

MANDATORY

SERVICE BULLETIN

No. MSB-E4-043/0

Distribution:	Portal
Date:	27-Aug-2024

1. Basic information

1.1. Subject

Piston borescope inspection

1.2. Record of revisions

Rev.	Date	Reason
0	27.08.2024	Initial approval

1.3. Definitions and Acronyms

For the purpose of this Service Bulletin, the following definitions and acronyms apply:

AD:	Airworthiness Directive
Diamond partners portal:	partners.diamondaircraft.com
EAD:	Emergency Airworthiness Directive
Flight Hours (FH):	Means the cumulative number of airborne hours in operation of each Engine computed from the time an aircraft leaves the ground until it touches the ground at the end of a flight.
GTC:	General Terms of Commerce
MSB:	Mandatory Service Bulletin
n/a:	Not applicable
no.:	Number
p/n or p/ns:	Part number or Part numbers
SB:	Service Bulletin
s/n or s/ns:	Serial number or Serial numbers
Time Since Installation:	Time since installation of the piston
Time Since New (TSN):	Is the amount of Flight Hours elapsed since new.
Time Since Overhaul (TSO):	Is the amount of Flight Hours elapsed since the last engine overhaul.
VMC:	Visual meteorological conditions

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1.4. Engines affected

Engine affected: E4 Series
Engine model(s): E4, E4P
Serial number(s) affected: All engines listed in **Table 1**, and any engines with Piston P/N E4A-72-400-000 installed. (Note: engines produced before 01/2023 without the piston P/N recorded are unaffected, if no core or piston replacement or overhaul has been performed).

- Piston or engine core replacement is not a terminating action:
- The recurrent inspection must be continued even if the engine core is replaced, and the installed core serial number is listed in **Table 1**.
- The recurrent inspection must be continued even if the pistons are replaced, and the installed piston p/n is E4A-72-400-000.

Table 1

Table 1

E4-A									
E4-A-00425		E4-A-06442		E4-A-06452		E4-A-06460		E4-A-06465	
E4-A-06435		E4-A-06443		E4-A-06455		E4-A-06461		E4-A-06466	
E4-A-06436		E4-A-06445		E4-A-06456		E4-A-06462		E4-A-06467	
E4-A-06437		E4-A-06448		E4-A-06458		E4-A-06463		E4-A-06468	
E4-A-06441		E4-A-06449		E4-A-06459		E4-A-06464		E4-A-06469	
E4-A-06470 & subsequent									
E4-B									
E4-B-06072		E4-B-06078		E4-B-06081		E4-B-06084		E4-B-06087	
E4-B-06076		E4-B-06079		E4-B-06082		E4-B-06085		E4-B-06088	
E4-B-06077		E4-B-06080		E4-B-06083		E4-B-06086		E4-B-06089	
E4-B-06090 & subsequent									
E4-C									
E4-C-00020		E4-C-00510		E4-C-06340		E4-C-06348		E4-C-06354	
E4-C-00085		E4-C-00681		E4-C-06341		E4-C-06349		E4-C-06355	
E4-C-00086		E4-C-06332		E4-C-06343		E4-C-06350		E4-C-06356	
E4-C-00304		E4-C-06336		E4-C-06345		E4-C-06351		E4-C-06357	
E4-C-00354		E4-C-06337		E4-C-06346		E4-C-06352		E4-C-06358	
E4-C-00400		E4-C-06339		E4-C-06347		E4-C-06353		E4-C-06359	
E4-C-06360 & subsequent									
E4P									
E4P-C-06221 & subsequent									
Engine Core s/n									
02435	02449	02462	02470	02478	02486	02507	02515	02523	02531
02436	02450	02463	02471	02479	02489	02508	02516	02524	02555
02439	02451	02464	02472	02480	02500	02509	02517	02525	02556
02440	02452	02465	02473	02481	02502	02510	02518	02526	02557
02444	02453	02466	02474	02482	02503	02511	02519	02527	02558
02446	02459	02467	02475	02483	02504	02512	02520	02528	02559
02447	02460	02468	02476	02484	02505	02513	02521	02529	
02448	02461	02469	02477	02485	02506	02514	02522	02530	
02560 & subsequent									

1.5. Reason

Cases of piston cracks have been identified by Austro Engine. These cracks can develop to an extent leading to power loss if not detected. Such cracks can be detected during the borescope inspection. This service Bulletin provides the necessary instructions to inspect pistons for early crack detection.

1.6. Time of compliance

Engine configuration	Time since installation	Initial inspection	Repetitive inspection
E4A, E4P	< 100 FH	100 FH	50 FH ± 10 FH
	> 100 FH	Before the Next Flight	50 FH ± 10 FH
E4B, E4C	< 200 FH	200 FH	100 FH ± 10 FH
	> 200 FH	Before the Next Flight	100 FH ± 10 FH

For the initial inspection, a single ferry flight without passengers, not exceeding 3 flight hours (FH) in VMC condition, is permitted to reach a maintenance location where the required action can be performed.

1.6.1. Credits

Piston borescope inspections, accomplished before the effective date of this Mandatory Service Bulletin in accordance with the instructions of the AR1734, are acceptable to comply with the requirements of this Mandatory Service Bulletin for that engine.

1.6.2. Parts Installation

From the effective date of this Mandatory Service Bulletin, installation of a piston p/n N E4A-72-400-000 is allowed, provided recurrent borescope inspection is accomplished in accordance with the compliance time listed in paragraph 1.6.

1.7. Concurrent documents / references

Note: If not specified, the latest revision of the referenced documents applies.

- Maintenance Manual E4 Series – Doc. No. E4.08.04, latest effective issue
- MSB-E4-039
- WI-MSB-E4-039-I
- WI-MSB-E4-039-II

1.8. Other publications affected

None

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2. Technical Details

2.1. Accomplishment / Instructions

1. Remove the injectors in accordance with MM section 73-10-01-A.
 - The compression test added with MM-TR-MDC-E4-849a is not required.
2. Use a borescope to examine the piston top for cracks, paying particular attention to the area marked in red in Fig. 1.
3. Report the inspection as “performed” on partners.diamondaircraft.com
 - Carefully handle the borescope to prevent any damage to the surface of the piston.
 - Refer to Appendix for borescope images. In case of doubt, contact Austro Engine.
 - In case of findings, proceed in accordance with paragraph 2.1.1.

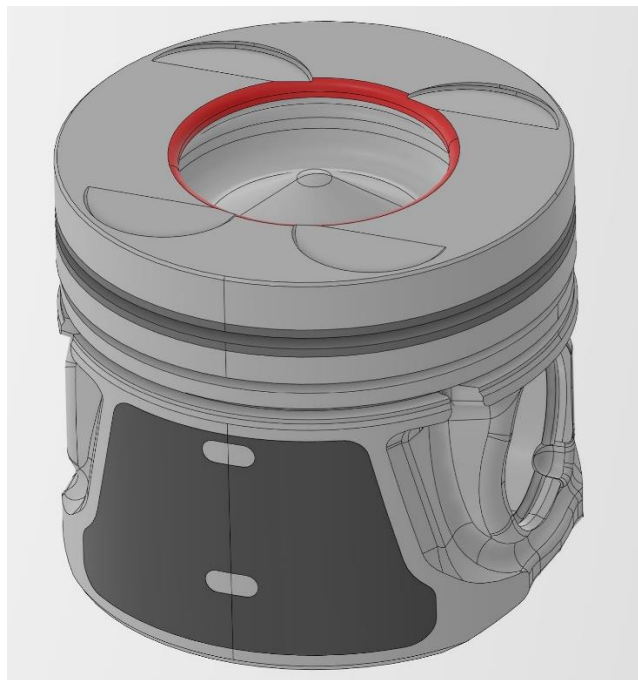


Fig. 1

4. Re-install the injectors in accordance with MM section 73-10-01-B.
 - If leakage is found after the ground run, replace the high-pressure fuel lines.
 - The compression test added with MM-TR-MDC-E4-849a is not required.

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2.1.1. Piston crack repair instructions

1. Report the engine data at AE300data@austroengine.net.
2. Collect a fuel sample from the HPP fuel return line.
3. Send the fuel to a laboratory and perform a fuel analysis in accordance with ASTM D6304 and provide the results to partners.diamondaircraft.com
 - If water or contaminants are found:
 - Collect a fuel sample from the HPP fuel inlet line and perform a fuel analysis, provide the results to partners.diamondaircraft.com **and**
 - Replace the injectors, the HPP, the fuel rails accordance with MM sections 73-10-01 "Injectors", 73-10-03 "High-Pressure Pump (HPP)", 73-20-02 "Fuel rail", and replace the engine core in accordance with WI-MSB-E4-039-I "Core engine replacement" **or**
 - Replace the injectors, the HPP, the fuel rails and the pistons in accordance with MM sections 73-10-01 "Injectors", 73-10-03 "High-Pressure Pump (HPP)", 73-20-02 "Fuel rail", and work instruction WI-MSB-E4-039-II "Piston replacement".

NOTE: Contact the airplane TCH for further instruction in case fuel system contamination is found.

- If water or contaminants are not found:
- Replace the engine core with new parts in accordance with WI-MSB-E4-039-I "Core engine replacement" **or**
- Replace the piston with new parts in accordance with WI-MSB-E4-039-II "Piston replacement".

2.2. Illustrations

Provided as Appendix to this Service Bulletin

2.3. Mass (weight)

Not affected

2.4. Approval statement

The technical content of this document is approved under the authority of the DOA, ref.: EASA. 21J.399.

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3. Planning Information

3.1. Material & availability

MSB Kit Number MSB-E4043-KIT Composed by the following parts		
Part Number	Description	Qty
DIN6797-6.4-A	tooth washer M6	6
E4A-03-000-201	Screw M6x79	4
E4A-03-000-801	Sealing ring 15x1,56 Cu	4
OR_7.8x3.2-ACM70	O-Ring 7,8x3,2 ACM70	1
DIN7603-A10X13,5-AL	Sealing ring 10x13,5 AL	2

3.2. Special tools

Refer to the MM.

3.3. Labour effort

5 Hours

4. Remarks

NOTE:

- All measures must be carried out by a certified engine maintenance organisation and certified engine mechanics.
- The accomplishment of the instructions shown under chapter 2.1 must be documented in the respective engine logbook.
- The accomplishment of the instructions must be carried out within the time of compliance according to chapter 1.6.
- In case of doubt, please contact Austro Engine GmbH via the Diamond Partner Portal.
- If you are not a Diamond Partner / Service Centre, please contact a Diamond Authorized Service Centre near you.

5. Explanatory notes

5.1. Symbol explanation



WARNING: Disregarding these safety rules can cause personal injury or even death.



CAUTION: Disregarding these special instructions and safety measures can cause damage to the engine or other components.



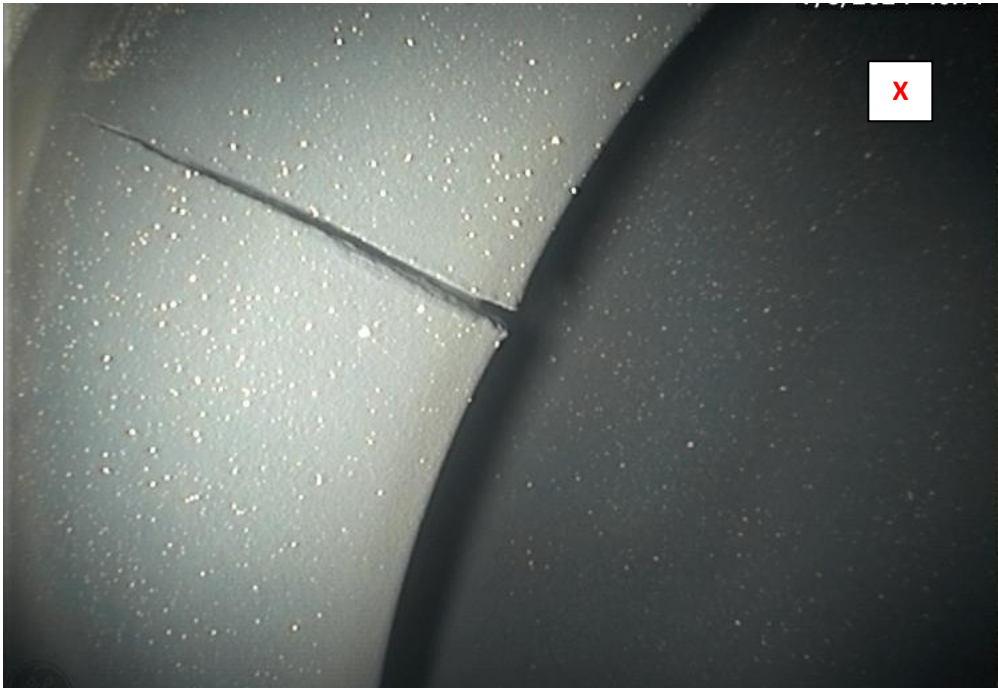
NOTE: Additional note or instruction for better understanding of an instruction.

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6. Appendix

The following examples of borescope images shall assist in determining the condition of the pistons.

Note: In case of doubt, contact Austro Engine.



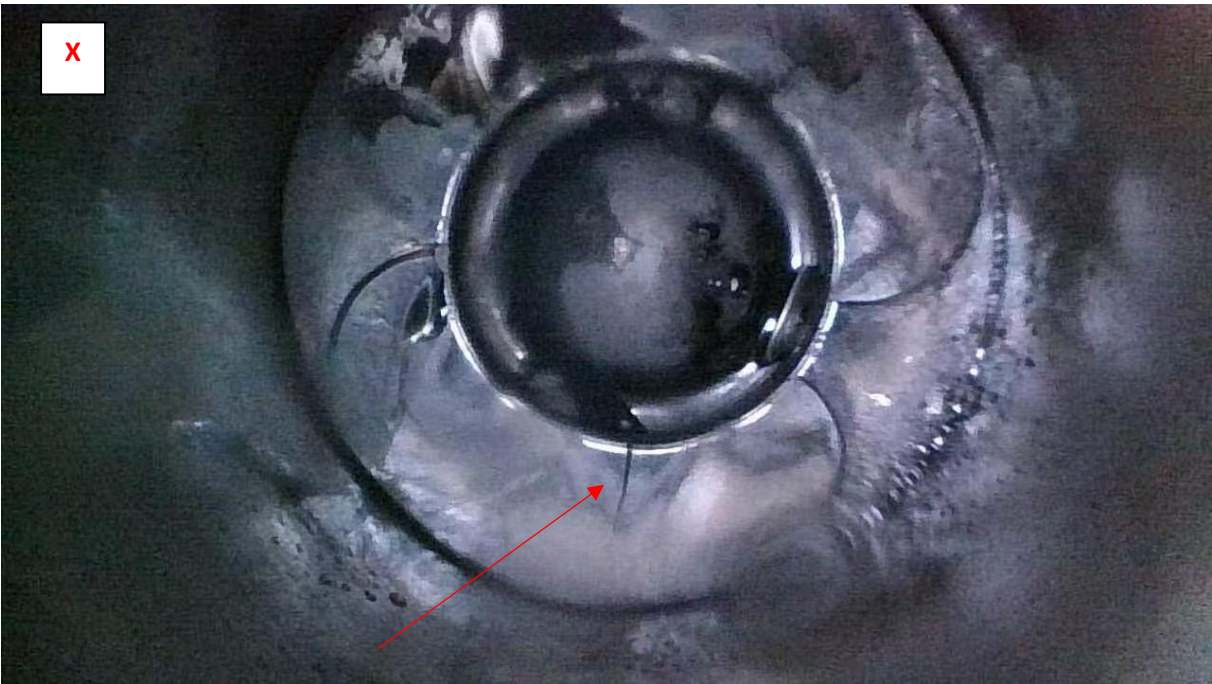
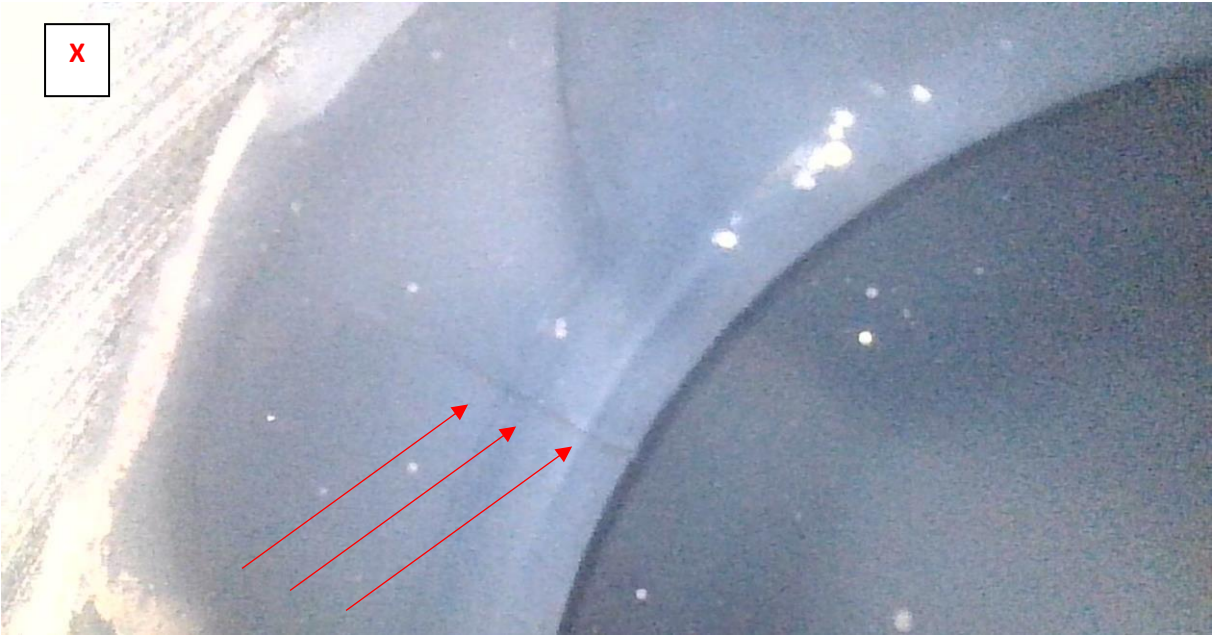
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