Airworthiness Directive

AD No.: 2021-0009

Issued: 08 January 2021

Note: This Airworthiness Directive (AD) 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.

This AD is issued in accordance with Regulation (EU) 748/2012, Part 21.A.3B. In accordance with Regulation (EU) 1321/2014 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [Regulation (EU) 1321/2014 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [Regulation (EU) 2018/1139, Article 71 exemption].

Design Approval Holder's Name:
ROLLS-ROYCE DEUTSCHLAND Ltd & Co KG

Type/Model designation(s):
Trent 1000 engines

Effective Date: 15 January 2021

TCDS Number(s): EASA.E.036

Foreign AD: Not applicable

Supersedure: None

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

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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.

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.

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, Part Number 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.

For the reason described above, this AD requires to deactivate the MAS control valves. This AD also specifies 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.

This AD is 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 in accordance with the instructions of the NMSB.

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

Compliance Time (whichever occurs later, **A** or **B**)	
A	Before exceeding 50 flight cycles (FC) since first installation of the engine on an aeroplane
B	Within 30 days or 100 FC, whichever occurs first after the effective date of this AD

MMEL:

(2) Following deactivation of the MAS control valves on both engines (as applicable) 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 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 engines of that aeroplane.

Note 1: Deactivation of the MAS control valves on an 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 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.

Ref. Publications:

Rolls-Royce Alert NMSB TRENT 1000 75-AK642 dated 30 November 2020.

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

Remarks:

1. If requested and appropriately substantiated, EASA can approve Alternative Methods of Compliance for this AD.

2. This AD 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 this AD.

3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: 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 AD, and which may occur, or have occurred on a product, part or appliance not affected by this AD, 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 AD 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 AD, 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**.