ROTAX®

SERVICE LETTER

Definition for propeller strike or accidental engine stoppage for ROTAX® Engine Type 916 i (Series), 915 i (Series), 912 i (Series), 912/914 (Series) and 2 Stroke Aircraft Engines

ATA System: 72-10-00 Propeller gearbox

1) Planning information

To obtain satisfactory results, procedures specified in this publication must be accomplished with accepted methods in accordance with prevailing legal regulations.

BRP-Rotax GmbH & Co KG cannot accept any responsibility for the quality of work performed in accomplishing the requirements of this publication.

1.1) Applicability

All versions of ROTAX® engine types:

Engine type	Serial number
916 i (Series)	all
915 i (Series)	all
912 i (Series)	all
912 (Series)	all
914 (Series)	all
2-stroke UL aircraft engines	all

1.2) Concurrent ASB/SB/SI and SL

None.

1.3) Reason

Field experience has shown that additional information is necessary in order to judge the degree of severity of damage and effect to an engine after a propeller strike or accidental engine stoppage.

1.4) Subject

Definition for propeller strike or accidental engine stoppage for ROTAX® Engine Type 916 i (Series), 915 i (Series), 912 i (Series), 912/914 (Series) and 2 Stroke Aircraft Engines.

1.5) Compliance

- on occurrence of incident

⚠WARNING Non-compliance with these instructions could result in engine damages, personal injuries or death.

These maintenance instructions shall be considered at any maintenance events, retrofitting, repair and overhaul.

1.6) Approval

The technical content of this document is approved under the authority of the DOA ref. EASA.21J.048.

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1.7) Labor time

Estimated labor hours:

Engine installed in the aircraft - - - labor time will depend on airframe installation and therefore no estimate is available from the engine manufacturer.

1.8) Mass data

Change of weight - - - none.

Moment of inertia - - - unaffected.

1.9) Electrical load data

No change.

1.10) Software modifications

No change.

1.11) References

In addition to this technical information refer to current issue of

- In general Operators Manual (OM)
- In general Illustrated Parts Catalog (IPC) and in particular: Chapters 72-10-00 & 61-20-00
- In general Maintenance Manual Line (MML) and in particular: Chapters 05-50-00 & 12-20-00
- In general Maintenance Manual Heavy (MMH) and in particular: Chapters 72-00-00 & 72-10-00

NOTE: The status of the Manuals can be determined by checking the table of amendments. The 1st column of this table shows the revision status. Compare this number to the one listed on the ROTAX website: www.flyrotax.com.
Updates and current revisions can be downloaded for free.

1.12) Other Publications affected

None.

1.13) Interchangeability of parts

- Not affected

2) Material Information

2.1) Material

Price and availability will be provided on request by ROTAX® Authorized Distributors or their independent Service Centers.

2.2) Company support information

None.

2.3) Material requirement per engine

Parts requirement - if necessary

NOTE: The parts requirement depends on the severity of the propeller strike or accidental engine stoppage and the relevant gearbox configuration.

2.4) Material requirement per spare part

None.

2.5) Rework of parts

None.

2.6) Special tooling/lubricants- /adhesives- /sealing compounds

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their independent Service Centers.

NOTE: The parts requirement depends on the severity of the propeller strike or accidental engine stoppage and the relevant gearbox configuration.

3) Accomplishment / Instructions

- ROTAX® reserves the right to make any amendments to existing documents, which might become necessary due to this standardization, at the time of next revision or issue.

NOTE: Before maintenance, review the entire documentation to make sure you have a complete understanding of the procedure and requirements.

Accomplishment

All measures must be implemented and confirmed by at least one of the following persons or organizations:

- ROTAX® - Airworthiness representatives
- ROTAX® - Authorized Distributors or their independent Service Centers
- Persons approved by the respective Aviation Authorities

NOTE: Indicates supplementary information which may be needed to fully complete or understand an instruction.

All work has to be performed in accordance with the relevant Maintenance Manuals of the respective engine type.

General

Further material on general inspection, maintenance and repair can be found also in relevant Advisory Circular AC 43.13 from FAA.

Advisory Circular

The Manual "Advisory Circular" AC describes maintenance methods, techniques and practice.

3.1) General

Damages to a propeller can have different causes. Especially in cases where the engine speed is suddenly changed due to external factors, unusual shock loads are forced onto the engine. This could be for example bird strike, ground contacts and any other contact with foreign object with the propeller turning. Also in cases where a stopped propeller has contact with an obstacle, engine damage is possible.

Judging the extent of the damage requires special knowledge and only can be performed by authorized personnel. If not governed by legal authority e.g. national Authority or propeller manufacturer in a different way, this information should help to classify the damage. The final decision on the airworthiness is at the relevant local authorized personnel by obeying the minimum requirements of the engine manufacturer and its guidelines.

3.2) Definition

3.2.1) Normal wear

Wear and minor dressings e.g.:

- damages as a consequence from improper ground-handling
- small scratches
- damage to paint

can be classified as normal wear.

This can also be cases where the propeller is damaged during operation by a foreign object, such as a small stone, but no essential RPM drop can be observed.

In case of visible damages an inspection and repair must be accomplished in accordance with the propeller manufacturer's published instructions.

3.2.2) Propeller strike

A propeller strike can be defined as follows:

1. Any cases in which the engine is operating and the propeller impacts an object which causes a **considerable drop in engine RPM**.
   Propeller strikes on ground or contact with various objects can result in engine and/or component damage even if the propeller may continue to rotate. Such damage may progress to engine failure.
2. Any incident, whether or not the engine is operating (e.g. damage due to contact with foreign objects, landing gear failure etc.), that requires a removal of the propeller for repair. Also if a propeller governor is installed, it must be inspected and repaired in accordance with the propeller governor manufacturer's published instructions.
3. Any incident with a sudden RPM drop while impacting water, tall grass, or other similar medium where visible damage on the propeller structure is not incurred.

3.2.3) Propeller constructions should be considered when assessing the possible engine damage from a propeller strike

1. Aluminum and solid composite (including some solid wood) propellers are more likely to transmit the forces and damage the engine due to the increased mass and strength.
2. Lightweight composite propellers with wood or foam cores are less likely to transmit forces to the engine as they tend to disintegrate upon impact.
3. If no drop in RPM is detected and a lightweight propeller is damaged from a strike it is possible there is no resulting engine damage.

⚠WARNING

Non-compliance with these instructions could result in engine damages, personal injuries or death!
If a propeller strike or accidental engine stoppage is not reported and inspected by persons approved by the respective Aviation Authority the operator continues to be liable for any subsequent damage.

3.3) Instructions

3.3.1) Inspection Rotax 912, 912 i, 914, 915 i and 916 i (Series)

If it is determined a propeller strike has occurred the engine must be inspected, repaired or overhauled to the extent necessary to bring it back to serviceable condition before further flight.

NOTE: All work has to be performed in accordance with the relevant Maintenance Manual Line (MML) or Maintenance Manual Heavy (MMH).

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⚠WARNING **Danger of severe burns and scalds!**
Always allow the engine to cool down to ambient temperature before starting any work.

⚠WARNING **During work on the engine there is a risk of life-threatening injuries from the propeller and rotating parts of the engine!**
Ensure that the ignition is switched off! Disconnect the battery. Prevent the engine from being unintentionally switched on!

Preparation:

Before the propeller gearbox is removed, the work described below must be carried out to identify any further malfunctions:

- General visual inspection, see current Maintenance Manual Line (MML) for the respective engine type.

  NOTE: Particular attention is needed in the corresponding zone of the crankcase and gearbox mounting screw holes, including the dowels. If any cracks/abnormalities are found, the engine must be shipped to any Rotax approved overhaul facility for repair/overhaul.
- Remove the surrounding assemblies, see current airframe and propeller manufacturer's instructions.
- Remove the gearbox oil line assy, if installed.
- Remove the external alternator, if installed.

Step	Procedure
1	Remove the gearbox and drive gear. See current Maintenance Manual Line (MML) for the respective engine type.
2	Perform a crankshaft run-out inspection on the PTO side. See current Maintenance Manual Heavy (MMH) Chapter72-10-00 for the respective engine type.
3	Perform a crankshaft distortion inspection. See current Maintenance Manual Heavy (MMH) Chapter 72-00-00 for the respective engine type.
4	If any of the above measurements are exceeded, the engine needs to be shipped to any Rotax approved overhaul facility for repair/overhaul.
5	If the above measurements are within limits, perform service of the whole gearbox in accordance with current Maintenance Manual Heavy (MMH) Chapter 72-10-00 for the respective engine type.

1 Crankshaft distortion
2 Crankshaft run-out

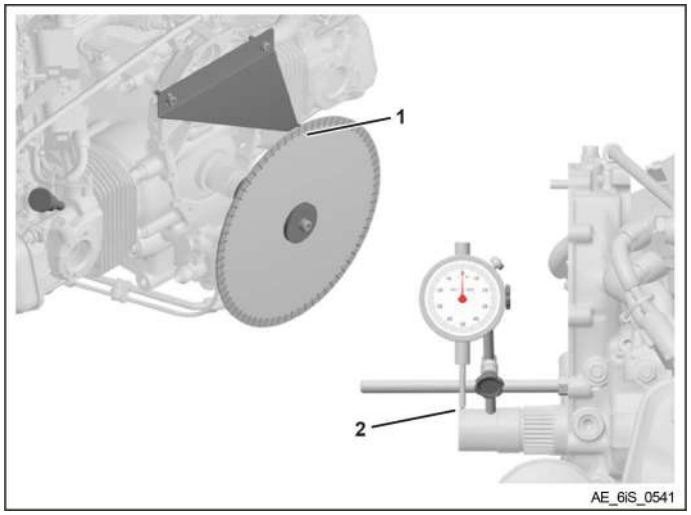

Fig. 1
Crankshaft distortion (1) and run-out inspection (2)

Step	Procedure
6	Perform NDT inspection of the propeller shaft (1), gear set (2) and gearbox housing (3). For 912, 912 i and 914 (series), also perform NDT inspection of the dog hub (4) or clutch hub (5). NOTE: In the case of 912 i, 915 i and 916 i engine series, the gearbox housing has an electrophoretic coating (black) that does not require removal in order to perform the crack detection.
7	If cracks are detected on any of these components the parts need to be replaced. NOTE: The gearbox mounting screw holes, dowel holes and roller bearing fixation screw holes must be carefully inspected for any cracks or abnormalities.

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1 Propeller shaft
2 Gear set
3 Gearbox housing
4 Dog hub
5 Clutch hub

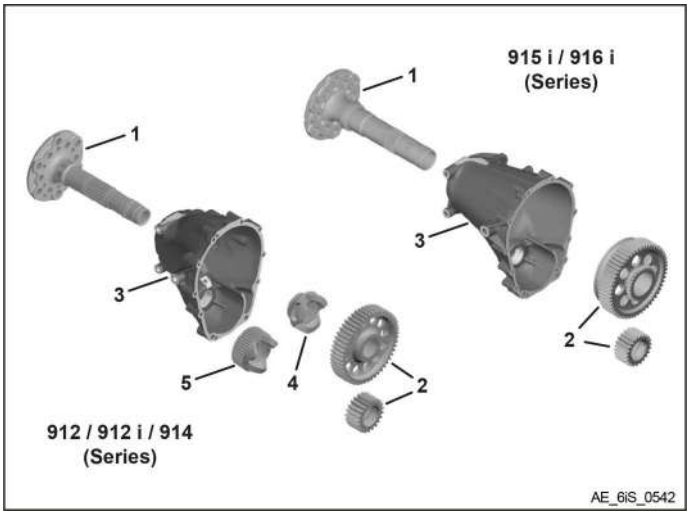

Fig. 2
Parts for NDT inspection

Step	Procedure
8	Disassemble overload clutch and damper clutch. See Chapter 72-10-00 Maintenance Manual Heavy (MMH). NOTE: The overload clutch of the 912, 914 and 912i Series, needs to be shipped to any Rotax approved overhaul facility for repair/overhaul.
9	Check all given wear limits for the gearbox assy. See current Maintenance Manual Heavy (MMH) Chapter 72-10-00 of the respective engine type section “Inspection” and “Wear Limits”.
10	Replace all 100% replacement parts in accordance with current Maintenance Manual Line (MML) chapter 05-50-00, for the respective engine type.

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1 Oil seal
2 Ball bearing
3 Washer
4 Hex screw
5 Thrust washer
6 Ring half (x2)
7 Roller bearing
8 Oil seal
9 Oil inlet flange
10 O-ring
11 O-ring
12 Sealing ring
13 O-ring
14 Retaining ring
15 Torsion shaft
16 Retaining ring
17 Needle bearing

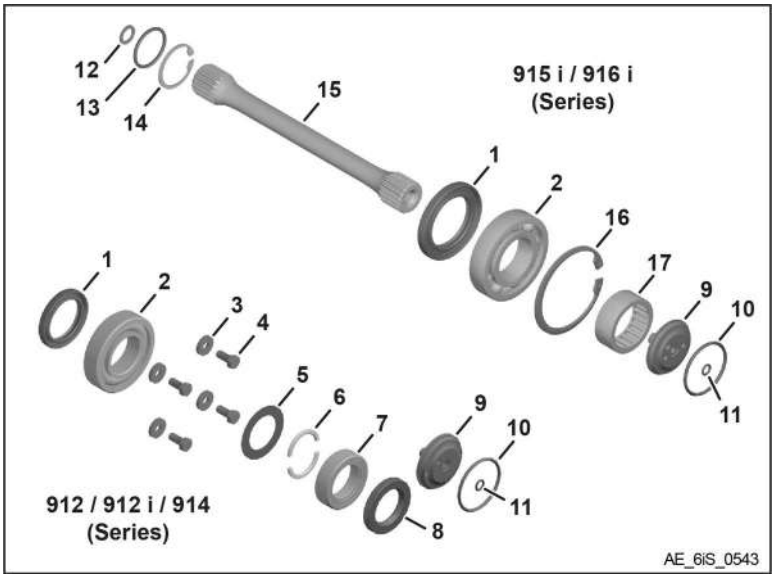

Fig. 3
100% replacement parts after propeller strike

NOTICE All gaskets, O-rings and oil seals must be replaced!

Step	Procedure
11	If the rest of the parts are not within given limits or have unusual wear or damage, the parts need to be replaced.
12	Assemble gearbox. See current Maintenance Manual Heavy (MMH) Chapter 72-10-00 of the respective engine type, section “Assembly”.
13	Re-install drive gear in accordance with current Maintenance Manual Line (MML) chapter 05-50-00, for the respective engine type. Check the crankshaft run-out. See current Maintenance Manual Heavy (MMH) Chapter 72-10-00 for the respective engine type.
14	Re-install the gearbox in accordance with current Maintenance Manual Line (MML) chapter 05-50-00 for the respective engine type.

Finishing work:

- Install the gearbox oil line assy, if installed.
- Install the external alternator, if installed.
- Install the surrounding assemblies, see current airframe and propeller manufacturer’s instructions.

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3.3.2) Rotax 2-stroke UL aircraft engines

If it is determined a propeller strike has occurred the engine must be inspected, repaired or overhauled to the extent necessary to bring it back to serviceable condition before further flight.

NOTE: All work has to be performed in accordance with the relevant Maintenance Manual Line (MML) or Maintenance Manual Heavy (MMH) for the relevant engine type.

3.4) Summary

These instructions (section 3) have to be followed in accordance with the deadlines specified in section 1.5.

The execution of the Service Letter must be confirmed in the logbook.

NOTE: Work on EASA certified parts might affect the EASA Form 1 and does require appropriate documentation by authorized persons. Repairs must be entered into the engine logbook and also do apply for the EASA Form 1.

A revision bar outside of the page margin indicates a change to text or graphic.

Translation into other languages might be performed in the course of language localization but does not lie within ROTAX® scope of responsibility.

In any case the original text in English language and the metric units are authoritative.

3.5) Inquiries

Inquiries regarding this Service Letter should be sent to the ROTAX® Authorized Distributor of your area. A list of all ROTAX® Authorized Distributors or their independent Service Centers is provided on www.flyrotax.com.