



## WA-SB-007

**SUBJECT:** Crankshaft Gearhub Inspection / Screw Replacement

**DESCRIPTION:** Avoiding fatigue issues from crankshaft torsional activity

**APPLICABILITY:** All Serial Numbers

**COMPLIANCE:** **On receipt of the Service Bulletin, Effective Date: 05 Sept 2013**

Duration: If carried out with your 50 hour pre combustion chamber change, it will add the time to remove and replace the alternator, inspect the gearhub and inspect the screws for tightness and damage / replace the screws (screw replacement mandatory at 100hrs, optional at 50 hrs).

*Following a recent service incident, damage has been found to the crank gearhub and to the screws that retain the crankshaft gear. It is not clear at this stage what the sequence of events was, or indeed if all the damage was caused by an impact of the propeller, and extremely rapid deceleration of the engine. As yet we have found no evidence of component wear in the damaged condition, leading us more to suspect damage has all been consequential upon the impact. However, to ensure the safety of all our customers, we are nevertheless taking the precaution of issuing a service bulletin to mandate inspection and replacement of certain key components at regular intervals. Since the majority of our fleet have been operating without incident we do not expect any damage to be found, however believe that this inspection will ensure the continued safe operation of the WAM engines, and of course if any damage is found and reported, we will then be able to react accordingly.*

**This check is mandatory at 50 hr oil changes, screw replacement mandatory NOW and at 100hr intervals, until further notice.**

*The detailed procedure is as set out below:*

### Alternator removal, inspection and refitting

Ensure this is conducted in a reasonably clean dust-free environment, to prevent dirt from contaminating the exposed parts and increasing wear rates etc. The crankshaft (gearhub) screws and the gearhub itself are only accessible for inspection with the alternator removed.

### **REMOVE & REFIT ALTERNATOR (reproduced from maintenance manual MA4-B)**

*Ensure that the battery master switch is off & pull the alternator circuit breakers (if fitted). Disconnect the feed, excitation and speed wire (if fitted). The alternator drive consists of a square block, which is driven by a square hole in the back of the crank gear. Between the two squares are four lengths of rubber bar to absorb any shock pulses being transmitted to the alternator drive. When removing the alternator these four rubbers may well drop out. Please place a rag or something suitable underneath the alternator to catch the rubbers if they fall. Undo the two M10 nuts and withdraw the alternator. Inspect the four rubbers for condition and replace if required. Place the four rubbers on the flat faces of the alternator drive coupling. The rubbers are slightly longer than the distance between the faces and should grip in place.*



*If they do not, then replace them. Place the alternator onto the studs and slowly move it forwards. Check the rubber alignment against the hole in the crank gear. If necessary rotate the alternator to align. Use a long screwdriver to help guide the rubbers into the gear fitting. Push the alternator on by hand until it butts up against the rear timing cover. Don't try and force it on, one of the rubbers may have moved and is now snagging. Refit retaining nuts and torque to 30Nm. Reconnect wiring. Carry out an engine ground run and check that the alternator can be turned on and off and is charging properly. Please note that the engine may be run without the alternator fitted, however the M10 nuts must be refitted and tightened to prevent loosening of the mounting studs.*

Failure to comply with any recommendations/limitations published by Wilksch Airmotive will invalidate your warranty.

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## Tools required

- 17mm socket & wrench, or spanner for retaining nuts
- 10mm socket & wrench, or spanner, for charging connection
- torque wrench suitable for use at 5Nm & 30Nm

## Crank Gearhub Inspection

- At this point the crankshaft gearhub with its female drive square for the alternator rubbers will be plainly visible. Remove any oil and rubber debris as well as you can to allow a close visual inspection gearhub (brake cleaner is very good for this). Rotate the propeller as appropriate to enable close inspection of the whole part.
- If access is limited it can be difficult to see all the surfaces - use a mirror and a torch (the inexpensive usb microscopes are also an excellent tool having built-in illumination from LEDs and being capable of recording images on a laptop).
- Some polishing where the rubber has been in contact is permissible but any dark jagged lines could be the first signs of a crack (the brake cleaner will penetrate into any cracks and draw the oil back out making any crack stand out against the polished surface of the gearhub).
- Be very suspicious if there is significant oil around the rubbers and end face of the drive square as this may indicate the presence of a crack. Any oil leakage past the crank rear seal would of course mask this, so be as thorough as you can when cleaning and inspecting.
- Report any suspicious findings to WAM immediately and do not fly your aircraft until further investigations have taken place.

## Crankshaft (gearhub) screws inspection, removal and fitting

- At the alternate 50 hr intervals, whilst the alternator is removed check that all 4 flange head screws are present, that there is no visible damage to their heads and that they are still tight - use a correctly calibrated torque wrench to apply 25Nm to them (clockwise) and note if they move. They should not move by more than a minute amount. If any of them rotate by any appreciable amount you must contact WAM for further instructions, and do not run your engine at all.
- At 100 hr intervals follow the instructions for changing the screws detailed in WA-SB-005-C and return the used screws to WAM for analysis. Note if any of the screws are not tight when you come to undo them and advise WAM.

***Please confirm receipt of instructions via email and also once the work is carried out.***