



# Notification of a Proposal to Revise an Airworthiness Directive

**PAD No.: 23-089**

**Issued: 28 July 2023**

Note: This Proposed Airworthiness Directive (PAD) is issued by EASA, acting in accordance with Regulation (EU) 2018/1139 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 129 of that Regulation.

In accordance with the EASA Continuing Airworthiness Procedures, the Executive Director is proposing the issuance of an EASA Airworthiness Directive (AD), applicable to the aeronautical product(s) identified below.

All interested persons may send their comments, referencing the PAD Number above, to the e-mail address specified in the 'Remarks' section, prior to the consultation date indicated.

**Design Approval Holder's Name:**

ROLLS-ROYCE DEUTSCHLAND Ltd & Co KG

**Type/Model designation(s):**

Trent 1000 engines

**Effective Date:** [TBD - planned: 7 days after revised AD issue date]

**TCDS Number(s):** EASA.E.036

**Foreign AD:** Not applicable

**Revision:** This PAD proposes to revise EASA AD 2021-0009 dated 08 January 2021.

## ATA 75 – Air – Modulated Air System Control Valves – Lock-Out / Deactivation

**Manufacturer(s):**

Rolls-Royce plc

**Applicability:**

Trent 1000-AE3, Trent 1000-CE3, Trent 1000-D3, Trent 1000-G3, Trent 1000-H3, Trent 1000-J3, Trent 1000-K3, Trent 1000-L3, Trent 1000-M3, Trent 1000-N3, Trent 1000-P3, Trent 1000-Q3 and Trent 1000-R3 engines, all serial numbers, except those on which Rolls-Royce modification (mod) 75-K778 has been embodied in production, or TRENT 1000 SB 75-K778 has been embodied in service.

These engines are known to be installed on, but not limited to, Boeing 787 aeroplanes.

**Definitions:**

For the purpose of this AD, the following definitions apply:

**The NMSB:** Rolls-Royce Alert Non-Modification Service Bulletin (NMSB) TRENT 1000 75-AK642.

**The SB:** Rolls-Royce Service Bulletin (SB) TRENT 1000 75-K778, which introduces an alternative air pipe, Part Number (P/N) LV26990.



**Reason:**

The Modulated Air System (MAS) optimises cooling air, extracted from the compressor, where full flow is not required at cruise conditions. It is only active during cruise. Recently, occurrences have been reported of finding high levels of wear on the seal fins on a small number of high pressure turbine triple seals, P/N FW34485. The effect on the secondary air system was conservatively assessed due to the resultant increased turbine cooling air leakage, which changes the cooling flow around the intermediate pressure (IP) turbine disc.

This condition, if not corrected, could lead to temperature increase at the IP turbine disc rim when the MAS is active, possibly resulting in IP turbine disc failure and high energy debris release, with consequent damage to, and reduced control of, the aeroplane.

To address this potential unsafe condition, Rolls-Royce has issued the NMSB, providing instructions to manually 'lock-out' (deactivate) the MAS control valves.

Consequently, EASA issued AD 2021-0009 to require deactivation of the MAS control valves. That AD also specified that the Master Minimum Equipment List (MMEL) item for 'MAS inoperative', which has a limit of 120 days, does not apply when the system is manually deactivated.

Since that AD was issued, Rolls-Royce developed mod 75-K778, introducing an alternative air pipe, P/N LV26990, which includes a modified restrictor ferrule, as replacement for the original air pipe, P/N KH41198. Embodiment of mod/SB 75-K778 results in deactivation of the MAS control valves but does not produce any spurious engine indicating and crew alerting system (EICAS) status messages (see Note 2 of this AD).

Consequently, this PAD proposes to revise EASA AD 2021-0009, excluding engines in post-mod/SB 75-K778 configuration from the AD Applicability, and to specify that embodiment of Rolls-Royce TRENT 1000 SB 75-K778 in-service is an acceptable alternative method to comply with the requirements of this AD.

This revised AD is still considered an interim action and further AD action may follow, when improved understanding of the seal fin wear and its effects is established.

**Required Action(s) and Compliance Time(s):**

Required as indicated, unless accomplished previously:

**MAS Deactivation:**

- (1) Within the compliance times specified in Table 1 of this AD, deactivate the MAS control valves of each affected engine on an aeroplane in accordance with the instructions of the NMSB.

Table 1 – MAS Deactivation (see paragraph (3) of this AD)

<b>Compliance Time</b> (whichever occurs later, <b>A</b> or <b>B</b> )	
<b>A</b>	Before exceeding 50 flight cycles (FC) since first installation of the engine on an aeroplane
<b>B</b>	Within 30 days or 100 FC, whichever occurs first after 15 January 2021 [the effective date of the original issue of this AD]



**MMEL:**

- (2) Following deactivation of the MAS control valves on each affected engine of an aeroplane, as required by paragraph (1) of this AD, flight operations can be conducted without the need to consider the limit of 120 days indicated in the affected aeroplane MMEL (see Notes 1 and 2 of this AD).

**Ferry Flight:**

- (3) For an affected engine installed on an aeroplane that is stored or otherwise out of service, a single ferry flight of up to 3 FC is allowed to position the aeroplane to a location where the required maintenance action can be accomplished on the affected engine(s) of that aeroplane.

Note 1: Deactivation of the MAS control valves on an affected engine as required by paragraph (1) of this AD changes the engine to an approved configuration that will produce engine indicating and crew alerting system (EICAS) status messages “ENG MAS VALVE L(R)” and “ENG MAS SYS TEST L(R)”. Whereas MAS is purposely disabled by complying with paragraph (1) of this AD, the status messages are not indicative of inoperative (failed) equipment and consequently, the associated (M)MEL instructions and limitations are not applicable in that context. This has been agreed with the Airframe Manufacturer and its State of Design Authority.

Note 2: Deactivation of the MAS control valves on an affected engine as required by paragraph (1) of this AD does not produce the EICAS status message “ENG MAS VALVE SENSOR L(R)”. Consequently, when this EICAS message appears, it remains indicative of inoperative equipment, even if the MAS has been disabled as required by paragraph (1) of this AD. As a result, the corresponding MEL instructions and limitations remain applicable whenever the EICAS status message “ENG MAS VALVE SENSOR L(R)” is produced.

**Alternative Method of Compliance:**

- (4) Modification of an engine in accordance with the instructions of Rolls-Royce TRENT 1000 SB 75-K778 is an acceptable alternative method to comply with all requirements of this AD for that engine. Following modification, the requirements and MMEL provisions of this AD no longer apply to that engine.

**Ref. Publications:**

Rolls-Royce Alert NMSB TRENT 1000 75-AK642 original issue dated 30 November 2020, or Revision 1 dated 14 July 2023.

Rolls-Royce SB TRENT 1000 75-K778 original issue dated 18 May 2023.

The use of later approved revisions of the above-mentioned documents is acceptable for compliance with the requirements of this AD.

**Remarks:**

1. This Proposed AD will be closed for consultation on 11 August 2023.
2. EASA [AD 2021-0009](#) was posted on 11 December 2020 as PAD 20-197 for consultation until 25 December 2020. The Comment Response Document can be found in the [EASA Safety Publications Tool](#), in the compressed (zipped) file attached to the record for that AD.



3. Enquiries regarding this PAD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).
4. Information about any failures, malfunctions, defects or other occurrences, which may be similar to the unsafe condition addressed by this PAD, and which may occur, or have occurred on a product, part or appliance not affected by this PAD, can be reported to the [EU aviation safety reporting system](#). This may include reporting on the same or similar components, other than those covered by the design to which this PAD applies, if the same unsafe condition can exist or may develop on an aircraft with those components installed. Such components may be installed under an FAA Parts Manufacturer Approval (PMA), Supplemental Type Certificate (STC) or other modification.
5. For any question concerning the technical content of the requirements in this PAD, please contact your designated Rolls-Royce representative, or download the publication from your Rolls Royce Care account at <https://customers.rolls-royce.com>.

If you do not have a designated representative or Rolls Royce Care account, please contact **Corporate Communications** at **Rolls-Royce plc**, P.O. Box 31, Derby, DE24 8BJ, United Kingdom Telephone +44 (0)1332 242424,

or send an email through <https://www.rolls-royce.com/contact-us/civil-aerospace.aspx> identifying the correspondence as being related to **Airworthiness Directives**.

