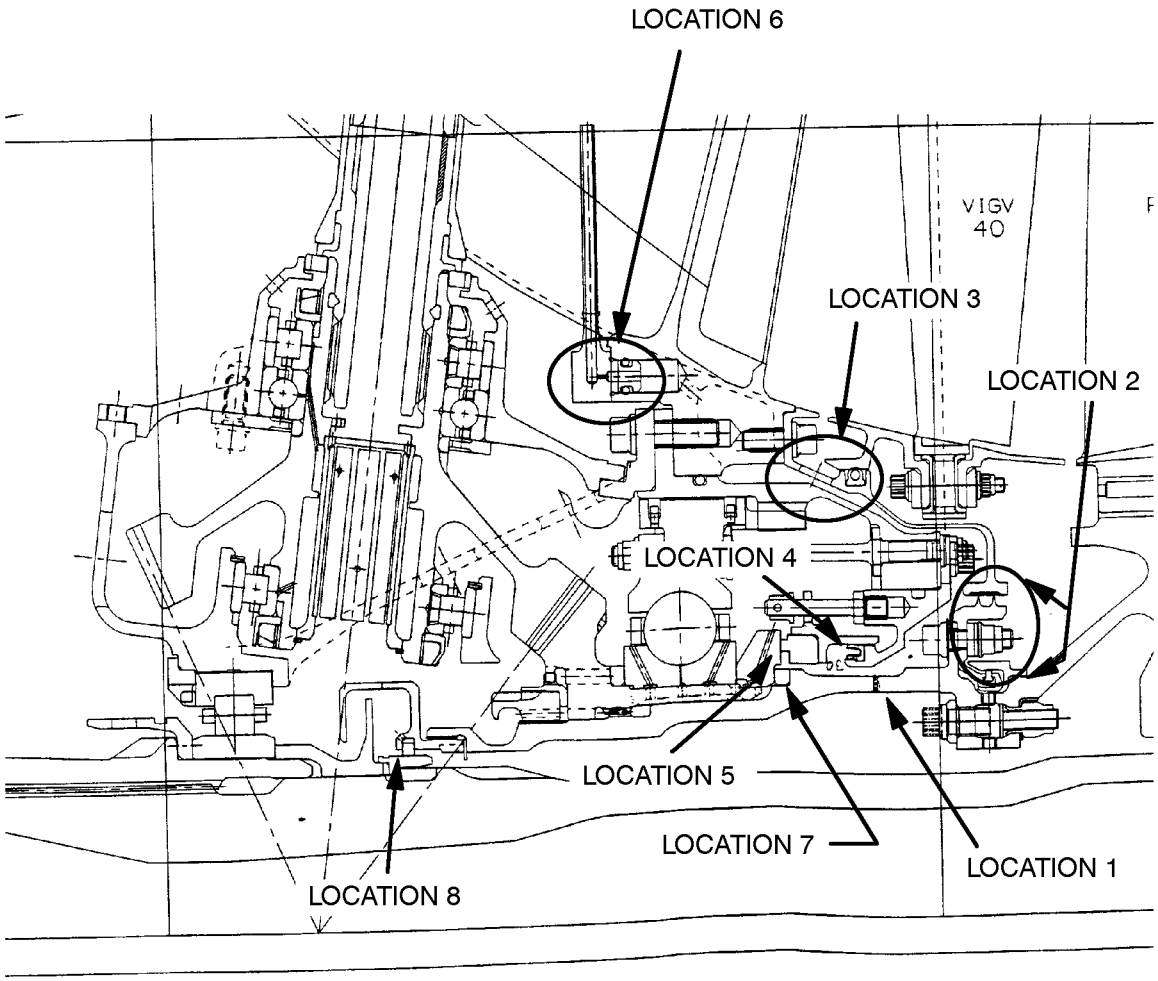
Task No.	Data Recording Measurements		Inspection Limit		Actual
2a	Location No.1: HPC stub shaft drain hole (inside and outside)		Any oil standing/coking? (digital picture)		
2a	Location No.2: Lab seal area both sides of case		Any oil standing/coking? (digital picture)		
2a	Location No.3: Hole exit to compressor area		Any oil standing/coking? (digital picture)		
2a	Location No.4: Carbon seal/sealing ring interface		Any oil standing/coking? (digital picture)		

Task No.	Data Recording Measurements		Inspection Limit		Actual
2a	Location No.5: Carbon seal/sealing face		Any oil standing/coking? (digital picture)		
2a	Axial HPC Adjusting Spacer		Thickness Parallelism 0.002in. (0,051 mm) max		
	Reference Figure 5, Location 7		Surface finish (2 faces) 32 micro in.		Face 1: Face 2:
2b	Location No.6: Drain hole		Drain hole blocked? Debris submitted?		
2c	No.3 Bearing Nut Breakaway torque (lbf.in.)		14,500 - 18,850 lbf.in. (1638.280 - 2129.763 Nm)		
2d	Axial HPC Adjusting Spacer		Any oil leakage? (digital picture)		
2d	Axial HPC Adjusting Spacer		Is axial stack-up dimension ok		
2d	Hydraulic seal piston ring		Any oil standing/coking? (digital picture)		
2d	Hydraulic seal runner/piston ring air gap		No gap allowed		
2e	Hydraulic seal inspection per EM 72-32-19-200-001:				
	Provide feedback to IAE Tech. Services all Inspection findings including photos				

Task No.	Data Recording Measurements		Inspection Limit		Actual
2f	No.3 carbon seal leakage per EM 72-32-25-440-001: Pre SBE 72-0132 SB 72-0132 incorporated		 4.5 pph @ 80 psi 2.5 pph @ 25 psi		
2g	No.3 carbon seal inspection per EM 72-32-25-200-001:				
	Location 2 diameter:		6.990 - 6.992in. (177,546 - 177,597 mm)		
	Location 2 roundness:		0.004in. (0,102 mm) max		
	Location 2 perpendicular:		0.001in. (0,025 mm) max		
	Location 3 nose height:		0.100 - 0.110in. (2,540 - 2,794 mm)		
	Location 4 Flatness:		0.004in. (0,102 mm) max		
	No.3 carbon seal inspection per EM 72-32-25-200-008:				
2g	Location 3: Hardface surface defect		Chipped? Pitted?		
2g	Location 1 and 7: Blocked oil holes		Any hole blocked?		
2g	Location 3: Hardface surface finish		5 max		
2g	Location 3: Hardface flatness		0.00002in. (0.0005 mm) max		
2g	Location 6: Pilot diameter		5.896 - 5.898in. (149,758 - 149,809 mm)		

Task No.	Data Recording Measurements		Inspection Limit		Actual
2h	A5 Model Oil Pressure Restrictor Part No. Indicate condition as well				
	A1 Model Oil Pressure Restrictor Part No. Indicate condition as well				
	No.1 Carbon Seal leakage per EM 72-32-53-440-001:				
2i	Pre SBE 72-0132		4.5 pph @ 80 psi		
2i	SB 72-0132 Incorporated		2.5 pph @ 25 psi		
	No.1 Carbon seal inspection per EM 72-32-53-200-001				
2j	Location 3 diameter:		10.389 - 10.391in. (263,881 - 263,931 mm)		
2j	Location 3 roundness:		0.004in. (0,102 mm) max		
2j	Location 3 perpendicular:		0.001in. (0,025 mm) max		
2j	Location 2 nose height:		0.100 - 0.110in. (2,540 - 2,794 mm)		
2j	Location 4 flatness		0.00002in. (0,0005 mm) max		
	No.1 Carbon seal seat inspection per EM 72-32-53-200-008:				
2j	Locations 4, 5 and 6 Hardface surface defects:		Chipped? Pitted?		
2j	Locations 1 and 7: Blocked oil holes:		Any hole blocked?		

Task No.	Data Recording Measurements		Inspection Limit		Actual
2j	Locations 4, 5 and 6 Hardface surface finish:		5 max		
2j	Locations 4, 5 and 6 Hardface flatness:		0.00002in. (0,00005 mm) max		
2j	Location 2 Pilot Diameter:		8.702 - 8.704in. (221,031 - 221,082 mm)		



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Engine inspection locations (Appendix C)
Fig 5