ALERT SERVICE BULLETIN REVISION NOTICE

NON-MODIFICATION ALERT SERVICE BULLETIN — ENGINE — DIFFUSER CASE REAR OUTER FLANGE — DIFFUSER CASE “M” FLANGE REPETITIVE VISUAL INSPECTION FOR CRACKS

Turbojet Engine Service Bulletin No. V2500-ENG-72-A0706 Revision No. 2 dated November 8, 2019.

Revision History

Original Issue February 14, 2019

Revision 1 dated June 28, 2019

Revision 2 dated November 8, 2019

Reason for the Revision

To reduce the initial inspection criteria for Table 1 from 19,500 cycles to 19,000 cycles for engines installed on aircraft.

To reduce the initial cyclic inspection limit in Table 1 from 20,800 cycles to 20,300 cycles.

To add a note in Table 1 that this inspection is not applicable to diffuser case rear outer flanges in shop with less than 19,000 cycles.

To add requirements in Table 1 that it is necessary to replace the diffuser case rear outer flange with 20,000 cycles or more at the start of April 1, 2020 as specified.

To add the statement in Table 1 that the diffuser case rear outer flanges that have been replaced by VRS 3633 resets the flange cycles to zero (0), as long as done before April 1, 2020.

To add Flourescent Penetrant Inspection procedure to the Accomplishment Instructions if indication can not be confirmed as a crack.

Effect of Revision on Prior Compliance

None.

This is a Complete Revision (Not Applicable to the SGML version)

The contents are in accordance with the list of effective pages. All pages have the current revision number. Technical changes are marked with black bars.

MODEL APPLICATION

V2500-A1, V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 72-A0706

Page	Revision No.	Date
1 thru 24	2	November 7/19

A copy of this Revision Notice and any future revision notices must be filed as a permanent record with your copy of the subject bulletin.

IAE PROPRIETARY INFORMATION

©IAE International Aero Engines AG (date as above). All rights reserved.

ALERT SERVICE BULLETIN

NON-MODIFICATION ALERT SERVICE BULLETIN — ENGINE — DIFFUSER CASE REAR OUTER FLANGE — DIFFUSER CASE “M” FLANGE REPETITIVE VISUAL INSPECTION FOR CRACKS

MODEL APPLICATION

V2500-A1, V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5, V2525-D5, V2528-D5

BULLETIN ISSUE SEQUENCE

V2500 Series 72-A0706

ATA NUMBER

72-42-11

IAE PROPRIETARY INFORMATION

This document is the property of International Aero Engines (IAE). You may not possess, use, copy or disclose this document or any information in it, for any purpose, including without limitation to design, manufacture, or repair parts, or obtain FAA or other government approval to do so, without IAE’s express written permission. Neither receipt nor possession of this document alone, from any source, constitutes such permission. Possession, use, copying or disclosure by anyone without IAE’s express written permission is not authorized and may result in criminal and/or civil liability.

Export Classification: Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

FAA Airworthiness Directive

Directive No. 2019-06-06

Compliance Category

Category 3

P&W Distribution Code

V2500

February 14/19

REVISION NO. 2 - November 7/19

©IAE International Aero Engines AG (date as above). All rights reserved.

Summary

The purpose of this Non-Modification Alert Service Bulletin (NMASB) is to provide instructions to visually inspect the diffuser case rear outer flange using a borescope. Cracking has been observed on the diffuser case rear outer flange on “M” Flange. This NMASB is to inspect for cracking on the diffuser case rear outer flange at specified intervals. This NMASB will also add a time requirement to remove the part numbers listed in this NMASB, at the start of April 1, 2020 and after. IAE plans to issue a modification Service Bulletin V2500-ENG-72-0709 for flange replacement.

Planning Information

Effectivity Data

Engine Models Applicable

V2500-A1
Engine Serial No. — All Engines with Diffuser Case Assembly, PN 2A0051, 2A2883-01, 2A2889-01, 2A2891-01, 2A2896-01, or 2A3132 installed.

V2522-A5, V2524-A5, V2527M-A5, V2527-A5, V2527E-A5, V2530-A5, V2533-A5
Engine Serial No. — All Engines with Diffuser Case Assembly, PN 2A2081-01, 2A2581-01, 2A2897-01, 2A2885-01, 2A2889-01, or 2A2891-01 installed.

V2525-D5, V2528-D5
Engine Serial No. — All Engines with Diffuser Case Assembly, PN 2A2081-01, 2A2581-01, or 2A2885-01, 2A2889-01, 2A2891-01, or 2A2897-01 installed.

Concurrent Requirements

There are no concurrent requirements.

Reason

1. Condition: This inspection will lessen the possibility of the diffuser case rear outer flange crack(s) propagating and causing a rupture of the diffuser case. This NMASB introduces a visual inspection using a borescope of the diffuser case rear outer flange at intervals.
2. Background: A crack was observed on the diffuser case rear outer flange that propagated from the bolt hole inner diameter into the diffuser case wall.
3. Objective: Perform a visual inspection using the borescope 360 degrees around the diffuser case rear outer flange to inspect for crack(s).
4. Substantiation: The inspection method provided has shown to identify crack(s) on the diffuser case rear outer flange.
5. Effects of Bulletin on:

   Removal/Installation: Not Affected.

   Disassembly/Assembly: Not Affected.

   Cleaning: Not Affected.

   Inspection/Check: Not Affected.

   Repair: Not Affected.

   Testing: Not Affected.
6. Supplemental Information

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

None.

Description

Do a visual inspection, using a borescope, of the diffuser case rear outer flange, diffuser case wall and on the OD strap of “M” Flange, which includes the diffuser case, Nozzle Guide Vane (NGV) support and High Pressure Turbine (HPT) case for cracks. This is a repetitive visual inspection that will initiate as shown in Table 1.

Compliance

Category 3

This is an inspection for engines installed on aircraft and must be accomplished at the specified cycles as follows:

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Table 1: “M” Flange Cycle Inspection Limits

April 1, 2020 And After		
For Engines Not Installed On Aircraft For diffuser case rear outer flanges in shop with 20,000 cycles or more: The diffuser case rear outer flange must be replaced as specified in the flange replacement modification. As of April 1, 2020, the part numbers listed in this NMASB that have rear outer flanges with 20,000 cycles or more cannot return to service. For Engines Installed On Aircraft For diffuser case rear outer flanges on-wing with 20,000 cycles or more: The diffuser case rear outer flange must be inspected at the specified intervals in Table 1 and the flange must be replaced at the next shop visit as specified in the flange replacement modification. As of April 1, 2020, the part numbers listed in this NMASB that have 20,000 cycles or more on the rear outer flange cannot return to service after their next shop visit and the diffuser case rear outer flange must be replaced per the flange replacement modification.		
For diffuser cases with rear outer flange with 19,000 cycles or more: Perform an initial inspection using the intervals based on the Cycles Since Last FPI (CSLFPI) of the diffuser case rear outer flange.		
Cycles Since Last Flourescent Penetrant Inspection (CSLFPI) (Cycles)	Inspect within (Cycles)	Re-inspection Interval For No Cracks Found (Cycles)*
Greater than 30,000	250	2,100
20,000 to 29,999	500	2,100
15,000 to 19,999	1,000	2,100
1 to14,999	1,300	2,100
0	In-Shop	2,100
*If cracks are found: Follow Table 2 for the V2500 A1/A5 Fly-On Limits and Table 4 for the V2500 D5 Fly-On Limits.		

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

For diffuser case rear outer flanges with less than 19,000 cycles: Perform an initial inspection of the diffuser case rear outer flange before reaching 20,300 cycles. Provided no cracks are found, re-inspect at an interval of 2,100 cycles. If cracks are found, follow Table 2 for the V2500 A1/A5 Fly-On Limits and Table 4 for the V2500 D5 Fly-On Limits.

Note As Follows:

NOTE: This inspection is not applicable to diffuser case rear outer flanges in shop with less than 19,000 cycles.

NOTE: Before April 1, 2020, Flange replacement of the diffuser case rear outer flange (VRS3633, Repair-028) resets the flange cycles to zero.

NOTE: April 1, 2020 and after, diffuser cases with rear outer flanges that have 20,000 cycles or more: Replace the diffuser case rear outer flange at the next shop visit per flange replacement modification.

NOTE: Fluorescent Penetrant Inspection (FPI) of the diffuser case rear outer flange bolt holes would reset the CSLFPI to zero.

NOTE: If the cycles on the diffuser case rear outer flange cannot be determined, you must use the total cycles on the diffuser case.

NOTE: If the cycles on the diffuser case cannot be determined, you must use the total engine cycles if it can be documented that the diffuser case was always with the engine.

NOTE: If the cycles on the diffuser case rear outer flange cannot be determined based on any of the above criteria then you must inspect in 250 cycles.

NOTE: A FPI of the diffuser case would have been accomplished at a Diffuser Workscope Level 3, and may have been accomplished at a lower Diffuser Workscope level.

NOTE: All inspections completed with References 7, 8, 9, 10, and 11, Special Instructions (SI) SI341F-18, SI350F-18, SI356F-18, SI372F-18, and SI04F-19, are in compliance with this NMASB. All engines that have been previously inspected must use the limits provided in this NMASB.

Approval Data

The compliance statement and the procedures described in this NMASB have been shown to comply with the applicable Federal Aviation Regulations and are FAA-APPROVED for the engine model listed.

The aircraft Type Certificate (TC) holder has been informed of this inspection.

Manpower

The estimate of man-hours of labor directly necessary to do the intent of this NMASB are as follows:

For Engines Installed On Aircraft

1. Necessary to Gain and Close Access ..... 0.8 hours.
2. Necessary for Inspection ..... 1.0 hours.
3. Total Necessary Man-Hours ..... 1.8 hours.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Weight and Balance

1. Weight Change

   None.

2. Moment Arm

   No Effect.

3. Datum

   Engine Front Mount Centerline (Power Plant Station (PPS) 100)

Electrical Load Data

This NMASB has no effect on the aircraft electrical load.

Software Accomplishment Summary

Not Applicable.

References

NOTE: In 2014 IAE converted the V2500 Technical Publications to a new system. As a result of the conversion, some manuals were consolidated. All manuals received new P&W part numbers. To facilitate the use of this NMASB, a Technical Publications conversion table is provided in the Appendix.

1. V2500 Standard Practices and Processes, P&W Ref. PN 2A4414, Chapter/Section 72-42-00.
2. V2500-A1 Series Illustrated Parts Catalog, P&W Ref. PN 2A4427, Chapter/Section 72-42-11.
3. V2500-A5 Series Illustrated Parts Catalog, P&W Ref. PN 2A4428, Chapter/Section 72-42-11.
4. V2500-D5, Series Illustrated Parts Catalog, P&W Ref. PN 2A4426, Chapter/Section 72-42-11.
5. V2500 A1/A5 Aircraft Maintenance Manual (AMM).
6. V2500-D5 Aircraft Maintenance Manual (AMM).
7. V2500 Special Instruction (SI) SI341F-18.
8. V2500 Special Instruction (SI) SI350F-18.
9. V2500 Special Instruction (SI) SI356F-18.
10. V2500 Special Instruction (SI) SI372F-18.
11. V2500 Special Instruction (SI) SI04F-18.
12. FAA Airworthiness Directive 2019-06-06.

Other Publications Affected

Not Applicable.

Interchangeability of Parts

Not Applicable.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Information in the Appendix

Alternate Accomplishment Instructions (No)

Progression Charts (No)

Added Data (Yes)

Revision to Table of Limits (No)

Inspection Procedures (No)

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Material Information

Material — Price and Availability

1. Part prices were not available at the time of NMASB publication. Contact IAE Spares Management & Logistics for firm quotations.
2. There is no kit provided to do this NMASB.
3. Part availability information is provided in material data Instructions — Disposition.

Industry Support Program

Contact your local IAE Customer Field Service Representative or Customer Fleet Director.

The material data that follows is for each engine.

Not Applicable.

For V2500-A1 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
	1	*	CASE — DIFSR, ASSY OF	2A0051 (72-42-11-01-010)	(4)(X)
	1	*	CASE — DIFSR ASSY OF	2A2889-01 (72-42-11-01-010 A)	(4)(X)
	1	*	CASE — DIFSR, ASSY OF	2A2883-01 (72-42-11-01-010 B)	(4)(X)
	1	*	CASE —- ASSY OF, DIFFUSER	2A3132 (72-42-11-01-010 C)	(4)(X)
	1	*	CASE —- ASSY OF, DIFFUSER	2A2891-01 (72-42-11-01-010 F)	(4)(X)
	1	*	CASE —- ASSY OF, DIFFUSER	2A2896-01 (72-42-11-01-010 E)	(4)(X)

The material data that follows is for each engine.

Not Applicable.

For V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
	1	*	CASE — A/O DIFFUSER	2A2081-01 (72-42-11-01-010)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2581-01 (72-42-11-01-010 A)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2897-01 (72-42-11-01-010 B)	(4)(X)

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
	1	*	CASE — A/O DIFFUSER	2A2885-01 (72-42-11-01-010 C)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2889-01 (72-42-11-01-010 D)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2891-01 (72-42-11-01-010E)	(4)(X)

The material data that follows is for each engine.

For V2525-D5, V2528-D5 Engines:

New PN	Qty	Estimate of Unit Price ($)	Keyword	Old PN	Instructions — Disposition
	1	*	CASE — A/O DIFFUSER	2A2581-01 (72-42-11-01-010)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2081-01 (72-42-11-01-010 A)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2891-01 (72-42-11-01-010 B)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2885-01 (72-42-11-01-010 C)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2889-01 (72-42-11-01-010 D)	(4)(X)
	1	*	CASE — A/O DIFFUSER	2A2897-01 (72-42-11-01-010 E)	(4)(X)

Instructions/Disposition Code Statements:

Parts Modification Conditions

Estimated part prices are provided when they are available at time of publication. The Estimate of Unit Price is only for planning purposes and does not constitute a firm quotation. An asterisk (*) is shown where part pricing information was unavailable. In either case, contact IAE Spares for firm quotations.

(4) Do an inspection as specified in the Accomplishment Instructions.

Spare Parts Availability

(X) See Reference 2, 3, or 4, Illustrated Parts Catalog for applicable replacement parts.

Vendor Services or Special Components/Materials

Not Applicable.

Tooling — Price and Availability

Special tools are not required to accomplish this NMASB.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Reidentified Parts

Not Applicable.

Other Material Information Data

Consumable materials required to incorporate this NMASB

Part Number	Part Name
CoMat 01-060 CoMat 01-031 CoMat 01-393	Acetone
CoMat 02-099	Lint — Free Cloth
CoMat 01-124 CoMat 01-410	Isopropyl Alcohol

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Accomplishment Instructions

For V2500-A1 and V2522-A5, V2524-A5, V2527-A5, V2527E-A5, V2527M-A5, V2530-A5, V2533-A5 Engines:

NOTE: All inspections completed with References 7, 8, 9, 10, and 11. Special Instructions SI341F-18, SI350F-18, SI356F-18, SI372F-18, and SI04F-19, are in compliance with this NMASB. All engines that have been previously inspected must use the limits provided in this NMASB.

1. Gain access

WARNING: THE THRUST REVERSER HYDRAULIC CONTROL UNIT (HCU) MUST BE DEACTIVATED BEFORE WORKING ON OR AROUND THE THRUST REVERSER. FAILURE TO DEACTIVATE THE HCU CAN RESULT IN INADVERTENT THRUST REVERSER OPERATION AND INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

A. Open the engine fan cowls (Reference 5, AMM, Task 71-13-00-010-010).

B. Deactivate the thrust reverser hydraulic control unit (Reference 5, AMM, Task 78-30-00-040-012).

C. Open the thrust reverser halves (Reference 5, AMM, Task 78-32-00-010-010).

2. Inspect “M” Flange

A. Refer to Figure 1 V2500 Major Flanges to identify the location of “M” Flange.

B. Refer to Figure 2 “M” Flange Cross Section and Figure 3 Diffuser Case Rear Outer Flange Clocking Positions to identify “M” Flange.

NOTE: It is not necessary to remove any “M” Flange brackets or components mounted on or around “M” Flange to accomplish this inspection.

NOTE: The diffuser case rear outer flange has one hundred (100) bolt holes. The locating pin is located at the 6 o’clock position between Bolt Holes fifty (50) and fifty one (51) when viewed from the rear.

C. Clean the inspection areas as necessary using Acetone or Isopropyl Alcohol and lint free cloth or cotton swab to remove any excess dirt and/or debris.

D. Refer to Figure 4 “M” Flange Inspection Zones and Figure 5 Diffuser Case Left Side View. Use a 4 mm or 6 mm diameter borescope with either a straight or a 90 degree tip.

CAUTION: EACH ZONE MUST BE INSPECTED SEPARATELY. IF THIS CAUTION IS NOT OBEYED, IT CAN INCREASE THE POSSIBILITY OF NOT IDENTIFYING A CRACK THAT CAN RESULT IN GREATER DAMAGE.

NOTE: Multiple cracks in Inspection Zone 1 and Inspection Zone 2 are acceptable and subject to the Fly-on limits.

(1) Borescope inspect 360 degrees around the “M” Flange at Zone 1 from the bottom of the flange nut to the transition radius.

(2) Borescope inspect 360 degrees around the Outer Diameter (OD) at Zone 2 of all three flanges of “M” Flange.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

CAUTION: THERE MAY BE AN INTERFERENCE FIT BETWEEN THE ACC VALVE AND THE BORESCOPE AT APPROXIMATELY THE 5:00 LOCATION AFT LOOKING FORWARD. ENSURE THAT ALL SURFACES ARE INSPECTED IN THIS AREA. IF THIS CAUTION IS NOT OBEYED, IT CAN INCREASE THE POSSIBILITY OF NOT IDENTIFYING A CRACK THAT CAN RESULT IN GREATER DAMAGE.

(a) If there is interference fit between the ACC valve and the borescope, use an inspection mirror as an aid and make sure you can see the borescope light in mirror on the opposite side of ACC valve. Ensure that you can see the area of interference on the borescope screen with full resolution.

NOTE: The distance between the transition radius and the center of the borescope boss is approximately 1.6 inches (40.64 mm). Borescope bosses are located at 45 degrees, 189 degrees, 243 degrees, 306 degrees and 333 degrees.

(3) Borescope inspect 360 degrees around the “M” Flange at Zone 3 from the transition radius to 0.50 inch (12.70 mm) minimum on the diffuser case wall as measured from the transition radius.

E. If you see an indication of a crack, clean the area with Acetone or Isopropyl Alcohol and a lint free cloth or cotton swab then re-inspect the area.

F. Inspect the indication from different angles to confirm if the indication is a crack.

G. If you are still unable to confirm the indication as a crack, perform the following steps:

(1) Perform local Flourescent Penetrant Inspection (FPI) of the indication using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity).

(2) If FPI does not indicate a crack, return the part to service and perform this NMASB at an interval of 2,100 cycles.

(3) If FPI does indicate a crack, inspect at the intervals specified in Table 2. Refer to Table 2 Fly-On Limits.

H. If any confirmed crack indications are found, inspect at the following intervals. Refer to Table 2 for Fly-On Limits.

TABLE 2 FLY-ON LIMITS

Determine the thrust rating that the engine is operating at and re-inspect at the following intervals.
This NMASB 72-0706 must be performed prior to engine installation on the aircraft.
This NMASB 72-0706 must be performed whenever the engine thrust rating is changed.

Zone	Engine Models		
	V2533-A5 V2530-A5 V2527E-A5	V2527-A5 V2527M-A5 V2500-A1	V2524-A5 V2522-A5
1 OR 2	200 Flight Cycles	380 Flight Cycles	600 Flight Cycles
3	Remove Engine	Remove Engine	Remove Engine

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

I. Refer to Figure 5 Diffuser Case Left Side View and Table 3 Inspection Summary Report. Results shall be communicated back to Pratt and Whitney using EagleNet under V2500 M Flange Fleet Management Team.

3. Close Up

A. Close the thrust reverser halves. (Reference 5, AMM, Task 78-32-00-410-010).

B. Activate thrust reverser hydraulic control unit. (Reference 5, AMM, Task 78-30-00-440-012).

C. Close the engine fan cowls. (Reference 5, AMM, Task 71-13-00-410-010).

4. Recording Instructions

A. A record of accomplishment is required.

TABLE 3: INSPECTION SUMMARY REPORT

V2500-ENG-72-A0706	
Date	
Engine Serial Number	
Thrust Rating and Engine Model	
Diffuser Case Part Number	
Diffuser Case Serial Number	
Time Since New Diffuser Case Rear Outer Flange	
Cycles Since New Diffuser Case Rear Outer Flange	
Time Since Last Level 3 or FPI of the Diffuser Case Rear Outer Flange	
Cycles Since Last Level 3 or FPI of the Diffuser Case Rear Outer Flange	
Diffuser Case Rear Outer Flange Previously Replaced?	
No. of Zone 1 Cracks	
No. of Zone 2 Cracks	
No. of Zone 3 Cracks	
Next Inspection Interval	

For V2525-D5, V2528-D5 Engines:

1. Gain access

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

WARNING: THE THRUST REVERSER HYDRAULIC CONTROL UNIT (HCU) MUST BE DEACTIVATED BEFORE WORKING ON OR AROUND THE THRUST REVERSER. FAILURE TO DEACTIVATE THE HCU CAN RESULT IN INADVERTENT THRUST REVERSER OPERATION AND INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

A. Open the engine fan cowls. (Reference 6, AMM, Chapter/Section 71-13-00).

B. Deactivate the thrust reverser hydraulic control unit. (Reference 6, AMM, Chapter/Section 78-30-00).

C. Open the thrust reverser halves. (Reference 6, AMM, Chapter/Section 78–32–00).

2. Inspect “M” Flange

A. Refer to Figure 1 V2500 Major Flanges to identify the location of “M” Flange.

B. Refer to Figure 2 “M” Flange Cross Section and Figure 3 Diffuser Case Rear Outer Flange Clocking Positions to identify “M” Flange.

NOTE: It is not necessary to remove any “M” Flange brackets or components mounted on or around “M” Flange to accomplish this inspection.

NOTE: The diffuser case rear outer flange has one hundred (100) bolt holes. The locating pin is located at the six (6) o’clock position between Bolt Holes fifty (50) and fifty one (51) when viewed from the rear.

C. Clean the inspection areas as necessary using Acetone or Isopropyl Alcohol and lint free cloth or cotton swab to remove any excess dirt and/or debris.

D. Refer to Figure 4 “M” Flange Inspection Zones and Figure 5 Diffuser Case Left Side View. Use a 4 mm or 6 mm diameter borescope with either a straight or a 90 degree tip.

CAUTION: EACH ZONE MUST BE INSPECTED SEPARATELY. IF THIS CAUTION IS NOT OBEYED, IT CAN INCREASE THE POSSIBILITY OF NOT IDENTIFYING A CRACK THAT CAN RESULT IN GREATER DAMAGE.

NOTE: Multiple cracks in inspection Zone 1 and inspection Zone 2 are acceptable and subject to the Fly-on limits.

NOTE: Due to engine installation platform for the D5 model, it is acceptable to inspect “M” Flange Inspection Zones in quadrants. Each zone can be inspected per quadrant. You must inspect at each zone separately.

(1) Borescope inspect 360 degrees around the “M” Flange at Zone 1 from the bottom of the flange nut to the transition radius.

(2) Borescope inspect 360 degrees around the Outer Diameter (OD) at Zone 2 of all three flanges of “M” Flange.

NOTE: The distance between the transition radius and the center of the borescope boss is approximately 1.6 inches (40.64 mm). Borescope bosses are located at 45 degrees, 189 degrees, 198 degrees, 243 degrees, 306 degrees and 333 degrees.

(3) Borescope inspect 360 degrees around the “M” Flange at Zone 3 from the transition radius to 0.50 inch (12.70 mm) minimum on the diffuser case wall as measured from the transition radius.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

E. If you see an indication of a crack, clean the area with Acetone or Isopropyl Alcohol and a lint free cloth or cotton swab then re-inspect the area.

F. Inspect the indication from different angles to confirm if the indication is a crack.

G. If you are still unable to confirm the indication as a crack, perform the following steps:

(1) Perform local Flourescent Penetrant Inspection (FPI) of the indication using SPOP 70 (high sensitivity)(or equivalent IAE TASK 70-23-05-230-501 high sensitivity).

(2) If FPI does not indicate a crack, return the part to service and perform this NMASB at an interval of 2,100 cycles.

(3) If FPI does indicate a crack, inspect at the intervals specified in Table 4. Refer to Table 4 Fly-On Limits.

H. If any confirmed crack indications are found inspect at the following intervals. Refer to Table 4 Fly-On Limits.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

TABLE 4: FLY-ON LIMITS

Re-inspect at the following intervals.	
Zone	Engine Model
	V2528-D5 V2525-D5
1 OR 2	350 Flight Cycles
3	Remove Engine

I. Refer to Figure 5 Diffuser Case Left Side View and Table 5 Inspection Summary Report. Results shall be communicated back to Pratt and Whitney using EagleNet under V2500 M Flange Fleet Management Team.

3. Close Up

A. Close the thrust reverser halves. (Reference 6, AMM, Chapter/Section 78-32-00).

B. Activate thrust reverser hydraulic control unit. (Reference 6, AMM, Task 78-30-00).

C. Close the engine fan cowls as specified in Reference 6, AMM, Task 71-13-00).

4. Recording Instructions

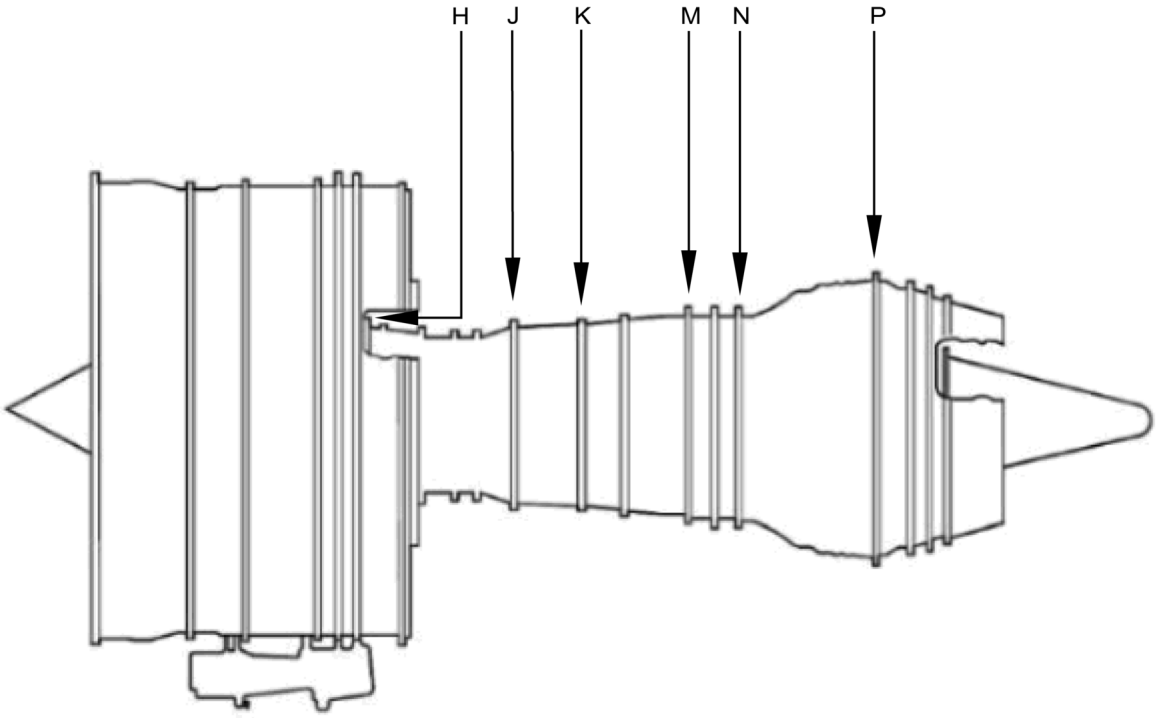
A. A record of accomplishment is required.

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

TABLE 5: INSPECTION SUMMARY REPORT

V2500-ENG-72-A0706	
Date	
Engine Serial Number	
Thrust Rating and Engine Model	
Diffuser Case Part Number	
Diffuser Case Serial Number	
Time Since New Diffuser Case Rear Outer Flange	
Cycles Since New Diffuser Case Rear Outer Flange	
Time Since Last Level 3 or FPI of the Diffuser Case Rear Outer Flange	
Cycles Since Last Level 3 or FPI of the Diffuser Case Rear Outer Flange	
Diffuser Case Rear Outer Flange Previously Replaced?	
No. of Zone 1 Cracks	
No. of Zone 2 Cracks	
No. of Zone 3 Cracks	
Next Inspection Interval	

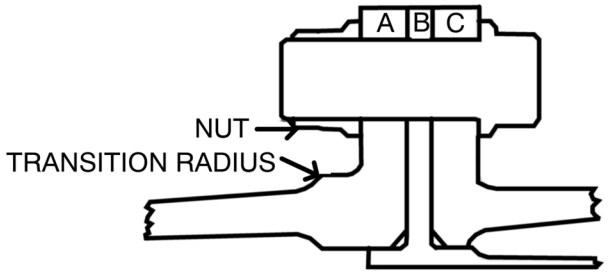
IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



B528176

ENGINE MAJOR FLANGES
FIGURE 1

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

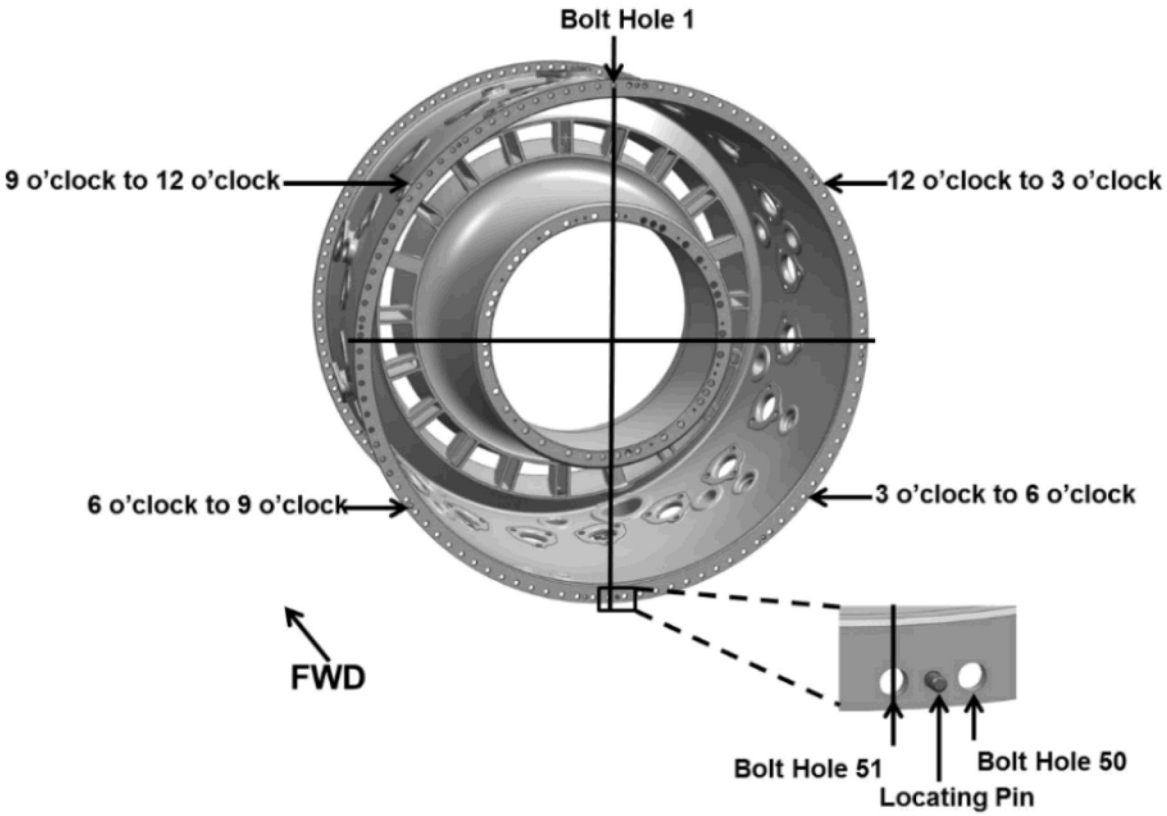


A. DIFFUSER CASE
B. NOZZLE GUIDE VANE (NGV) SUPPORT
C. HIGH PRESSURE TURBINE (HPT) CASE

B528157

"M" FLANGE CROSS SECTION
FIGURE 2

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



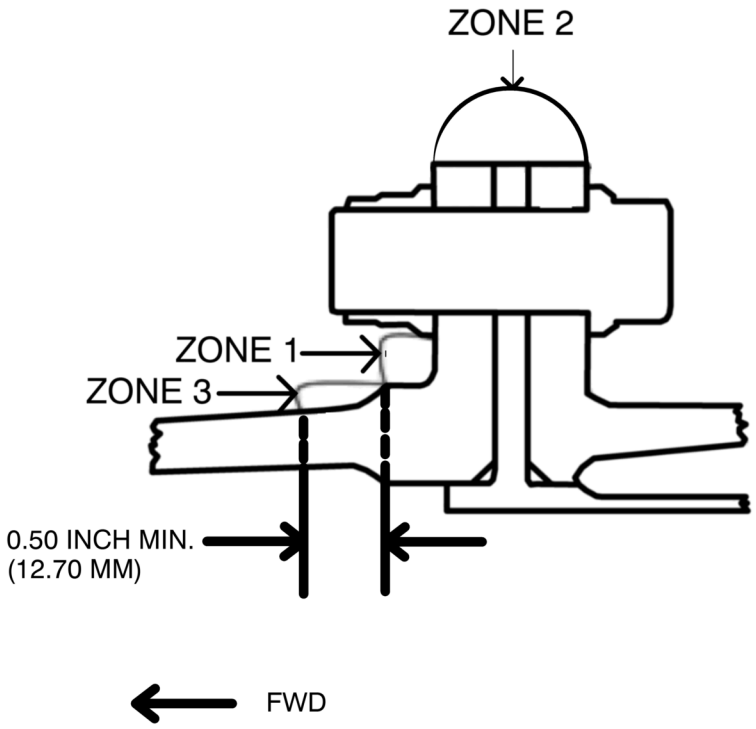
B528185

DIFFUSER CASE REAR OUTER FLANGE CLOCKING POSITIONS (AFT LOOKING FORWARD)
FIGURE 3

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

INSPECTION ZONES

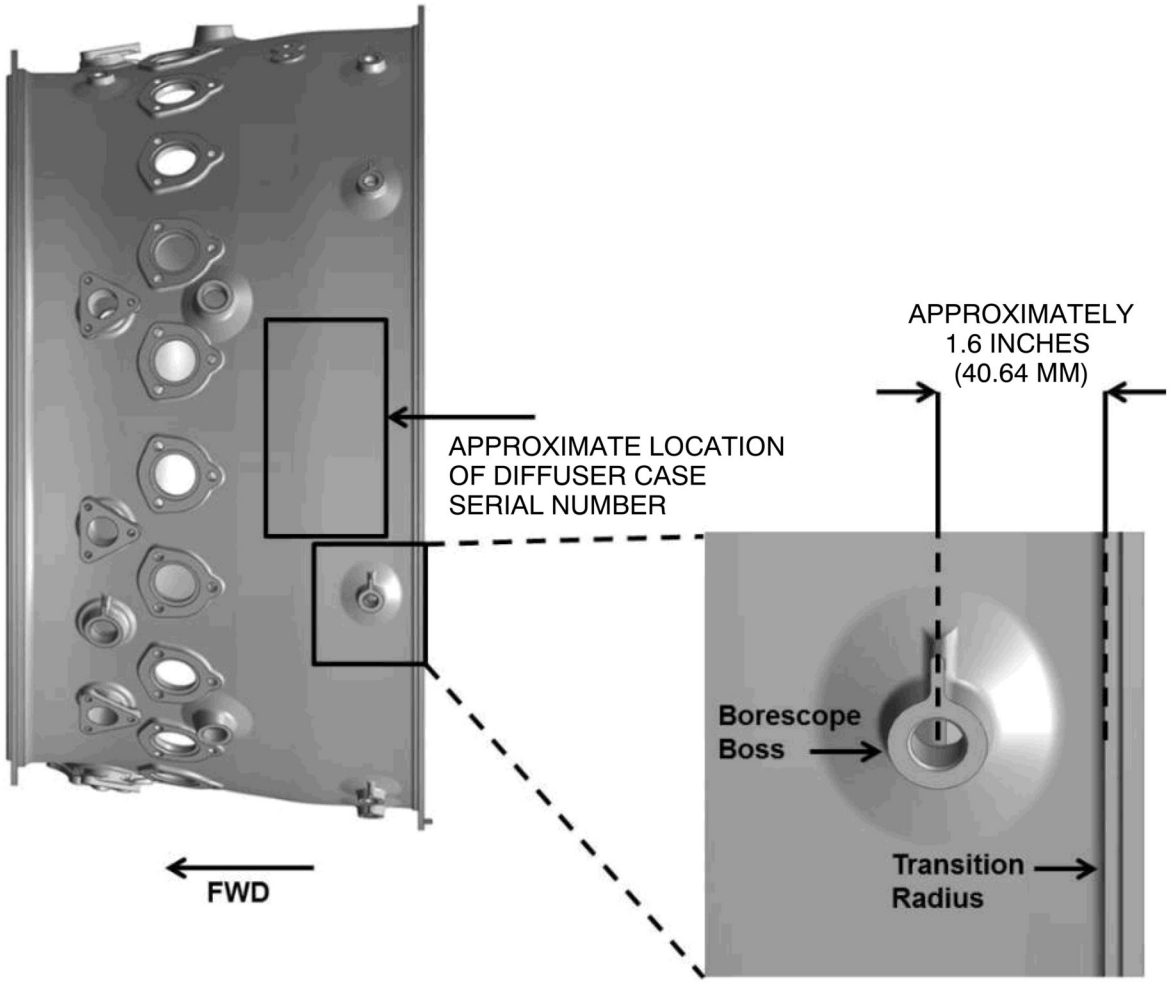
ZONE 1. DIFFUSER CASE ID - BOTTOM OF THE FLANGE NUT TO THE TRANSITION RADIUS.
ZONE 2. OD OF ALL THREE FLANGES OF "M" FLANGE.
ZONE 3. DIFFUSER CASE ID - FROM TRANSITION RADIUS TO A 0.50 INCH MINIMUM ON THE DIFFUSER CASE WALL.



B528158A

"M" FLANGE INSPECTION AREAS
FIGURE 4

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).



B528186A

DIFFUSER CASE LEFT SIDE VIEW (AFT LOOKING FORWARD)
FIGURE 5

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Appendix

Added Data

Internal Reference Information

Revision No.	Reference Document	Origination
Original	EA19VC066	RD/RCM
1	EA19VC066	RD/RCM
2	EA19VC066	RD/RCM

Number values shown in parentheses adjacent to U.S. values are International System of units (SI) equivalents.

To calculate part life, include the hours and/or cycles since the part was made. Use the total hours or cycles to calculate life limits that are the result of part modification, a part used in an engine with different thrust, or for some other reason.

NOTE: In 2014 IAE converted the V2500 Technical Publications to a new system. As a result of the conversion, some manuals were consolidated. All manuals received new P&W part numbers. To facilitate the use of this NMASB, the following Technical Publications cross reference table is provided.

Technical Publications Cross Reference Table

Publication	Engine Model(s)	IAE IETM Pub Ref	P&W Part Number
ENGINE MANUAL — A1, A5	All	E-V2500-1IA	2A4407
CMM-EHC — A1, A5	All	EHC-V2500-1IA	2A4409
CMM-FN — A1, A5	All	FN-V2500-1IA	2A4410
CMM-MMC — A1, A5	All	MECH-V2500-1IA	2A4411
CMM-THD — A1, A5	All	THD-V2500-1IA	2A4412
TLM — A1, A5	All	T-V2500-1IA	2A4408
ENGINE MANUAL — D5	All	E-V2500-3IA	2A4416
CMM-EHC — D5	All	EHC-V2500-31A	2A4418
CMM-FN — D5	All	FN-V2500-3IA	2A4419
CMM-MMC — D5	All	MECH-V2500-3IA	2A4420
CMM-THD — D5	All	THD-V2500-3IA	2A4423
TLM — D5	All	T-V2500-3IA	2A4417
SPPM (SPM) — A1, A5, D5	All	SPP-V2500-1IA	2A4414
EIPC — A1	V2500-A1102Q00	S-V2500-1IA	2A4427

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).

Publication	Engine Model(s)	IAE IETM Pub Ref	P&W Part Number
EIPC — A5	V2522/V2524/V2527M-AQ02	S-V2500-6IA	2A4428
	V2522/V2524/V2527M-AQ03	S-V2500-6IB	
	V2522/V2524/V2527M-SQ02	S-V2500-6SA	
	V2522/V2524/V2527M-SQ03	S-V2500-6SB	
	V2522/V2524/V2527M-SQ04	S-V2500-6NA	
	V2522/V2524/V2527M-SQ05	S-V2500-6NB	
	V2527/V2527E-AQ02	S-V2500-7IA	
	V2527/V2527E-AQ03	S-V2500-7IB	
	V2527/V2527E-SQ02	S-V2500-7SA	
	V2527/V2527E-SQ03	S-V2500-7SB	
	V2527/V2527E-SQ04	S-V2500-7NA	
	V2527/V2527E-SQ05	S-V2500-7NB	
	V2530-AQ02	S-V2500-2IA	
	V2530-AQ03	S-V2500-2IB	
	V2530-SQ02	S-V2500-2SA	
	V2530-SQ03	S-V2500-2SB	
	V2530-SQ04	S-V2500-2NA	
	V2530-SQ05	S-V2500-2NB	
	V2533-AQ02	S-V2500-5IA	
	V2533-AQ03	S-V2500-5IB	
	V2533-SQ02	S-V2500-5SA	
	V2533-SQ03	S-V2500-5SB	
	V2533-SQ04	S-V2500-5NA	
	V2533-SQ05	S-V2500-5NB	
EIPC — D5	V2525/V2528-AQ02	S-V2500-3IA	2A4426
	V2525/V2528-AQ03	S-V2500-3IB	
	V2525/V2528-AQ04	S-V2500-3IC	

IAE PROPRIETARY INFORMATION
©IAE International Aero Engines AG (date as above). All rights reserved.
Not subject to the EAR per 15 C.F.R. Chapter 1, Part 734.3(b)(3).