



Tech.Variances: 1422002810145170

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Where the recipient of this document works in accordance with regulations under control of the relevant national aviation authority, outside of the EU jurisdiction and no applicable bi-lateral agreement or equivalent exists, it is essential that the recipient ensures that the relevant national aviation authority accepts / approves the incorporation of this Technical Variance.

This Technical Variance is only applicable for parts of the Rolls-Royce Engine Type Design and does not apply to parts marked with 'PMA' in accordance with the national regulations. (e.g. USA/FAA)

The content of this document is supplemental to the Manual(s) specified below and should be suitably stored in accordance with local airworthiness requirements.

TV No.	289517	Issue:	1	Date of Application:	06 February 2025
Application Type	One-off <input checked="" type="checkbox"/> Repeater <input type="checkbox"/>			Expiry date (If Repeater)	N/A
Operator/Applicant	EXECUTIVE JET MANAGEMENT INC / ROLLS-ROYCE CANADA LIMITED			Original Request No.	BR25-057
Engine Type	BR700-710			Engine Mark/Model (s)	A1-10
Part Description	ENGINE			Eng/Mod Serial No.	11498 / N/A
Part No.	REFER TO TABLE 1			Part Serial No.	N/A
Manual Title	ENGINE MANUAL	Ref.	E-710-1BR	ATA/DMC Ref.	72-00-51
TV Title	ACCEPT OVERSIZED GAP BETWEEN 3-OFF DIAPHRAGM ASSEMBLIES				
Hours	HSN: 10585.1 (MODULE)	Cycles	CSN: 4340 (MODULE)		

Existing Requirement

Engine Manual (EM) TASK 72-00-51-400-001 'Install the LP Turbine Module' SUBTASK 72-00-51-420-006, 22. Install the LP Turbine Module instructs to install the diaphragm assembly on the flange maintaining a gap between each diaphragm assembly between 0,0 mm to 2,0 mm (0.0 in to 0.08 in) with the surface mismatch not greater than 0,5 mm (0.02 in). Refer to figure 2 on page 4 of this TV.

Requested Variance

The requested Technical Variance (TV) is raised to accept the subject engine exhibiting gap between 3-off Diaphragm Assemblies as detailed in Table 2 on page 2 of this TV.

Refer to figures on pages 3 to 5 for inspection locations and photo of damage.

ESN 11498 was removed due to fuel nozzle cracked burner sleeve.

Approval Statement

TV CLASSIFICATION	MAJOR <input type="checkbox"/>	MINOR <input checked="" type="checkbox"/>
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The technical content of this document is approved under the authority of:

- DOA ref. EASA.21J.065. It has been demonstrated that the TV and areas affected by the TV comply with the type-certification basis.
- A representative of European Union Aviation Safety Agency (EASA) Certificate no: *Certificate Number, where applicable*.
- Rolls-Royce has demonstrated compliance with the type-certification basis and environmental protection requirements, as established and notified by the Agency, following the certification programme as accepted by the Agency.
- Airframer reference no: *Airframer Reference Number, where applicable*.

Approval by Airworthiness Office


Digitally signed by
Sauvageau, Francois
Date: 2025.02.07
14:58:16 -05'00'

Country	Export Classification	Date
GERMANY	Not Listed	07 Feb 25



Summary of Investigation and Conclusions

The above request has been investigated. RRD Engineering has concluded that the reported deviation in gap between 3-off Diaphragm Assemblies will not affect the integrity and functionality of the part/ engine, if the recommendations given in this TV are complied with.

This TV is accepted subject to compliance with the following recommendations:

- Accept the deviation in gap between 3-off Diaphragm Assemblies in as-is condition.
- Make a record of this TV289517 in the applicable records.

Part Number	ATA / Fig-Item	Part Description
BRR24300	72-00-51 / 02-600	Diaphragm Assembly
BRR24301	72-00-51 / 02-700	
BRR24302	72-00-51 / 02-800	
BRR24303	72-00-51 / 02-900	

Table 1: Details of affected Parts

Deviation details	Measured Gap between Diaphragm	Deviation from EM
Measured over gap between 3-off Diaphragm Assemblies	3,4 mm (0.13 in)	1,4 mm (0.05 in) more than EM limit

Table 2: Damage and Deviation Details

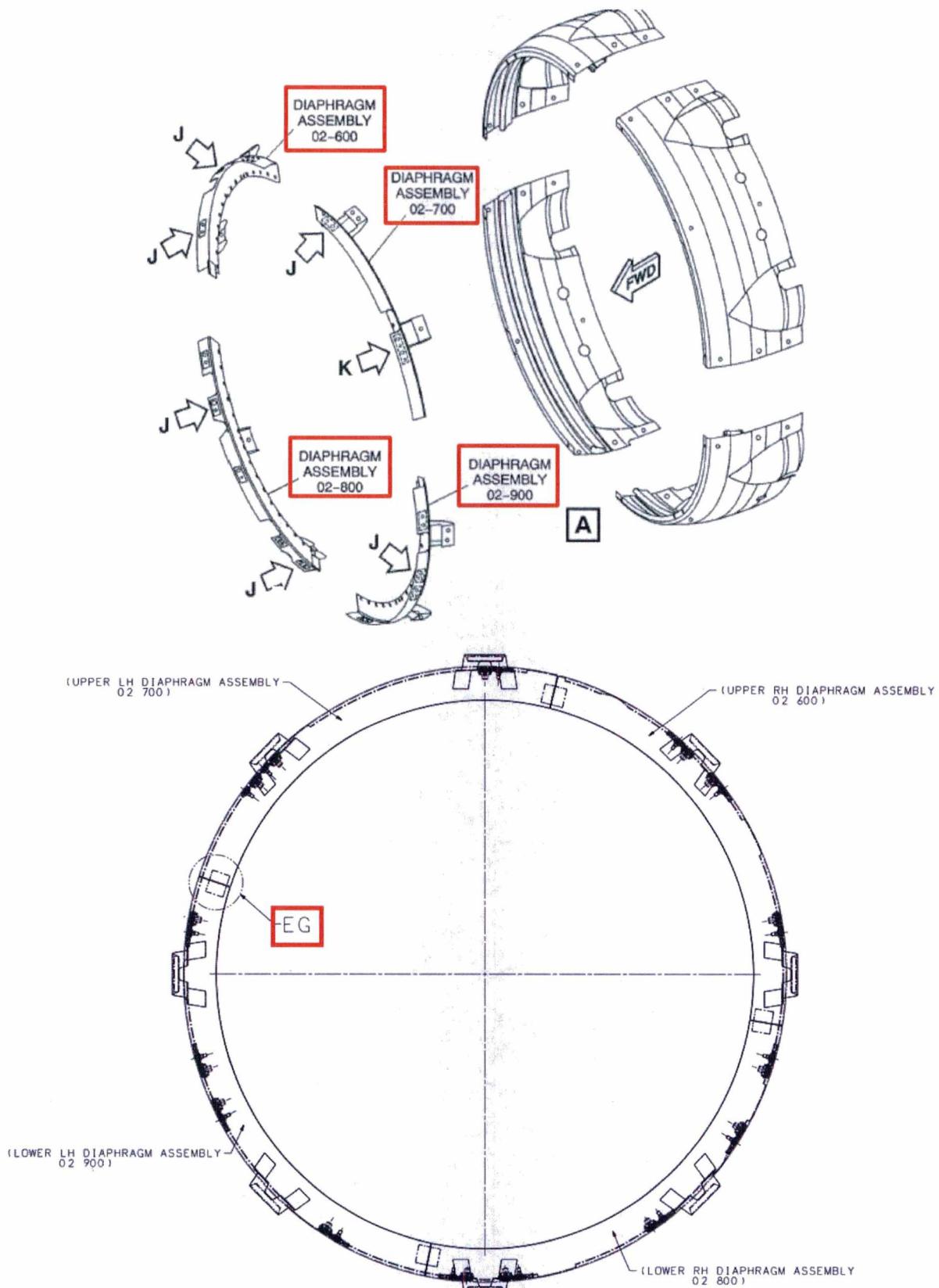


Figure 1: Inspection Locations on the Diaphragm Assemblies

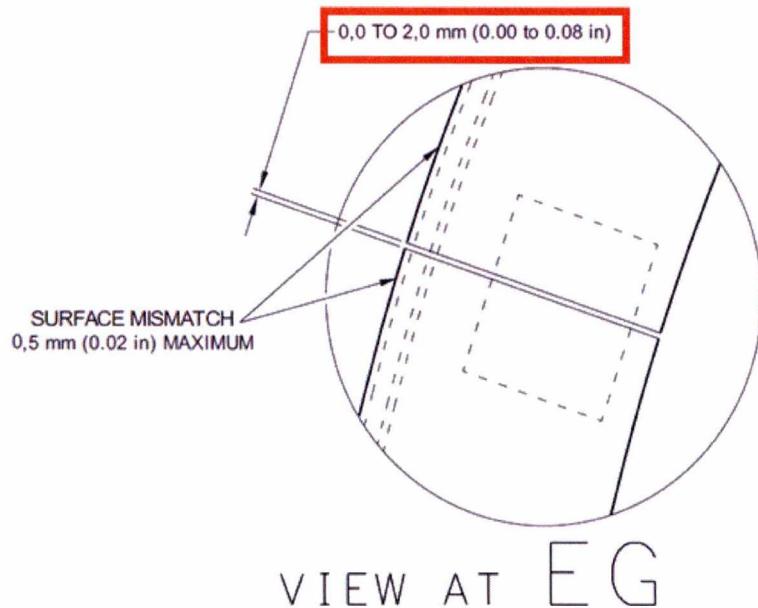


Figure 2: Gap between Diaphragm Assemblies (Referred from Fitting Instruction Drawing: KH12724)

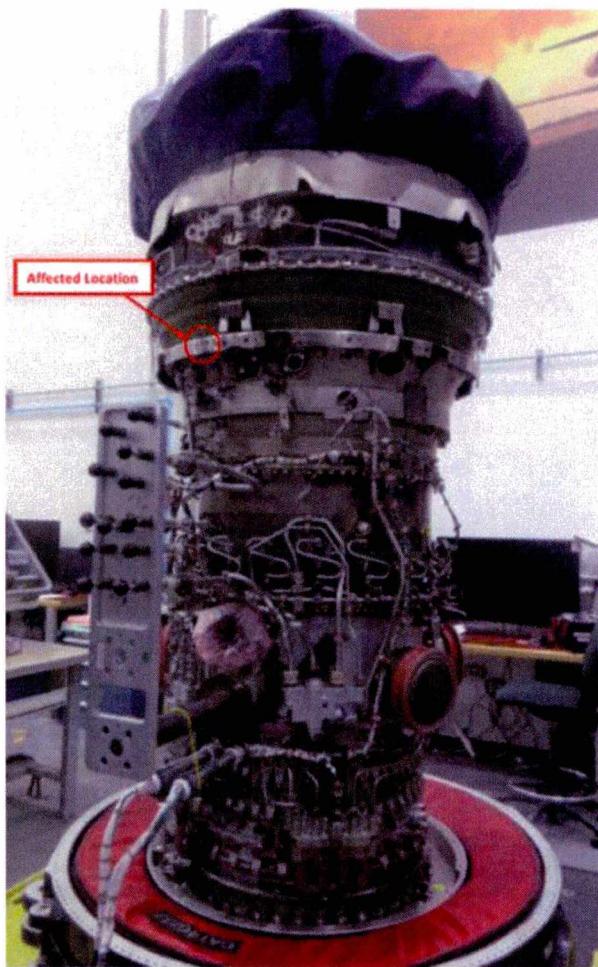


Figure 3: General view to show affected engine with deviated LPT Module Diaphragm Assemblies

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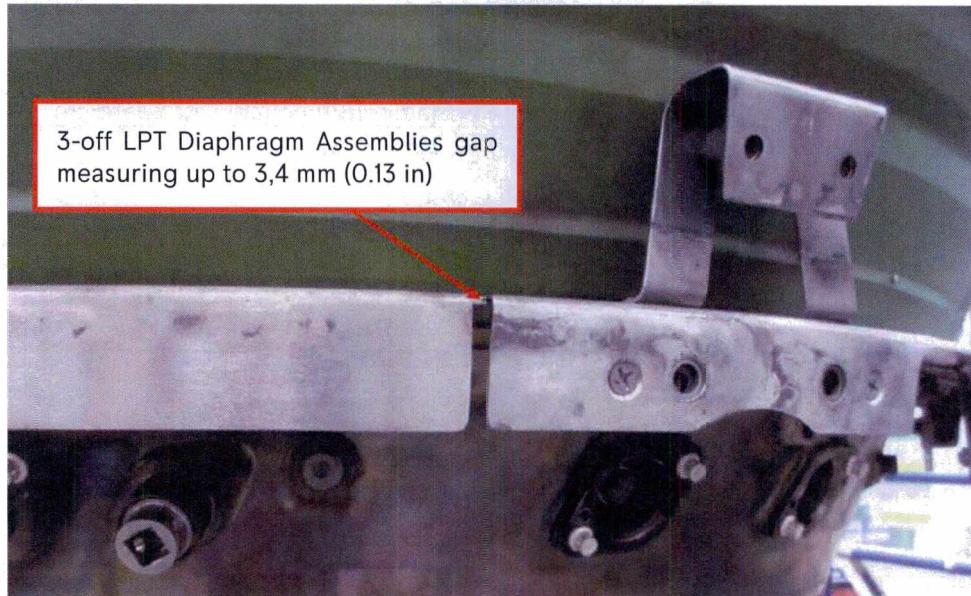


Figure 4: Typical view to show gap between Diaphragm Assemblies



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Technical Variance Approval Sheet

TV No. 289517
Issue 1
Version 1

The signatures below confirm compliance with the Engine Type Certification requirements as stated in EU 21A.433 (a).
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Note: All approvals below must include a signature, printed name, role/function, and a date.

TV Originator Only required if not originated by a TV Competent Author.  Signed by Ayush Khushu Service Engineer	TV Competent Author Responsible for the showing of compliance demonstration, where applicable.  Service Engineer Competent Author (CA)
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TV Approver

Confirmation that:

- the procedures as specified in the Civil Aerospace Design Organisation handbook have been followed including all mandatory requirements.
- no feature or characteristic has been identified that may make the product unsafe for the uses for which certification is requested. Refer to Standardisation Report Safety Review section of this TV.


Digitally signed by
Sauvageau, François
Date: 2025.02.07
14:56:22 -05'00'

Generic Approval TV	TV Number N/A	<input type="checkbox"/>	Applicable the criteria given in RRCS 10060-003 Appendix A has been confirmed
		<input checked="" type="checkbox"/>	Not Applicable

Specialist Function 	Specialist Function 	Specialist Function 
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Specialist Function 	Specialist Function 	Specialist Function 
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Specialist Function 	Specialist Function 	Specialist Function 
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Compliance Verification Engineer (CVE) (Including a RR assigned CVE number)

Confirmation of an independent verification of the compliance demonstration, where applicable. Refer to Standardisation Report Compliance Demonstration section of this TV.


Digitally signed by
Sauvageau, François
Date: 2025.02.07
14:58:02 -05'00'
(CVE) Certificate No. 267



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PROPOSED TECHNICAL VARIANCE HAS A POTENTIAL EFFECT ON: (Tick in the appropriate boxes)											
	Yes	No		Yes	No		Yes	No		Yes	No
Stress	✓		•Performance/operability		✓	•Noise		✓	Repair		✓
Containment		✓	Balancing/Vibration		✓	Icing		✓	Limits		✓
Component life		✓	Oil system		✓	•Flight deck indication		✓	Tooling		✓
Design	✓		Fuel system		✓	Testing		✓	Others (Please specify)		
Material		✓	•Engine handling/controls		✓	Build/strip procedure		✓	1.		
Air system		✓	•Fire and ventilation		✓	Cleaning		✓	2.		
Thermals		✓	•Emissions		✓	Inspection		✓	3.		

For any ticked to indicate "Yes"; relevant technical substantiation (compliance demonstration with the certification basis) and/or mitigation / justification is to be provided on the Standardisation Report's continuation sheet(s).

Where identified by •, airframer approval may be required.

Future Arisings: - Subject to the understanding at the time of issue of this document.	Yes	No
Can limits approved in this TV be read across to future TVs for the current marks/models of this engine type?	✓	
Can the limits approved by this TV be introduced into the Manuals?		✓
If "No" to either of the above - provide justification, why these limits cannot be read across for future arisings.		
If "Yes" to either of the above - provide actual limits that can be applied for future arisings.		
This is to be documented in the Previous Occurrences, Future Arisings and Associated Exit Strategies section of this Standardisation report in this TV.		



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Safety Review

It is the accountability of the TV Approver to ensure that the Safety Review has been correctly completed before TV issuance.

Mandatory Regulatory Requirements - Airworthiness Directives (ADs)

A review of open EASA, FAA and CAA-UK ADs has been carried out and it is confirmed that all applicable ADs have been assessed and substantiated for relevance to the deviation contained in this TV. Chief Engineer and/or Airworthiness Office approval is not mandated for this specific assessment, however guidance may be required if uncertain.



List in the table below all ADs that are applicable to the deviation in this TV. Assess if the applicable AD is additionally relevant, i.e., the deviation contained in this TV contradicts the intent of the AD and enter "Y" or "N" in the table. Provide substantiation why the applicable AD is relevant or not relevant to the deviation in this TV.

If an AD is both applicable and relevant the TV **MUST NOT be issued**.

Applicable AD No.	Applicable AD Subject	Relevant?	Relevance Substantiation
N/A	N/A	N/A	There are no ADs applicable and relevant to deviation addressed in current TV.

Regulator & Project commitments and Safety Policies - Safety Management Plans (SMPs)

A review of the applicable specific engine type/model SMP has been carried out and it is confirmed that all applicable regulator & project commitments and safety policies have been assessed and substantiated for relevance to the deviation contained in this TV. Chief Engineer and/or Airworthiness Office approval is not mandated for this specific assessment, however guidance may be required if uncertain. However, if any commitments / safety policies are assessed to be both applicable and relevant Chief Engineer approval is mandated, unless specific waiver approval has been provided by the CE in a previous precedent TV for the same deviation.



List in the table below all SMP regulator & project commitments and safety policies that are applicable to the deviation in this TV. Assess if the applicable commitments / safety policies are additionally relevant, i.e., the deviation contained in this TV contradicts the intent of and/or deviates from the declared commitment / safety policy and enter "Y" or "N" in the table. Provide substantiation why the applicable SMP commitment / safety policy is relevant or not relevant to the deviation in this TV.

If a SMP commitment / safety policy is both applicable and relevant to the deviation contained in this TV Chief Engineer (CE) approval **must be obtained BEFORE TV issuance unless a precedent waiver applies***.

SMP No.	Applicable SMP Commitment	Relevant?	Relevance Substantiation
EDNS01000983731/004-ISS004	Safety Management Plan – Project BR710 and BR725	N	SMP does not contain specific commitments against the part addressed in this TV.

Safety Occurrence Reporting - Red Tops (RTs)

A review of all open and closed Red Tops (RT) has been carried out and it is confirmed that all applicable RTs have been assessed and substantiated for relevance to the deviation contained in this TV. Chief Engineer and/or Airworthiness Office approval is not mandated for this specific assessment, however guidance may be required if uncertain. However, if open and/or closed Red Top is assessed to be both applicable and relevant Chief Engineer approval is mandated, unless specific waiver approval has been provided by the CE in a previous precedent TV for the same deviation.



List in the table below all open and closed RTs that are applicable to the deviation contained in this TV. For applicable closed RT the closure actions, including ALARP actions, contained in the close-out report must be assessed. Assess if the applicable open RT, and/or closed RT actions, are relevant, i.e., the deviation contained in this TV contradicts the intent of and/or deviates from the declared RT assumptions and/or actions and enter "Y" or "N" in the table. Provide substantiation why the applicable RT is relevant or not relevant to the deviation in this TV.

If an open RT, and/or a closed RT closure action (including ALARP actions), is both applicable and relevant to the deviation contained in this TV Chief Engineer (CE) approval **must be obtained BEFORE TV issuance unless a precedent waiver applies***.

Applicable RT No.	Applicable RT Subject	Relevant?	Relevance Substantiation
N/A	N/A	N/A	The issue addressed in the current TV is not related to any open/ closed Red Tops.



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Proposed TV Certification Basis, Classification & Rationale

Certification Basis	<p>Airworthiness Standards: JAR-E, Change 8 Amendment E/91/1, effective 27.05.1991 Amendment E/93/1, effective 17.05.1993 Emissions and Fuel Venting: ICAO Annex 16, Volume II (Second Edition July 1993)</p> <p>Special Conditions (SC): Ingestion of Hail, Ingestion of Rain</p> <p>Equivalent Safety Findings: JAR-E840(a)(2) Rotor Integrity</p> <p>Deviations: JAR-E890(a) Engine Calibration in Reverse Thrust – Exemption</p> <p>Environmental Protection: CS-34 as issued by EASA Decision No. 2003/3/RM of the Executive Director of the Agency dated 17 October 2003 in accordance with environmental protection requirements, ICAO Annex 16 Volume II Amendment 7 applicable 17 November 2011. NOx standard in accordance with ICAO Annex 16 Volume II, Part III, Chapter 2, paragraph 2.3.2 e) (CAEP/8).</p>
Classification Rationale and Decision	The subject TV has been classified as 'Minor' in line with RRCS 10060/002.
	<p style="text-align: center;">MAJOR <input type="checkbox"/> MINOR <input checked="" type="checkbox"/></p>

Technical Substantiation and Compliance Demonstration

Component Classification	N/A	Material	N/A														
<table border="1"><thead><tr><th data-bbox="301 1517 601 1572">Part Number</th><th data-bbox="601 1517 980 1572">Part Classification</th><th data-bbox="980 1517 1343 1572">Material</th></tr></thead><tbody><tr><td data-bbox="301 1572 601 1617">BRR24300</td><td colspan="2" data-bbox="601 1572 980 1617">UNCLASSIFIED</td></tr><tr><td data-bbox="301 1617 601 1663">BRR24301</td><td colspan="2" data-bbox="601 1617 980 1663"></td></tr><tr><td data-bbox="301 1663 601 1709">BRR24302</td><td colspan="2" data-bbox="601 1663 980 1709"></td></tr><tr><td data-bbox="301 1709 601 1754">BRR24303</td><td colspan="2" data-bbox="601 1709 980 1754"></td></tr></tbody></table>	Part Number	Part Classification	Material	BRR24300	UNCLASSIFIED		BRR24301			BRR24302			BRR24303			QGP (MSRR7104)	
Part Number	Part Classification	Material															
BRR24300	UNCLASSIFIED																
BRR24301																	
BRR24302																	
BRR24303																	

Assessment

The subject ESN 11498 exhibits deviation in gap between 3-off Diaphragm Assemblies. The reported worst gap measures up to 3,4 mm which is 1,4 mm more than EM acceptable limits.

It is found that in the previous revision of EM TASK 72-00-51-400-001 of BR700-710A1-10 Engine Model, instructions to measure gap between diaphragm assemblies were not mentioned. However, the changes proposed through CR: DW-9901, CR: DW-9947 is to introduce the clearance limit of 2,0 mm and to add the

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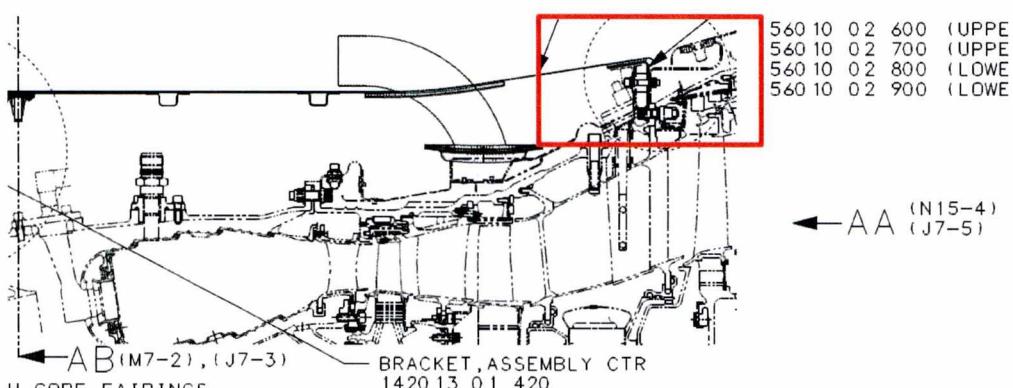
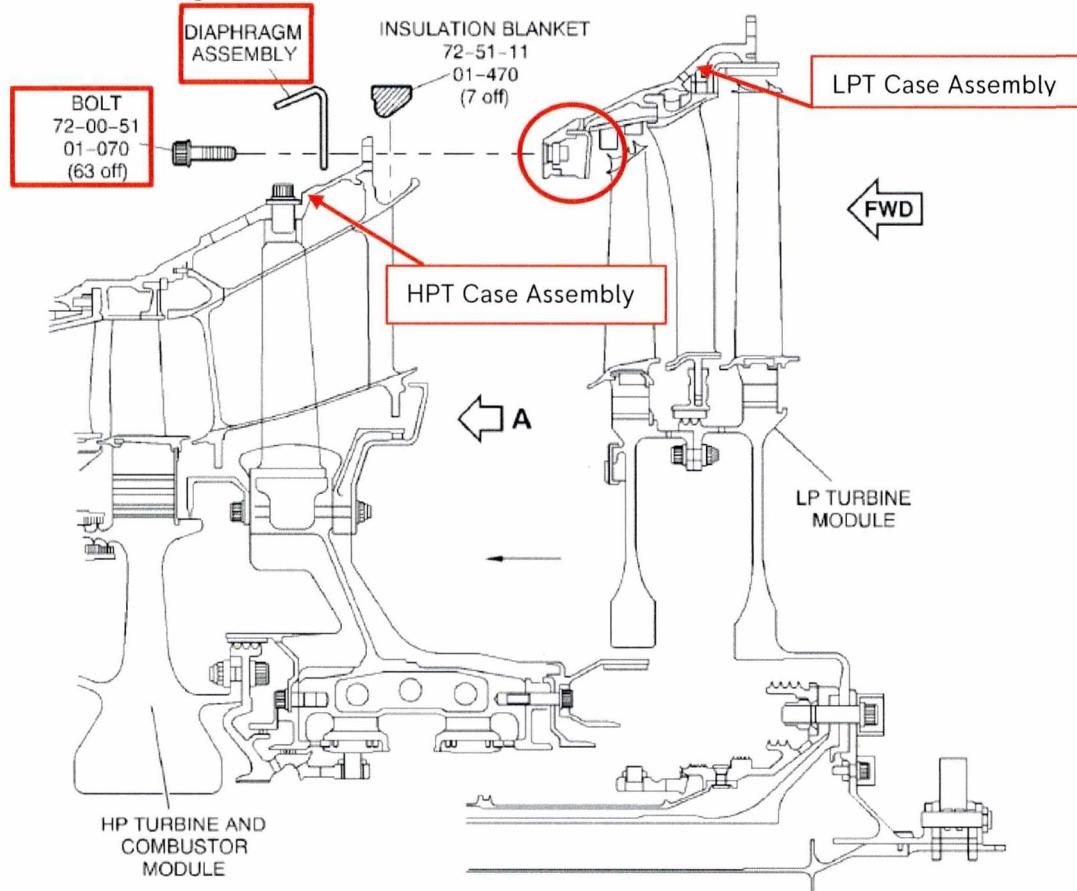
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surface mismatch limit of 0,5 mm for the diaphragms (72-00-51, 02-600), (72-00-51, 02-700), (72-00-51, 02-800) and (72-00-51, 02-900) for BR700-725A1-12 and BR700-710 Engine Models in line with fitting instruction drawing KH12724.

From the general arrangement drawing, it is assessed that the Diaphragm Assemblies (EIPC: 72-00-51, 02-600, 02-700, 02-800 and 02-900) are installed on the front of the HPT/LPT flange using bolts (EIPC 72-00-51, 01-070). Refer to Illustration 1 given below.



PRIOR TO TIGHTENING FASTENERS AT HPT/LPT FLANGE, ENSURE DIAPHRAGMS UINS 1560 10 02 600 TO 1560 10 02 900, ARE FITTED TO GIVE THE BEST ACHIEVABLE COLD BUILD CLEARANCES AS SHOWN (VIEW AT EG K15-5).

Illustration 1

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Technical Variance Standardisation Report

TV No. 289517
Issue 1
Version 1

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Based on engineering assessment, it is concluded to accept the reported deviation in gap between the Diaphragm Assemblies on LPT Module in 'as-is' condition.

It is assessed that the reported Diaphragm Assemblies on the front fixed fairings and forward seal lands with correct position gives the best achievable cold build clearances and will not have any effect on the functionality of the parts.

RRD Engineering has concluded that accepting the deviated gap between 3-off Diaphragm Assemblies of LPT Module will not affect the integrity and functionality of the part/ engine, if the recommendations given in this TV are complied with.

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Compliance Demonstration

The effect of this TV on the certification requirements has been investigated and the following items have been considered. All other requirements (Airworthiness and Environmental Protection) are deemed to be not applicable to the subject of this TV.

Requirement	Title	Means of Compliance Demonstration	Evidence
JAR-E 100	Strength	Engineering Judgement	Based on engineering assessment, it is concluded that the deviated gap between 3-off Diaphragm Assemblies will not have any adverse effect on the strength of the part, if the recommendations given in this TV are complied with.
JAR-E 510	Failure Analysis	Engineering Judgement	The FMECA Report TR1498/11-ISS02 does not contain specific failure mode, effect, and criticality analysis for Diaphragm Assemblies. However, the recommendation given in this TV do not introduce any new failure modes for parts addressed in FMECA Report TR1498/11-ISS02 and nor do they change any assumption, analysis or conclusion contained in existing FMECA Report E-TR1498/11-ISS02.
JAR-E 500	Functioning	Engineering Judgement	Based on engineering assessment, it is concluded that the reported condition will have negligible effect on the engine performance. Hence, the performance of the engine to meet the applicable aircraft requirements, to which it is installed, will not be adversely affected, if the recommendations given in this TV are complied with.
JAR-E 110	Drawings and marking of the parts – Assembly of Parts	Engineering Judgement	This TV does not recommend to Vibropeen TV number on the part. Based on engineering assessment, the recommendations given in this TV to accept the deviated gap between the Diaphragm assemblies will not have any adverse effect on the assembly process of the LPT Module and therefore the risk of incorrect assembly is not affected. Compliance with the requirements of JAR-E 110 has been demonstrated by the compliance statement above.



Based on the evidence given compliance with the applicable certification basis has been demonstrated.



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Previous Occurrences, Future Arisings and Associated Exit Strategies

Previous Occurrences:

Previously, the following TVs have been issued to accept the deviation in gap between Diaphragm Assemblies of LPT Module:

TV Number	Engine Model	Affected Diaphragm Details	Measured Gap	Disposition
TV289262	BR700-710 A1-10	2-off Diaphragm Assemblies	2,9 mm	Accept 'as-is'
TV289048	BR700-710 A1-10	3-off Diaphragm Assemblies	2,8 mm	
TV288702	BR700-710A1-10	4-off Diaphragm Assemblies	2,8 mm	
TV287998	BR700-710C4-11	3-off Diaphragm Assemblies	4,75 mm	

The reported gap measured between Diaphragm assemblies in current TV is less than the previous TV287998. Further, the disposition given in current TV is same as the previous TVs.

Export Control Information (This table applies to TV Approval Sheet, Standardisation Report & Information Sheet Only)

Country	Export Classification	Date
Germany	Not Listed	07 February 2025
Canada	Not Listed	07 February 2025
India	Not Listed	07 February 2025

Note 1 (Germany): The technology contained in these parts of a TV must be confirmed, by the TV Approver, to have an Export Classification of either "Not Listed" or "PL9009.c". These sections of a TV must NOT contain technology of any other Export Classification but may reference such technology (e.g. Technical Reports). However, such referenced material must NOT be archived in the TV Database.

Note 2: (All other countries including Singapore & USA): Export Control must be considered, and these parts of the TV document marked in accordance with the requirements of that country. Refer to the relevant Export Control Manager.



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What date is the completed TV due to the customer (RR Promise date)?	Date:	<input type="text"/>
Are the relevant detail drawings, general arrangement and schemes included with the pack? Any comments:		<input type="checkbox"/>
Are the relevant Engine Manual Inspection Checks, I.P.C. illustrations, Service Bulletins included in the pack? Any comments:		<input type="checkbox"/>
Has a TV history search for the engine and part number (including description) been completed and appropriate TVs included in the pack? Any comments:		<input type="checkbox"/>
Has a TV history search for similar engines and part numbers (including description) been completed and appropriate TVs included in the pack? Any comments:		<input type="checkbox"/>
Are the relevant Previous TVs and FRSs included in the pack and any examples of rejected TVs? Any comments:		<input type="checkbox"/>
Has a concession search been completed, and relevant documentation included in the pack? Any comments:		<input type="checkbox"/>
Is the condition of mating parts understood (if applicable)? And is the part to be rebuilt reusing the mating part or using matched pair option? Any comments:		<input type="checkbox"/>
Have the Engine Manual Limits and Aircraft Manual Limits been included (if applicable)? Any comments:		<input type="checkbox"/>
Has the root cause of damage been identified with the TV request originator and a statement included in the pack? Any comments:		<input type="checkbox"/>
Has a sketch / diagram of non-conformance been included? Any comments:		<input type="checkbox"/>
Have replicasts been included? Any comments:		<input type="checkbox"/>
Are all damaged / repaired areas fully dimensioned on the request? Where applicable, have relevant min remaining wall sections been included? Any comments:		<input type="checkbox"/>
Are there Repair Parts (Spares) required to carry out the repair, if so, does the relevant supply chain exist? Any comments:		<input type="checkbox"/>
Has EDC been updated with the latest information? Any comments:		<input type="checkbox"/>
Have you confirmed that no export-controlled technology is within the TV document content? Any comments:		<input type="checkbox"/>
Have you reviewed all current and historic Red Top Investigations? Any comments:		<input type="checkbox"/>

NOTE: An entry should be made in all boxes. Acceptable entries include Y (Yes), N (No) or NA (Not Applicable). Explain briefly within the boxes above if N or NA is entered.