



## Airworthiness Directive

**AD No.:** 2010-0215R1

**Issued:** 26 January 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:** Revision 1: 02 February 2016  
Original issue: 28 October 2010

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

**Foreign AD:** Not applicable

**Revision:** This AD revises EASA AD 2010-0215 dated 14 October 2010.

### ATA 73 – Engine Fuel & Control – High Pressure / Low Pressure Fuel Pump Metering Unit – Inspection / Replacement

#### Manufacturer(s):

Turbomeca, S.A.

#### Applicability:

ARRIEL 2B, 2B1 and 2B1A engines, as defined in Turboméca Mandatory Service Bulletin (MSB) A292 73 2836 version A, and Turbomeca MSB A292 73 2830 version B, except engines on which Turbomeca Modification (Mod) TU178 has been embodied in production, or on which Turbomeca Service Bulletin (SB) 292 73 2178 has been embodied in-service.

These engines are known to be installed on, but not limited to, Airbus Helicopters (formerly Eurocopter) AS 350 B3 and EC 130 B4 helicopters, and Changhe Z11 helicopters.

#### Reason:

Several events were reported of uncoupling of the low pressure (LP) fuel pump impeller and the high pressure (HP) fuel pump shaft on ARRIEL 2 engines which do not incorporate Mod TU147, which consists of bonding the LP fuel pump impeller with the impeller screw. In most cases, the "low fuel pressure switch" lighted up, the pilot activated the fuel booster pump in accordance with the Flight Manual Instructions and landed safely with no other incident. In another case, on a single-



engine helicopter, the pilot failed to activate the fuel booster pump and the helicopter was operated with high flight load factor, which led to a sudden engine power loss.

The uncoupling of the LP fuel pump impeller and the HP fuel pump shaft may lead to a limitation of engine power, or an uncommanded In-Flight Shut-Down (IFSD). On a single-engine helicopter, the result may be an emergency autorotation landing.

To address this potential unsafe condition, EASA issued AD 2009-0184 to require actions to ensure that the LP fuel pump impeller was correctly driven by the HP fuel pump shaft, to prevent any detachment of the LP fuel pump impeller from the HP fuel pump shaft. That AD did not apply to engines equipped with HP/LP Pump Metering Units which incorporate Mod TU147 because this modification was specifically designed to prevent uncoupling.

Since that AD was issued, three occurrences were reported of uncoupling of the LP fuel pump impeller and the HP fuel pump shaft on engines in post-Mod TU147 configuration. The results of the investigation showed a significant scattering in the bonding process of the LP fuel pump impeller on the HP fuel pump shaft. However, the capability of Mod TU147, if properly performed, to improve the coupling between LP fuel pump impeller and HP fuel pump shaft, is still believed to be adequate.

In response to these findings, from March 2010, Turbomeca introduced an improvement (with new qualification) in all production lines, and a reinforced control of the bonding manufacturing scheme.

Consequently, EASA issued AD 2010-0215, which superseded EASA AD 2009-0184, partially retaining its requirements, to require a one-time inspection of certain post-Mod TU147 HP/LP Pump Metering Units to ensure that the LP fuel pump impeller is correctly driven by the HP fuel pump shaft to prevent any uncoupling. That AD also required replacement of HP/LP Pump Metering Units where discrepancies were found.

Since that AD was issued, Turbomeca developed Mod TU178, which consists of introducing longitudinal needles between HP fuel pump shaft and LP fuel pump impeller, which prevents detachment. Turbomeca published SB 292 73 2178 for embodiment of this modification in-service.

For the reasons described above, this AD is revised to exclude post-Mod TU178 and post-SB 292 73 2178 engines from the Applicability.

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

Required as indicated, unless accomplished previously:

- (1) Within the compliance time indicated in Appendix 1 of this AD, as applicable, accomplish the inspection and, in case of discrepancies, replace the HP/LP pump metering unit, in accordance with the instructions of the applicable Turbomeca MSB.
- (2) DELETED.



- (3) From 28 October 2010 [the effective date of this AD at original issue], do not install a HP/LP Fuel Pump Metering Unit on any engine, unless it has passed an inspection in accordance with the instructions of Turbomeca MSB A292 73 2830 version B, or MSB A292 73 2836 version A, as applicable.
- (4) Modification of an engine in accordance with the instructions of Turbomeca SB 292 73 2178 is an acceptable alternative method to comply with the requirements of this AD.

**Ref. Publications:**

Turbomeca MSB A292 73 2830 version B dated 10 July 2009.

Turbomeca MSB A292 73 2836 version A dated 17 August 2010.

Turbomeca SB 292 73 2178 Version A dated 01 April 2015.

The use of later approved revisions of these documents 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. The original issue of this AD was posted on 13 September 2010 as PAD 10-099 for consultation until 11 October 2010. No comments were received during the consultation period.
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: Turbomeca, ARRIEL 2 Customer Support, 40220 Tarnos, France, Fax: +33 5 59 74 45 15, or your usual or nearest Turboméca technical representative at [www.turbomeca-support.com](http://www.turbomeca-support.com).



## Appendix 1 – HP/LP Fuel Pump Metering Unit Inspection / Replacement

Condition	Inspection	Compliance Time for the inspection	Corrective Action
HP/LP Pump Metering Units which <u>do not incorporate</u> modification TU147	Check the transmissible torque between the LP pump impeller and the HP pump shaft in accordance with paragraph 2 of Turboméca MSB A292 73 2830 version B	Within 500 Engine Flight Hours (EFH) after 28 August 2009 [effective date of EASA AD 2009-0184] but no later than 30 June 2010 [original compliance date of EASA AD 2009-0184]	If <u>no discrepancies are found</u> , apply the nominal tightening torque to the screw of the LP pump impeller
			If <u>discrepancies are found</u> , before next flight, replace the HP/LP Pump Metering Unit with a serviceable pre-TU147 unit or a serviceable post-TU147 unit
HP/LP Pump Metering Units which <u>incorporate</u> modification TU147 <u>and</u> on which modification TU 147 was applied <u>before or on 31 March 2010</u> , and are not listed in Figures 2 and 3 of Turboméca MSB A292 73 2836 version A	Check the transmissible torque between the LP pump impeller and the HP pump shaft in accordance with paragraph 2 of Turboméca MSB A292 73 2836 version A	Within 750 EFH after 28 October 2010 [the effective date of this AD at original issue], but no later than 14 months after 28 October 2010 [the effective date of this AD at original issue]	If <u>no discrepancies are found</u> , no further actions are required for compliance with the requirements of this AD
			If <u>discrepancies are found</u> , before next flight, replace the HP/LP Pump Metering Unit with a serviceable post-TU147 unit

