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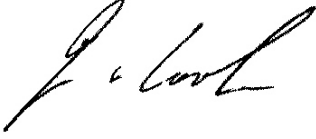
Engineering Report: AVDALSR085-1

Issue: 1 Date: 30th July 2013

Subject: Procedure for Cylinder Head Modification for CHT
Sensor Installation

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Issue	Details of Change
1	Original Issue

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2 Background

2.1 General

The layout of previous cylinder head designs used large diameter ring terminals to retain the CHT sensor probe beneath the one of the spark plugs. The spark plug sensor was prone to damage to the thermocouple during maintenance as well as inaccurate readings due to exposure to combustion gasses when not correctly centred.

The current cylinder head design allows the installation of the CHT sensor probe via a small screw located between the two spark plugs. The new arrangement gives more consistent cylinder head temperature readings and allows removal and replacement of spark plugs without necessitating the removal of the CHT probe, reducing fatigue in the sensor leads.

The procedure given below details the conversion of an older cylinder head to reposition the CHT probe terminal to the same position as the most current cylinder head design revision.

2.2 Applicability

The following procedure is applicable and approved by Jabiru Aircraft Pty Ltd to be carried out to Jabiru Engines operating in the following categories:

- Special Light Sport Aircraft
- Experimental Light Sport Aircraft
- Other Experimental categories – including “Experimental – Amateur-Built”.
- International equivalents to these Australian categories.
- International categories allowing modifications approved by the manufacturer.

2.3 Temperature Readings and Limits

Typically a temperature sensor installed at the new location will indicate temperatures similar to the old sensor. In some cases (depending on internal details of the cooling ducts etc.) indicated temperatures may increase slightly.

There are no changes to the cylinder head temperature limits given in the current revisions of the engine manuals: they apply to temperature readings taken from both locations.

2.1 Before You Start

The following procedure involves making modifications to the cylinder head and alterations to the temperature sensing thermocouple. The procedures are relatively simple, however there is potential to severely damage the cylinder head and break or damage the thermocouple such that it gives inaccurate or unreliable readings.

In the context of the “Spanner Scale” used in the current engine maintenance and overhaul manuals, this is considered a “3-spanner” task: *“Straightforward, but requires special tools, training and/or judgement. Sound basic knowledge guidance and a careful approach are required.”*



Personnel must realistically assess their skills and equipment before carrying out the task. If in doubt, professional assistance must be sought. Personnel must hold current maintenance approvals appropriate to the aircraft’s operating category.

2.2 Recording

On completion of the work the aircraft or engine’s maintenance logbook must be annotated to indicate completion of the work in accordance with Jabiru Aircraft Procedure AVDALSR085.

3 Procedure for modification

The procedure for installing the CHT probe is as follows. The work can be done while the head is fitted to the engine.

1. The spark plugs, Allen key headed bolt and the current CHT sensor terminal are removed.
2. Cover the spark plug holes to ensure that metal swarf does not fall into the combustion chamber. Carefully wipe the area surrounding each spark plug hole with a clean rag to remove excess lubricants, taking care not to wipe any contaminants into the combustion chamber. Apply a piece of adhesive tape – “Race” or “Duct” type tape – over each hole. Ensure it adheres correctly and does not leave any gaps.
3. The cooling fins between the sparkplug housings are ground down several millimetres using a die grinder, sharp edges on the fins are de-burred.

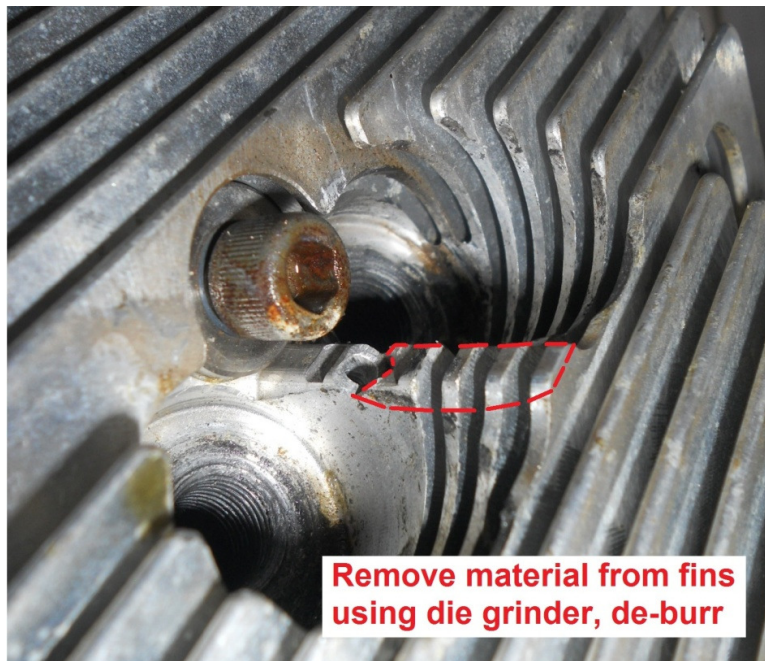


Figure 1 – Fin Modification

4. The existing 1/8” hole located on the bridge between the sparkplug housings is drilled out to 9/64” and the hole bored to no more than 12mm depth.
5. The now enlarged hole is tapped for a 5/32” unc machined screw (**#8-32unc tap**), the thread must extend down into the hole far enough to accommodate a 5/32” screw, 3/8” (9.5mm) long.

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Figure 2 – Hole Tapping

6. Use a vacuum, brush or similar to remove all swarf and other loose contaminants from around the spark plug holes.
7. Remove the tape covering the spark plug holes.
8. Re-fit the cylinder head bolt (Allen key headed bolt) to the torque specified in the appropriate engine maintenance manual.
9. Re-fit the spark plugs to the torque specified in the appropriate engine maintenance manual.
10. The existing sparkplug retaining ring terminal connector is removed from CHT sensor lead. Take care not to damage the thermocouple: to function correctly the very tip of the thermocouple wires must be welded together, then for the remainder of their length the two wires must be insulated from each other. Care must be taken to not break the wires or damage the insulation. Any damage will result in inaccurate or unreliable readings.
11. A standard red 4mm ring terminal connector is modified by bending the ring inwards by approximately 45 degrees, and removing the red plastic insulation plastic piece.
12. The modified ring terminal is crimped onto the CHT sensor lead. Again, take care not to damage the thermocouple wires. Check that the terminal is secure and that the crimping process has not bent or broken the wires.
13. Insulate the connection with heatshrink. Where the thermocouple uses metallic shielding, ensure that the shielding does not contact either or both of the thermocouple wires.

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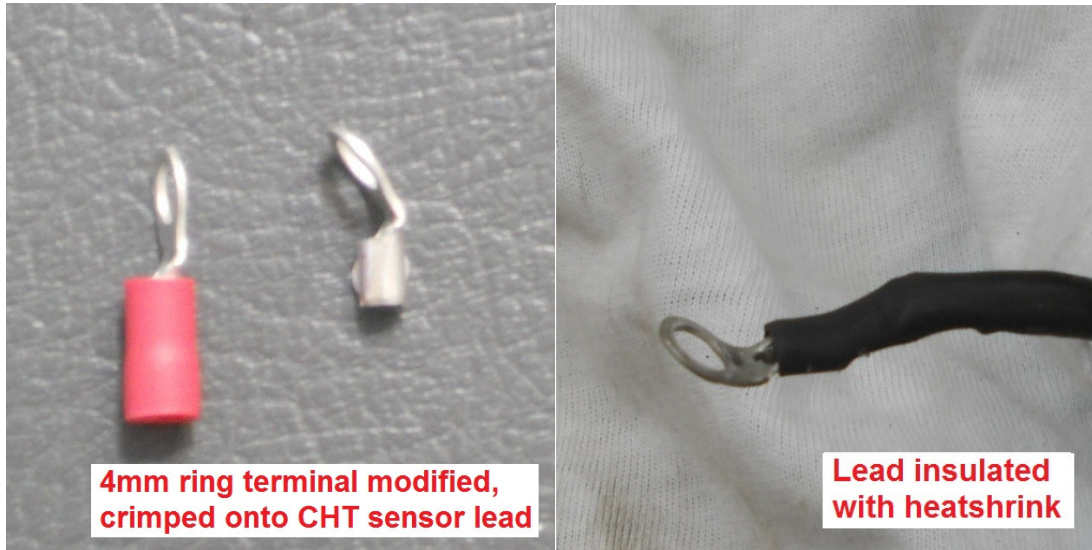


Figure 3 – CHT End Fitting

14. The CHT sensor with the new ring terminal is installed onto the cylinder with a 3/8" long, 5/32" fine thread screw into the newly tapped hole.
15. It is recommended at this point to test the thermocouple: the easiest way is usually to place the terminal in a mug of water which has just boiled: depending on the purity of the water, the altitude etc. the instrument should read over 90°C (194°F). The reading should be steady.
16. The lead is arranged to arrive at the terminal directly between each spark plug such that removal of either spark plug is not inhibited by the CHT sensor lead.



Figure 4 – CHT Cable Routing