
AIRWORTHINESS DIRECTIVE

For the reasons set out in the background section, the CASA delegate whose signature appears below issues the following Airworthiness Directive (AD) under subregulation 39.001(1) of CASR 1998. The AD requires that the action set out in the requirement section (being action that the delegate considers necessary to correct the unsafe condition) be taken in relation to the aircraft or aeronautical product mentioned in the applicability section: (a) in the circumstances mentioned in the requirement section; and (b) in accordance with the instructions set out in the requirement section; and (c) at the time mentioned in the compliance section.

Turbomeca Turbine Engines - Makila Series

AD/MAKILA/14 Engine Control Unit - Comparator/Selector Boards 7/2009 DM

Applicability: Makila 1A and 1A1 turboshaft engines, all serial numbers, having Engine Control Units (ECU) equipped with TU250 Comparator / Selector (CS) boards with serial numbers (S/N) in the range 241 EL to 1192 EL.

Note 1: CS boards with S/N in the above range are hereafter referred to as the suspect batch.

Note 2: Makila 1A and 1A1 engines are installed in, but not limited to, Eurocopter AS 332 C, C1, L and L1 helicopters.

Requirement:

1. If both TU250 CS boards on the same helicopter are from the suspect batch and if both have an operating time since new of less than 200 hours, unless previously accomplished, replace at least one of the boards with a board not from the suspect batch in accordance with the instructions of Turboméca Mandatory Service Bulletin (MSB) 298 73 0809 Version A dated 12 February 2008.
2. Unless accomplished previously, replace all TU250 CS boards from the suspect batch with boards not from the suspect batch in accordance with the instructions of Turboméca MSB 298 73 0810 Version B dated 27 April 2009.

Replacement of all TU250 CS boards, accomplished prior to the effective date of this Directive, in accordance with Turboméca MSB 298 73 0810 Version A dated 12 February 2008 is acceptable for compliance with Requirement 2.

The use of later Versions of the above MSBs, approved by the European Aviation Safety Agency (EASA), are acceptable for compliance with the requirements of this Directive.

Note 3: EASA AD 2009-0090 refers.

Compliance: For Requirement 1 - Within 50 hours time in service from the effective date of this Directive.

For Requirement 2 - During the next 500-hour routine inspection, or before 30 November 2009, whichever occurs first.

This Airworthiness Directive becomes effective on 12 May 2009.

Turbomeca Turbine Engines - Makila Series

AD/MAKILA/14 (continued)

Background: Makila 1A and 1A1 ECUs incorporate a backup control law that fixes N1 (gas generator speed) at 65% when at least two of the three N2 (power turbine speed) signals are lost. The intent is to limit the maximum speed attainable by the power turbine in the event of a failure of the shaft between the engine and the main gearbox that could result in collateral damage to the N2 speed probes.

Several occurrences of 65% N1 backup activation remain unexplained despite detailed investigation. It is postulated that the events may have been due to corruption of the engine N2 speed signals by short perturbations, for example by electromagnetic interference. The potential therefore existed for a hazardous condition in which both engines on the same helicopter were simultaneously affected.

To address this risk, Turboméca introduced modification TU250, which affects the CS board in the ECU and allows recovery from the 65% backup mode if the loss of N2 speed signals is determined to be temporary. Incorporation of modification TU250 was mandated by AD/MAKILA/9 (EASA AD 2007-0144).

The installation of TU250 CS boards, however, has resulted in a few occurrences of erratic engine behaviour, in the form of unexpected N1 variations and/or illumination of the “GOV” warning light. The conclusions from an investigation by Turboméca are that these malfunctions are due to a lapse of quality control in the varnishing process applied to the boards, and that only boards in a specific serial number range, as defined under “Applicability” and referred to below as the “suspect batch”, are affected.

Turboméca has addressed this latest concern in two steps which provide first a near-term and then a long-term solution. The two steps are described in the referenced mandatory service bulletins (MSB).

The first step, described in MSB 298 73 0809, recommends that no helicopter has CS boards from the suspect batch in both engines. Boards with more than 200 hours of trouble-free operation are exempt because service experience has shown that the malfunctions potentially induced by this manufacturing discrepancy are most likely to occur early in the lives of the boards.

The second step, described in MSB 298 73 0810, recommends that ultimately all TU250 CS boards in the suspect batch, regardless of time in operation, be replaced with TU250 boards not from the suspect batch.

Turbomeca Turbine Engines - Makila Series

AD/MAKILA/14 (continued)

This Directive makes the replacement of TU250 CS boards in the suspect batch mandatory.

A handwritten signature in black ink, appearing to read 'James Coyne', with a stylized flourish at the end.

James Coyne
Delegate of the Civil Aviation Safety Authority

4 May 2009