Title: Rotax engine life extension		
AG-SB-2018-03-C-EN		**Compliance Category:** ~~**A - MANDATORY**~~ ~~**B – RECOMMENDED**~~ **C - OPTIONAL**
Applicability		
Aircraft type & model: **All AutoGyro models fitted with Rotax 912ULS or 914UL engines**	**Affected Serial number(s):** **All AutoGyro models fitted with Rotax 912ULS or 914UL engines**	
The maintenance manual to be referenced is this stated or subsequent issue.		As per AutoGyro website
This form is the response from AutoGyro GmbH either against a problem found in the product in service requiring a containment or rectification action, or as service information for aircraft modification incorporation. For help, contact AutoGyro on 49(0)5121 88056-00, or email airworthiness@auto-gyro.com.		

Documentation (Service Bulletin Completion action)

The accomplishment of this Service Bulletin, or the decision of its rejection, must be properly documented, if such procedure is required by the relevant authority

Category Codes

A – Mandatory	– failure to comply result in a significant reduction of flight safety, injury or death
B – Recommended	– failure to comply may result in reduced safety margin, injury and/or equipment damage
C - Optional	– improves operating behavior, reliability and/or maintainability

Chief Certification Officer	**Chief Technical Officer**
G. Speich Apr 26 2018 7:23 PM This document has been issued according to an approved computer generated signature procedure DocuSign	Otmar Birkner Apr 27 2018 9:14 AM DocuSign

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Reason and overview of the Service Bulletin (cause of problem if known)

The Rotax 912ULS and 914UL engines used in AutoGyro gyroplanes are life-limited by the manufacturer BRP-Powertrain by means of a stated Time Between Overhaul (TBO). This varies according to engine type and serial number, older engines having TBO 1200 hours or 10 years (whichever comes first) and newer engines 2000 hours or 15 years. Extension of the TBO is possible and is specified by a Rotax Service Bulletin (SB) for the respective engine type. However, the maximum life available for any type is 2000 hours or 15 years (with authorised exceedance 5% or 6 months).
However, The UK CAA have approved continuation of engine operation beyond the Rotax TBO by an "on condition" status, as determined by the engineer maintaining the aircraft under RSUK Service Bulletin SB-124. Autogyro now adopt the same arrangement, for markets where such control is required.

Therefore:

1) Without embodiment of this AG-SB-2018-03-C-EN the engine must be maintained in accordance with the engine manufacturer's Manuals and Worksheets, or as required by the market Regulator.
2) After embodiment of this AG-SB-2018-03-C-EN the requirements of the relevant AutoGyro Aircraft Maintenance Manual (AMM) and Service Worksheets take precedence over the engine manufacturers Manuals and Worksheets.
3) After embodiment of this AG-SB-2018-03-C-EN the service life of the engine (TBO) is considered extended by 20% beyond the applicable Rotax TBO (either operating hours or calendar time, as appropriate
4) Operation beyond the 20% extension is permitted "on-condition" at the discretion of the authorised engineer maintaining the aircraft and engine on the basis of inspection to AG-SB-2018-03-C-EN (being 100hours or Annually, whichever first)

Unless the Aircraft Maintenance Manual states otherwise, AutoGyro considers that if the engine manufacturer's required maintenance is not followed, this does not invalidate the airworthiness. However, if the engine manufacturer's advice is not followed the user must fully accept that there may be an increased risk of engine stoppage due to major mechanical failure (eg crankshaft) or failure of engine systems (e.g. lubrication, cooling, electrical, ignition, fuel supply, turbo, exhaust). The consequence of failure of a sub system may or may not lead to a stoppage (worst case), but may cause another significant in-flight effect (loss of electrical supply for instance).

In allowing embodiment of this Service Bulletin the aircraft Owner/Operator accepts that unless he is satisfied that the engine remains in an airworthy condition, the Owner/Operator should have the engine overhauled.

Further commentary (text adapted from GR24 published by UK CAA)

Many factors affect the wear that takes place in an engine, the most important of these include: the efficiency of the air intake filter, the techniques used in engine handling, particularly during starting, the quality of the fuel and oil used in the engine and the conditions under which the aircraft is housed when not in use. Conditions of operation are also relevant; the length of flights, the atmospheric conditions during flight and on the ground, and the type of flying undertaken. Many of these factors are outside the province of the maintenance engineer, but meticulous compliance with the approved Maintenance Programme and any instructions provided in the form of service bulletins or constructor's recommendations will undoubtedly help to prolong the life of an engine

Owners of aircraft used infrequently should take particular note of Rotax recommendations regarding long periods of storage and the need for inhibiting to reduce the risk of corrosion

It is also recommended that owners keep a record of oil consumption and pass this information to the engineer inspecting the aircraft.

Prior conditions required

The engine must have a known and recorded service history, and preferably be installed within the applicable gyroplane for a period of 200 hours immediately prior to completion of the engine manufacturer's recommended overhaul period expressed in hours, and 12 months prior to completion of the manufacturer's overhaul period expressed in terms of calendar time.

Note that an engine that has already exceeded the manufacturer's recommended overhaul period may not have this SB AG-SB-2018-03-C-EN embodied

Continued airworthiness conditions

If during the course of operating beyond the engine manufacturer's recommended overhaul limits in accordance with AutoGyro Service Bulletin AG-SB-2018-03-C-EN the engine experiences a mechanical failure or inspection requirement necessitating full or significant partial engine disassembly, the organisation performing the work should inspect the engine to determine if it is practicable to restore the engine to a serviceable condition without performing an overhaul. The results of the inspection should be recorded in the engine logbook.
Examples of activities requiring significant disassembly include propeller strike/shock load inspections and crankshaft/camshaft replacements for wear-related issues. Defects requiring replacement of individual cylinder and piston assemblies, and oil pump (where such work does not involve the removal/replacement of individual gears) are not included in the category of maintenance necessitating assessment.

Manpower estimates

The task may only be performed by an organization or individual entitled and trained to do:
Heavy maintenance.

Estimated man-hours to complete the task as a stand-alone item are: 8 hours

Tooling required

Hand tools and compression testing equipment

Weight and Balance Effects

No effect

Manuals affected

The AMMs are supplemented by this SB.
The POHs are unaffected.

Previous Modifications that affect the SB

No previous AutoGyro service bulletins applicable but Rotax service bulletins do affect this AG-SB-2018-03-C-EN bulletin (see later)

Accomplishment instructions (Action required to implement this bulletin):

Effective date of this SB is 15.APR. 2018

There is no relevant MPD to be referenced.

Rotax Installation Manuals, Line Maintenance Manuals and Heavy Maintenance Manuals and other service publications must be consulted for detail information. These are available for download on the website www.flyrotax.com. At the time of publication of this AG-SB-2018-03-C-EN the status of the Rotax Line maintenance manuals was:

MML-912Series_ED3_R2_E.pdf (Dated February 01/2015)
MML-914Series_ED2_R2_E.pdf (Dated February 01/2015)

Particular reference should be made to:

Time Limits section 05-10-00
Maintenance Schedule section 05-20-00

Instructions

This AG-SB-2018-03-C-EN has three elements, each having its own worksheet (see later)

#1 – Preliminary (pre-requisite) actions to check that it is appropriate and then to extend the service life of the engine in question by 20% of the manufacturers overhaul period (operating hours or calendar time)

#2 - Ongoing actions to ensure that the engine is maintained in an airworthy condition. These are based on continuation of the original Rotax schedule and additional tasks

#3 – Engineer feedback to AutoGyro of observations and measurements. Completion of this document is requested by AutoGyro and it may be returned by post or email (airworthiness@auto-gyro.com)

Material information (Parts required to be made to implement this service bulletin):

No parts made during embodiment

List of components (with purchasable part nos)

All required parts are defined by the applicable Rotax service schedule

Interchangeability

Not affected

Parts disposition

a) Disposal requirements – Normal waste
b) Environmental hazards of parts containing hazardous materials - take care with used engine oil
c) Scrap requirements (e.g. mutilate scrapped items beyond use) – Not applicable

Service Bulletin AG-SB-2018-03-C-EN implementation Worksheet #1 - PRELIMINARY

Aircraft type:	**Serial no:**	**Reg:**
Worksheet completed by:		**Document ref: AG-SB-2018-03-C-EN**
Worksheet cross-checked by (if applicable):		

Purpose – record service bulletin implementation actions taken to inspect aircraft and return to service with engine TBO extended by 20%.

Maintenance manual referred-to and issue level:	

Note: attach SB sheets to this document

Task	Notes	Eng'r check/date	Inspector check/date
By examination of the engine's logbook and its service history establish whether the engine has the original Rotax TBO or that extended by Rotax Service bulletin. Note: This SB cannot be applied if the TBO can be extended under Rotax Service Bulletin	Declare basis of existing limit (hours or years age)		
By examination of the engine's logbook and its service history confirm that the periodic service requirements have been correctly implemented and any Airworthiness Directives or equivalents addressed	See Rotax MML section 05-20-00		
By examination of the engine's logbook and its service history establish whether the time-limited parts have been correctly replaced: (Rubber parts, Fuel pump, Coolant)	If incorrect then replace or accept on-condition		
Drain engine and retain oil sample for SOAP analysis. State analysis result and attach report to this worksheet	Oil consumption advised as: (Engine Satisfactory/Not satisfactory for extended service life)		
Replace oil filter and examine original as described in Rotax MML	(Engine Satisfactory/Not satisfactory for extended service life)		
Examine magnetic plug as described in Rotax MML	(Engine Satisfactory/Not satisfactory for extended service life)		
Carry-out engine service to the applicable Rotax interval	See Rotax MML section 05-20-00 Declare cylinder compression data: Cyl1…… Cyl2…… Cyl3…… Cyl4…… (Engine Satisfactory/Not satisfactory for extended service life)		

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Declare extended life (hours and time) - engine Operating hours limit now:……. Operating time limit now:……	Make engine log-book entry as follows; 'The life of this engine has been extended under AG-SB-2018-03-C-EN to 120% of the original applicable TBO'. The user must fully accept that there may be an increased risk of engine stoppage due to major mechanical failure or failure of engine systems (e.g. lubrication, cooling, electrical, ignition, fuel supply, turbo, exhaust). The consequence of failure of a sub system may or may not lead to a sudden stoppage (worst case), but may cause another significant in-flight event (eg loss of electrical supply).		
Declare extended life (hours and time) - aircraft Operating hours limit now:……. Operating time limit now:……	Make aircraft log-book entry as follows; 'The life of engine serial no xxxx has been extended under AG-SB-2018-03-C-EN to 120% of the original applicable TBO'. The user must fully accept that there may be an increased risk of engine sudden stoppage due to major mechanical failure or failure of engine systems (e.g. lubrication, cooling, electrical, ignition, fuel supply, turbo, exhaust). The consequence of failure of a sub system may or may not lead to a stoppage (worst case), but may cause another significant in-flight event (eg loss of electrical supply).		
Declare restriction to Private Flight	Make aircraft log-book entry as follows: 'This aircraft's engine is operating under extended overhaul period and may be used only for private flight and flight training by an authorised instructor or examiner'.		

Customer acceptance:

Name: Signature/date:	Aircraft hobbs meter reading: Confirm logbooks annotated:

Maintenance Release statement:

'The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight. I confirm that no tools, equipment or debris have been left in the aircraft'

Engineer signature and date: Engineer Authorisation no (if applicable):	Location where work completed

Service Bulletin AG-SB-2018-03-C-EN implementation Worksheet #2 - Ongoing

Aircraft type:	**Serial no:**	**Reg:**
Worksheet completed by:		**Document ref: AG-SB-2018-03-C-EN**
Worksheet cross-checked by (if applicable):		

Purpose – record service bulletin implementation actions taken to inspect aircraft and return to service.

Maintenance manual referred-to and issue level:	

Note: attach SB sheets to this document

Task	Notes	Eng'r check/date	Inspector check/date
Declare basis of continued operation under this worksheet (strike-out accordingly) Under 20% extension of the original overhaul period: Operating hours limit now:……. Operating time limit now:……... Or, beyond the above 'On condition' assessed as satisfactory by the authorised engineer completing this worksheet	State present operating hours:…….. State present age (years):……..		
By examination of the engine's logbook and its service history confirm that the periodic service requirements have been correctly implemented and any airworthiness directives or equivalents addressed	See Rotax MML section 05-20-00		
By examination of the engine's logbook and its service history establish whether the time-limited parts have been correctly replaced: (Rubber parts, Fuel pump, Coolant)	If incorrect then remedy		
Every 200 operating hours drain engine and retain oil sample for SOAP analysis.	State analysis result and attach report to this worksheet. Oil consumption advised as:…….		
Carry-out engine service to the applicable Rotax interval	See Rotax MML section 05-20-00 Every 200hrs declare cylinder compression data: Cyl1……. Cyl2……. Cyl3……. Cyl4…….		
Every 100 operating hours or annually (whichever sooner) conduct flight test iaw AutoGyro flight test document.	(Engine Satisfactory/Not satisfactory for continued service) If the engine performance is unsatisfactory, take appropriate remedial action and retest.		
Store the flight test report with the aircraft documents, and annotate the aircraft and engine logbooks to confirm the SB has been incorporated and flight test satisfactory,			

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Customer acceptance:	
Name: Signature/date:	Aircraft hobbs meter reading: Confirm logbooks annotated:
Maintenance Release statement: ***'The work recorded above has been completed to my satisfaction and in that respect the aircraft is considered fit for flight. I confirm that no tools, equipment or debris have been left in the aircraft'***	
Engineer signature and date: Engineer Authorisation no (if applicable):	Location where work completed

Service Bulletin AG-SB-2018-03-C-EN implementation Worksheet #3 – Engineers feedback form

Aircraft type:	**Engine Type & S/no:**		**Reg:**
Engine age:	**Original TBO**	**New TBO**	**Document ref: AG-SB-2018-03-C-EN**
Worksheet completed by:			

Purpose – report on service bulletin implementation actions taken in maintaining a Rotax engine beyond the Manufacturers TBO. Please return to AutoGyro by email to airworthiness@auto-gyro.com. This will assist us in reviewing ongoing engine life.

Maintenance manual referred-to and issue level:	

Task	Notes
Clean exterior	Comment on corrosion, cracks, damage, any oil leaks found State present operating hours:…….. State present age (years):……..
Change oil State new oil type added ……	Comment on cleanliness (attach oil analysis report if available) Oil consumption advised as:……
Examine oil filter	Comment on contamination
Examine magnetic plug	Comment on contamination
Examine spark plugs. Comment on condition, tip colour and age (if known)	Cylinder 1 Cylinder 2 Cylinder 3 Cylinder 4
Compression check State method used: ……	Cylinder 1 Cylinder 2 Cylinder 3 Cylinder 4
Examine rubber parts	Comment on condition and age (if known)
Any other inspection or replacement work	Comments
Every 100 operating hours or annually (whichever sooner) conduct flight test iaw AutoGyro flight test document.	Comment on engine performance

Engineer signature and date: Engineer Authorisation no (if applicable):	Aircraft hobbs meter reading: Location where work completed

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