



ADDENDUM to SERVICE BULLETIN WA-SB-005

- SUBJECT:** Crankshaft Flange Head Screws
- DESCRIPTION:** Avoiding fatigue issues of crankshaft gear timing bolts
- APPLICABILITY:** All Serial Numbers
- COMPLIANCE:** **On receipt of the Service Bulletin, Effective Date: 1 June 2009**

This Addendum provides further instruction for the correct replacement of screws Part Number: 001304 with new items.

It has been issued because one of our customers, having decided that he didn't have sufficient mechanical knowledge and skill, asked an Aircraft Engineer to do the job. A mistake was made because the Engineer did not have the appropriate tools and a bolt was broken in the back of the crankshaft. It is very important that a correctly calibrated torque wrench is used – both under-tightening and over-tightening of the bolts may contribute to premature failure. Additional instructions and information are in bold *Italics*. For customers who do not have a calibrated torque wrench WAM uses and can thoroughly recommend wrenches made by Norbar, model SLO part number 11123 is ¼" drive and 11087 is 3/8" drive, both have a maximum capacity of 20Nm.

Tools needed: 10 and 17mm sockets, 17mm spanner, measuring calliper, Calibrated torque wrench.

Duration: Depending on Installation the process should take approximately an hour and should only be carried out by someone with a good mechanical aptitude.

As a precautionary measure we have decided to change our original M6 crankshaft gear timing bolts every 10 hours of operation. This should avoid any possible fatigue failures in the bolts. This is just an interim measure until we have tested and approved some higher strength M6 bolts which will allow higher tightening torques.

We will supply new parts with this bulletin, carefully monitor your total hours with each set of bolts and let us know when you require more.

The procedure to fit is noted below, please read through carefully and if you have any concerns do not hesitate to contact us on - 0870 170 9670. ***If you have any suspicion that the procedure has not gone to plan for a particular bolt, slacken it off and start again. Do not retighten a bolt more than once – contact WAM and further bolts will be sent.***

1. Remove the Alternator by unscrewing the 2 nuts on the back of the engine, retain it and carefully withdraw the unit ensuring you catch the 4 rubber drive pieces which may fall out.
2. Once removed, you will see 4 flange head screws; mark these so that you know which one you have started with, and unscrew the first and remove.
(DO NOT UNSCREW ALL 4 AT THE SAME TIME ALWAYS LEAVE 3 TIGHT)
3. Measure the under-head length of the screw that you have just removed. Check the end threads carefully for signs of thread damage that could have been caused by bottoming out in the hole. If there is any sign of this contact Wilksch for further instructions.
4. As long as the measurement at 3 above is 40mm or greater, ***liberally*** apply clean engine oil (***and nothing but clean engine oil***) to the threads of a new screw, and tighten to 16Nm (***11.8 lbft***) with a ***calibrated*** torque wrench. ***Use a torque wrench, which has a maximum capacity of between 20 and 30Nm (14.7 – 22 lbft).*** (Not one where 16 is near the bottom of the scale).

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

Unit SE3, Gloucestershire Airport, Staverton. Gloucestershire. GL51 6SP. England

Tel: 0870 170 9670 Fax: 0870 170 9678 Web: www.wilksch.com



There should be at least 10 full threads of engagement (corresponds with 10 turns of the screw). If the measurement in 3 is less than 40mm but over 38mm carefully shorten one of the new screws to the same length and then fit it and tighten to 16Nm. If the measurement of the just-removed screw shows that it is less than 38mm contact Wilksch for further instructions.

Note that to ensure soundness of the drive the screws MUST be torqued to between 15.5 and 17 Nm (11.4 – 12.5 lbft) – a correctly calibrated torque wrench set to 16Nm (11.8 lbft) will achieve this.

5. Work round the other 3 screws carefully in a sequence following steps 3 & 4 for each screw. Then reassemble the alternator to the engine, being very careful to ensure all 4 rubber drive pieces are located in the square drive correctly.
6. Re-torque the alternator retaining nuts to 30 Nm.
7. Pack up the removed screws and return them to Wilksch for analysis.

One of the factors that may contribute to reduced fatigue life of the crankshaft gear bolts is extra torsional activity being transmitted through the gear drive train. WAM is taking all practical precautions to ensure that there are no field failures. As part of these precautions we are asking that all customers remove the sump from their engine and carefully visually inspect the camshaft gear (half is clearly visible with the sump removed, the other half is visible when the propeller is turned through 180 degrees). The teeth should show light even polishing across their flanks and there should (obviously) be no chips, cracks etc. on the teeth, spokes, rim or anywhere else on the gear. This check should be repeated at 50 hr oil changes until further notice.

The detailed procedure is set out below:

Sump removal, inspection and refitting

Ensure this is conducted in a clean dust-free environment, or dirt may get into the internals of your engine, shortening its life. Draining the oil before starting means less chance of oil spillage, the oil may be re-used if it has less than 50 hrs use.

Tools required

- 10mm ¼” drive socket or 5mm ¼” drive hex key (depending on bolt type)
- ¼” drive ratchet and 6” extension bar
- ¼” drive torque wrench suitable for use at 12Nm (8.8lbft)

Removal

- Locate 10 sump retaining bolts; fully remove 8, leaving two remaining bolts in opposing corners.
- Carefully undo the remaining bolts by ½ turn at a time until both are undone 3 whole turns.
- Let the sump hang on the bolt heads whilst making sure the rubber seal is not stuck to the cylinder head. If the seal is stuck, remove with a small screwdriver or similar, being careful not to ‘nick’ it,
- Obtain a helper and hold sump whilst the last bolts are fully removed. Lower sump slowly taking care not to spill oil.

Inspection

- At this point the camshaft gear will be plainly visible. Remove the oil as well as you can to allow visual inspection of the teeth and other gear parts (brake cleaner is very good for this). Rotate the propeller as appropriate to enable inspection of the rest of the gear.
- If the sump is empty, take this opportunity to clean it out thoroughly, removing any pieces of dislodged RTV silicone etc. Should there be any metallic particles inform WAM immediately.
- Similarly clean the oil strainer “foot” that hangs into the bottom of the sump.

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

Unit SE3, Gloucestershire Airport, Staverton. Gloucestershire. GL51 6SP. England

Tel: 0870 170 9670 Fax: 0870 170 9678 Web: www.wilksch.com



Re-Fitment

- Clean the head face and ensure that there is no RTV silicone or oil remaining on it.
- Ensure the rubber seal is correctly seated in the sump track. Silicone or other high melting point grease can be used to retain it if necessary.
- Apply a small amount of RTV silicone to the joint in the seal where it sits in the sump track and two small amounts at the head / timing cover joints either side of the cam gear.
- Lift and locate the sump on to cylinder head and re-fit two opposing corner bolts hand tight to retain the sump in position. Fit remaining 8 bolts hand tight, then torque all 10 bolts to 12Nm (8.8lbft) in a diagonal pattern from centre out (using correct torque wrench as described above).
- Re-fill engine with oil and check level after settling.
- On first run of the engine, stop after approximately 5 minutes and check that there are no oil leaks. Re-check the oil level.
- Check again after first flight.

*Do not fly again until you have carried out the process described above.
Please confirm receipt of instructions via email and also once the work is carried out.*

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

Unit SE3, Gloucestershire Airport, Staverton. Gloucestershire. GL51 6SP. England

Tel: 0870 170 9670 Fax: 0870 170 9678 Web: www.wilksch.com