



## Airworthiness Directive

**AD No.:** 2016-0055

**Issued:** 17 March 2016

Note: This Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) 216/2008 on behalf of the European Union, its Member States and of the European third countries that participate in the activities of EASA under Article 66 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 (EC) 216/2008, Article 14(4) exemption].

**Design Approval Holder's Name:**

TURBOMECA

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

ARRIEL 2 engines

**Effective Date:** 31 March 2016

**TCDS Number(s):** EASA.E.001

**Foreign AD:** Not applicable

**Supersedure:** This AD supersedes EASA AD 2015-0162 dated 06 August 2015.

### ATA 72 – Engine – Accessory Gear Box Module M01 – Inspection / Replacement

**Manufacturer(s):**

Turboméca S.A.

**Applicability:**

ARRIEL 2B, 2B1, 2B1A, 2B1B, 2C, 2C1, 2C2, 2D, 2E, 2N, 2S1 and 2S2 engines, all serial numbers.

These engines are known to be installed on, but not limited to, Airbus Helicopters AS350B3, EC130B4, EC130T2, AS365N3, EC155B and EC155B1 helicopters, Airbus Helicopters Deutschland MBB-BK 117 D-2 (EC145T2 or H145) helicopters, Avic international AC311 helicopters, and Sikorsky S-76C helicopters.

**Reason:**

An uncommanded in-flight shut-down (IFSD) of an ARRIEL 2 engine was reported, caused by rupture of the 41-tooth gear, which forms part of the bevel gear of the accessory gearbox (module M01). The subsequent investigation revealed that wear on the housing of the front bearing of this gear was a major contributor to this rupture. In addition, the investigation showed that this wear mechanism had resulted in positive Spectrometric Oil Analysis (SOA) indications before the event.

This condition, if not detected and corrected, could potentially lead to further cases of IFSD, possibly resulting in an emergency landing.



To address this potentially unsafe condition, Turboméca issued Mandatory Service Bulletin (MSB) 292 72 2861 to provide SOA check instructions. Consequently, EASA issued AD 2015-0162 to require repetitive SOA checks and, depending on the results, replacement of the module M01.

Since that AD was issued, it was determined that wear inspections are necessary, in addition to the repetitive SOA checks. Turboméca updated MSB 292 72 2861 to add instructions to accomplish this inspection.

For the reasons described above, this AD partially retains the requirements of EASA AD 2015-0162, which is superseded, and requires accomplishment of wear inspection, and, depending on the results, replacement of the module M01.

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

Required as indicated, unless accomplished previously:

- (1) Within the compliance time specified in Table 1 of this AD, perform a visual inspection in accordance with the instructions of Turboméca MSB 292 72 2861 to identify if a machined front casing Part Number (P/N) 0292120650 is installed on that engine.

#### **SOA Checks:**

- (2) For engines equipped with a module M01 fitted with a machined front casing P/N 0292120650 (as identified in Turboméca MSB 292 72 2861), within the threshold specified in Table 1 of this AD, and, thereafter, at intervals not to exceed 100 EH (see Notes 1 and 2 of this AD), accomplish a SOA check in accordance with the instructions of Turboméca MSB 292 72 2861.

Table 1 – Initial SOA check

<b>Engine Hours (EH) accumulated by the Module M01</b> (since first installation on an engine or since last overhaul) on 20 August 2015 [the effective date of EASA AD 2015-0162]	<b>Threshold</b>
Less than 800 EH	Before exceeding 850 EH since first installation of the Module M01 on an engine, or since last Module M01 overhaul, as applicable
800 EH or more, or EH not known	Within 50 EH after 20 August 2015 [the effective date of EASA AD 2015-0162]

Note 1: A non-cumulative tolerance of 10% EH may be applied to the compliance times specified in this AD for repetitive inspections, to allow synchronization of the required inspections with other maintenance tasks for which a non-cumulative tolerance is already granted in the applicable EMM. The 10% EH tolerance does not apply to the initial SOA check and wear inspection.

Note 2: Engine operation could be continued pending oil analysis result within the limit of SOA periodicity of 100 EH (see Note 1 of this AD), starting from the oil sampling action.



**Wear Inspection:**

- (3) For engines equipped with a module M01 fitted with a machined front casing P/N 0292120650 (as identified in Turboméca MSB 292 72 2861), within the threshold specified in Table 2 of this AD, and, thereafter, at intervals not to exceed the values specified in Table 3 of this AD (see Note 1 of this AD), accomplish a wear inspection in accordance with the instructions of Turboméca MSB 292 72 2861 version B.

Table 2 – Initial Wear Inspection

<b>EH accumulated by the Module M01</b> (since first installation on an engine or since last overhaul) on the effective date of this AD	<b>Compliance Time</b>
Less than 800 EH	Before exceeding 850 EH since first installation of the Module M01 on an engine, or since last Module M01 overhaul, as applicable
800 EH or more, or EH not known	Within 50 EH or 30 days, whichever occurs first after the effective date of this AD

Table 3 – Wear Inspection Interval

<b>Engine Models</b>	<b>Interval</b> (see Note 1 of this AD)
ARRIEL 2B, 2B1, 2B1A, 2C, 2C1, 2C2, 2D, 2S1 and 2S2	600 EH
ARRIEL 2E and 2N	800 EH

**Corrective Actions:**

- (4) If, during any SOA check accomplished from the effective date of this AD, as required by paragraph (2) of this AD, the aluminium concentration is 0.8 ppm or more, within 20 EH after that SOA check, accomplish a wear inspection in accordance with the instructions of Turboméca MSB 292 72 2861 version B.
- (5) If, during the last SOA check on an engine accomplished before the effective date of this AD, as required by paragraph (2) of this AD, the aluminium concentration was 0.8 ppm or more, within 50 EH after that SOA check, or within 20 EH after the effective date of this AD, whichever occurs first, accomplish a wear inspection on that engine in accordance with the instructions of Turboméca MSB 292 72 2861 version B.
- (6) If, during any wear inspection, as required by paragraph (3), (4) or (5) of this AD, as applicable, wear exceeding 0.15 millimetres (mm) is found, within the compliance time specified in Table 4 of this AD, as applicable, depending on the wear results and where the inspection was accomplished, replace the module M01 with a serviceable module M01 (refer to paragraph (8) of this AD), in accordance with the instructions of Turboméca MSB 292 72 2861 version B.



Table 4 – Module 01 Replacement (after finding wear)

Wear (W) Found [in mm]	Wear Inspection accomplished while engine installed on aircraft	Wear Inspection accomplished in- shop
$0.15 < W \leq 0.30$	Within 200 EH	Before release to service of the engine
$0.30 < W \leq 0.40$	Within 25 EH	
$W > 0.40$	Before next flight	

- (7) For the purpose of this AD, a serviceable module M01 is either a module M01 fitted with a machined front casing P/N 0292120650, that is subjected to SOA checks in accordance with paragraph (2) and (3) of this AD, or a module M01 fitted with a cast front casing P/N 0292127020.

#### Parts Installation:

- (8) From the effective date of this AD, it is allowed to install a module M01 fitted with a machined front casing P/N 0292120650 on an engine, provided that, following installation, the engine is subjected to SOA checks and wear inspections as required by paragraphs (2) and (3) of this AD.

#### Ref. Publications:

Turboméca MSB 292 72 2861 version A dated 24 April 2015, version B dated 02 February 2016, version C dated 11 March 2016.

The use of later approved revisions of this 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. Based on the required actions and the compliance time, EASA have decided to issue a Final AD with Request for Comments, postponing the public consultation process until after publication.
3. Enquiries regarding this AD should be referred to the EASA Safety Information Section, Certification Directorate. E-mail: [ADs@easa.europa.eu](mailto:ADs@easa.europa.eu).
4. For any question concerning the technical content of the requirements in this AD, please contact: Turboméca S.A., ARRIEL 2 Customer Support, 40220 Tarnos, France  
Fax: +33 5 59 74 45 15, or your usual or nearest TURBOMECA technical representative (refer to <http://www.turbomeca-support.com>).

