

SERVICE BULLETIN: JSB 019-2
Issue: 2
Date: 24th November 2010
Subject: Control Surface Clearance

Issue	Reason for Issue	Issue Status
1	Original Issue	CANCELLED
2	Include recurring inspection requirements, clarify acceptance criteria	CURRENT

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1 Applicability

- All Jabiru Aircraft.
- **Note:** For aircraft in Light Sport Aircraft categories this Bulletin is equivalent to a Manufacturer’s Safety Direction.

2 Background:

2.1 General:

- In early 2008 this bulletin was first released to address several cases where the control surfaces of Jabiru Aircraft have rubbed against fixed parts of the airframe during flight. In some cases this lead to the control jamming. Figure 1 illustrates a typical control in both the normal (shown at left) and jammed (shown at right) positions.
- Since this bulletin was first released these incidents have continued to occur, though at a lower rate. In some cases these incidents have lead to a loss of control of the aircraft, resulting in significant damage.

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2.2 Details For Issue 2:

- This bulletin is being re-released now with new requirements intended to prevent further recurrence of this type of problem. The aircraft Technical Manuals are also being updated to include additional recurring inspections of the control system.
- Issue 1 of this bulletin has been cancelled and replaced by Issue 2. Issue 1 must no longer be referenced during maintenance.
- In Figure 1 several terms used throughout this bulletin are defined. This definition is provided to clarify the statements given in the remainder of this bulletin.
- **Control** – This refers to control surfaces – rudder, elevator and ailerons.
- **Aircraft** – This refers to the fixed part of the aircraft immediately in front of the controls. In particular it refers to the point indicated in Figure 1, where the control will hit the aircraft if a jam occurs.
- **Control at the point of overlap** – This is the particular point where the rearmost edge of the aircraft is aligned with the front of the non-hinged side of the control. This is the critical point where a control jam becomes possible. Any control which has a critical overlap of less than 2mm should also be treated as having a “point of overlap” as defined by this bulletin.
- **Control clearance** – This is the working clearance between the control and the aircraft.
- **Control gap** – Best shown on Figure 3 (left). If the control passes the point of overlap a gap opens between the aircraft and the control. A gap like this combined with excess flexing of the control surface hinges will lead to control surface jamming.

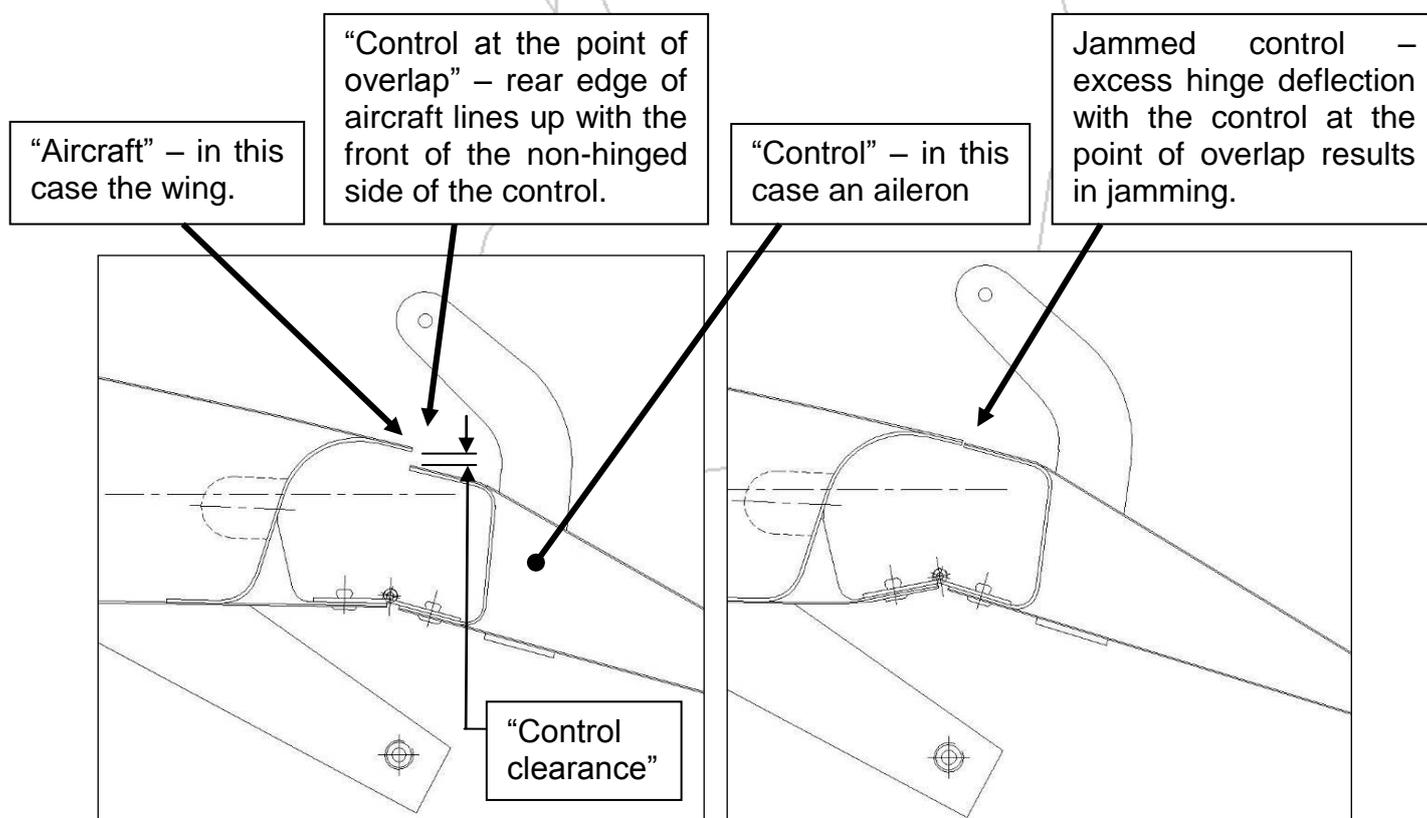


Figure 1 – Normal and Jammed Control Illustration

3 Inspections:

3.1 Inspection A:

- This inspection is to check if the controls are configured in such a way that there is a point of overlap as shown in Figure 1. At noted above the point of overlap is the critical point at which severe control jamming becomes possible.
- Check each control by moving it to its maximum deflection and inspecting for a control gap – as shown in the example of Figure 3.
- Note the result of Inspection A and carry on to Inspection B in all cases.

3.2 Inspection B:

- This inspection has two purposes: to check to see if jamming is likely due to insufficient clearance at the control's point of overlap and to check if the control hinges are sufficiently stiff. All controls must be inspected in this way regardless of the results of Inspection A.
- Check the clearance between the control surface and the aircraft at the point of overlap as detailed below:
 1. Set the controls so that the control being tested is at the point of overlap – as shown in the right picture in Figure 3. If the control being tested does not deflect to a point of overlap then place it as close as possible to the overlap point.
 2. Press against the control using a thumb – pushing the control in the direction that would **close** the control clearance. Measure the control clearance while this load is applied.
 3. Remove the load from the control and re-measure the control clearance.
 4. Controls are to be tested this way at every hinge. The force to be applied in each direction is approximately 5-7kg (11 – 15lb). Inspectors can “calibrate” their thumbs by pushing onto a set of scales to indicate how hard they need to push. See Figure 4 for details of where to push on the controls.
- 5. **Rectification work is necessary whenever any of the following criteria are met:**
 - The control clearance is less than 3mm at the control's point of overlap when tested as detailed in Inspection B. Note that this clearance limit only applies to controls which are configured such that they actually have a point of overlap.
 - The control clearance changes by 5mm or more when the test load of Inspection B is applied. This is irrespective of if the control has a point of overlap or not.
- Carry on to Inspection C in all cases.

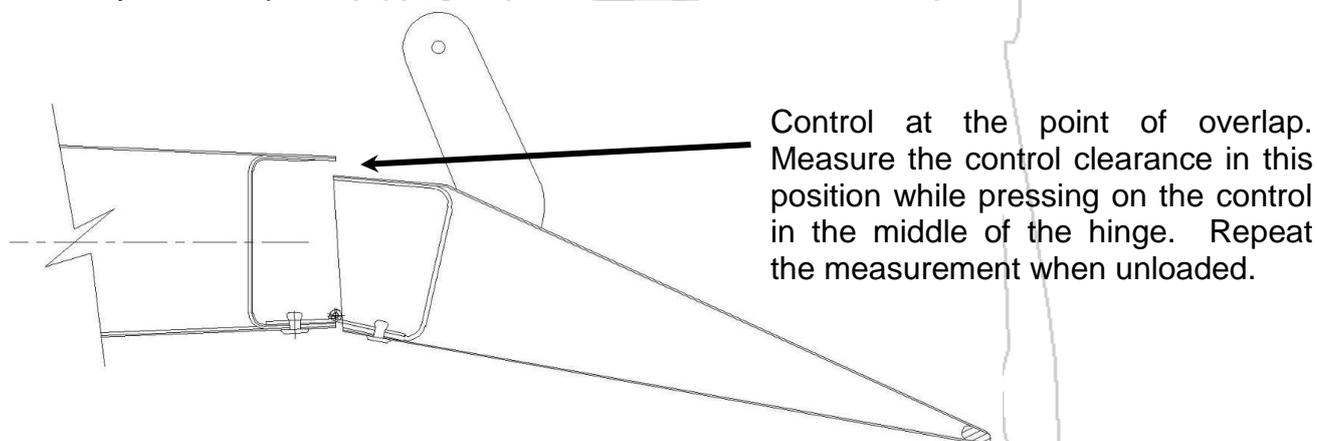


Figure 2 – Rudder Gap Cross Section

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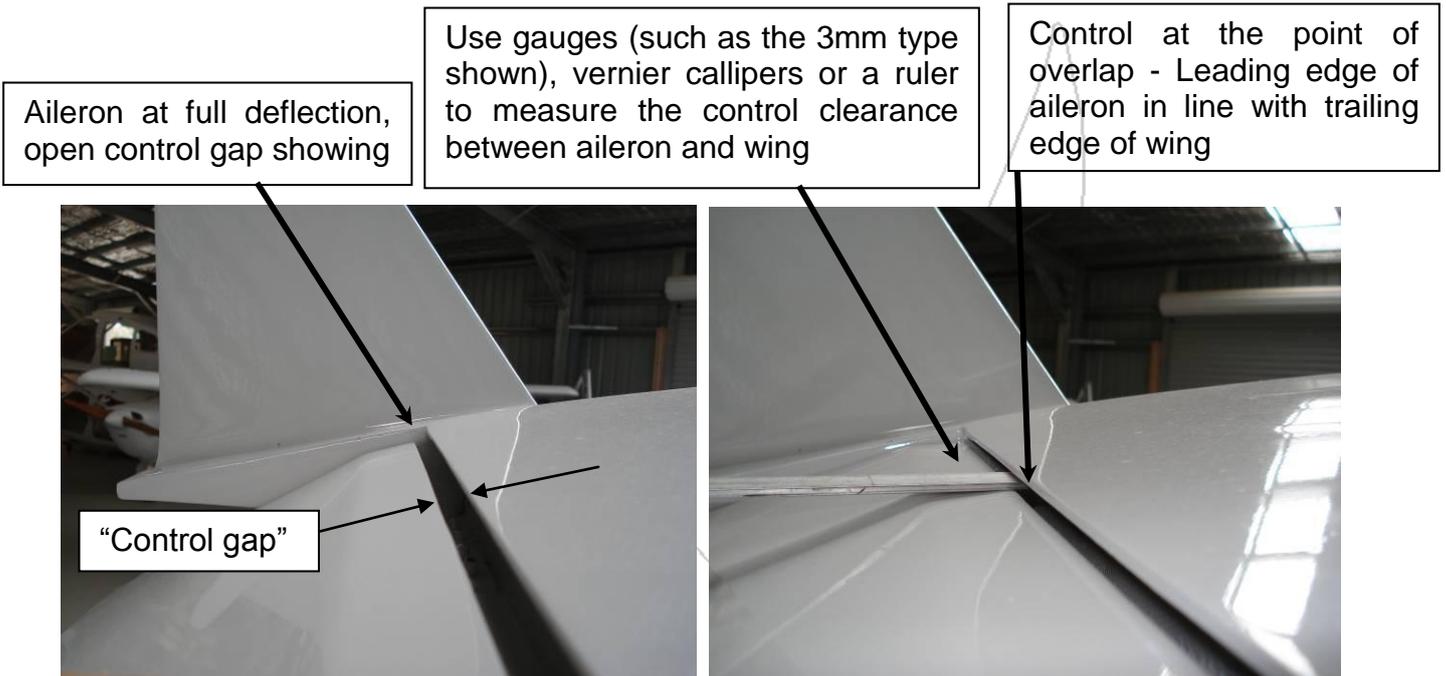


Figure 3 – Aileron Clearance

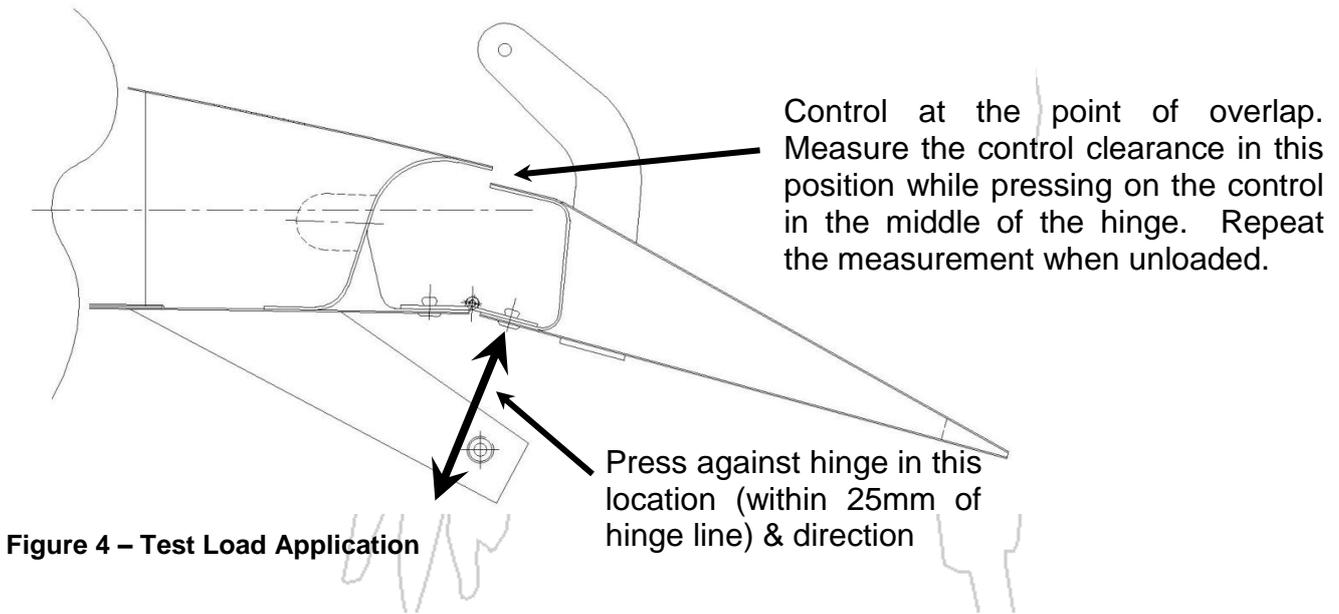


Figure 4 – Test Load Application

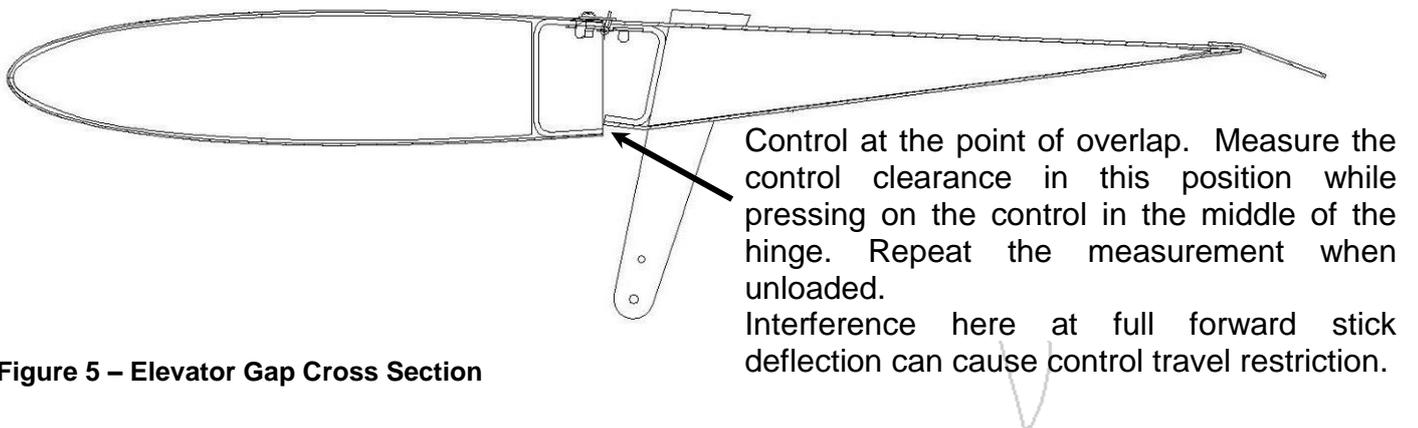


Figure 5 – Elevator Gap Cross Section

3.3 Inspection C:

- This inspection is to see if there is any travel restriction of a control at deflections other than at the control's point of overlap.
- For the purposes of this inspection a travel restriction is defined as a one-way jam – i.e. the control cannot reach full deflection but is able to move freely in the other direction.
- While a control is very unlikely to completely jam due to a travel restriction the fact that the control is not achieving its full travel must be addressed.
- Travel restriction normally presents at the opposite control travel extreme to the control's point of overlap – i.e. for the elevator shown above (Figure 5) full stick-forward deflection is the point most likely to exhibit a travel restriction as the lower surface of the elevator hits the aircraft.
- Inspect each control as detailed below:
 1. Inspect the control for scratches and marks (as shown in Figure 6) in the overlap area where the control runs inside the aircraft. If no marks are found further inspection and/or rectification is unnecessary. However, if such marks are found complete the following steps:
 2. Mark the extents of the control surface travel when driven by the controls.
 3. Disconnect the control from the control cable, allowing it to swing freely.
 4. Take care not to deflect the control beyond the point where it can normally be driven by the flight controls as this will result in a "false positive" - controls are able to move slightly beyond the normal travel limits but rubbing at these extreme deflections is not dangerous provided there is no chance of mechanical jamming. Note that for the rudder and elevator the fixed stops fitted at the rear of the aircraft are located approx 2mm beyond the normal travel limit.
 5. Move the control through its normal travel range while pushing against each hinge in the direction that would **close** the control clearance with a force of approximately 5-7kg (11 – 15lb).
 6. Note if there is any travel restriction caused by the control rubbing against the aircraft.
 7. **Rectification work is necessary whenever any of the following criteria are met:**
 - There is travel restriction caused by the control rubbing against the aircraft.



Scratches here indicate the control has rubbed against the fin (illustration)

Figure 6 – Scratches on Rudder

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4 Recommendations:

- Contact Jabiru Aircraft or local representative for rectification instructions wherever the results of any of the inspections indicate a need for rectification action.

5 Compliance – Implementation Schedule:

- Carry out the inspections detailed herein within the next 50 hours TIS and thereafter at the interval specified in the latest revision of the aircraft's Technical Manual.
- Whenever the aircraft rigging is altered – i.e. if control travels are adjusted, control surfaces are repaired, or control surfaces are removed & re-fitted.

5.1 Reporting

- Anyone finding an aircraft which has controls meeting the criteria of Section 4 are requested to inform Jabiru Aircraft Australia. Preferred method is via an email to info@jabiru.net.au. Please include the following information:
 1. Aircraft model
 2. Aircraft serial number
 3. Approximate hours flown
 4. Controls affected (rudder / aileron / elevator)
 5. Builder information – kit built or factory built.
 6. Any relevant additional information

6 Airworthiness Note:

- Current revisions of aircraft documentation – aircraft Technical Manuals, Service Bulletins, Service Letters etc are available for download direct from the Jabiru Aircraft Australia website – www.jabiru.net.au. Once the updated versions are available the main front page of the site will carry a note to that effect.
- Where required, maintenance work called for by this Bulletin must be carried out by authorised personnel. For the aircraft detailed herein this means the owner, an RA-Aus Level 2 holder or a Licensed Aircraft Maintenance Engineer (LAME) – as appropriate to the aircraft's registration and use (Private or Air Work operations).
- On completion of the work, the authorised person must note the completion of the actions required by this bulletin in the aircraft's maintenance logbook. This note should indicate what was found during the inspection, details of any additional work carried out and include the date of the work and the identity (including licence number where appropriate) of the person carrying out the work.