

SERVICE BULLETIN 98


SUBJECT: SLOTTED FLAP HINGE POINT CORRECTIONS

APPLICATION: All Slotted Flap Kits shipped before 1/24/91

DESCRIPTION: As you know, we have twice revised the Slotted Flap Instructions and the slotted flap Hinge Pivot Locating Jig Templates. In generating the revisions, however, we overlooked the minor differences in wing thickness that exist among different airplanes in the field; these differences have caused some clearance problems with the flap pivot plates in some installations.

There are now several sets of flaps that have been completed by builders using the same instructions and templates. Some builders have had major problems and some have had few or no problems. This indicates to us that some of the problems are caused by slight variations in construction of the wing. Many factors could cause problems. For example, the curvature of the lower or upper wing surface could change slightly as the aft shearweb laminates cure, which could result in smaller "Z" dimensions at the wing trailing edge, or, since the flaps are constructed to match extensions of the upper and lower wing surfaces, could result in thinner flaps.

Some builders have experienced problems when using the Revision B Hinge Locating Jig Templates. In some cases, the templates position the flap hinge pivot plates too high so they extend too close to the upper surface of the flaps. This, in turn, causes the rod-end bearing on the actuator rod to protrude above the upper surface of the flap. One cannot simply drill a new hole and trim off the top of the pivot plate, because this changes the lever arm for the actuator.

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MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
GLASAIR	SERVICE BULLETIN 98		2/01/91		1 of 4

SOLUTION:

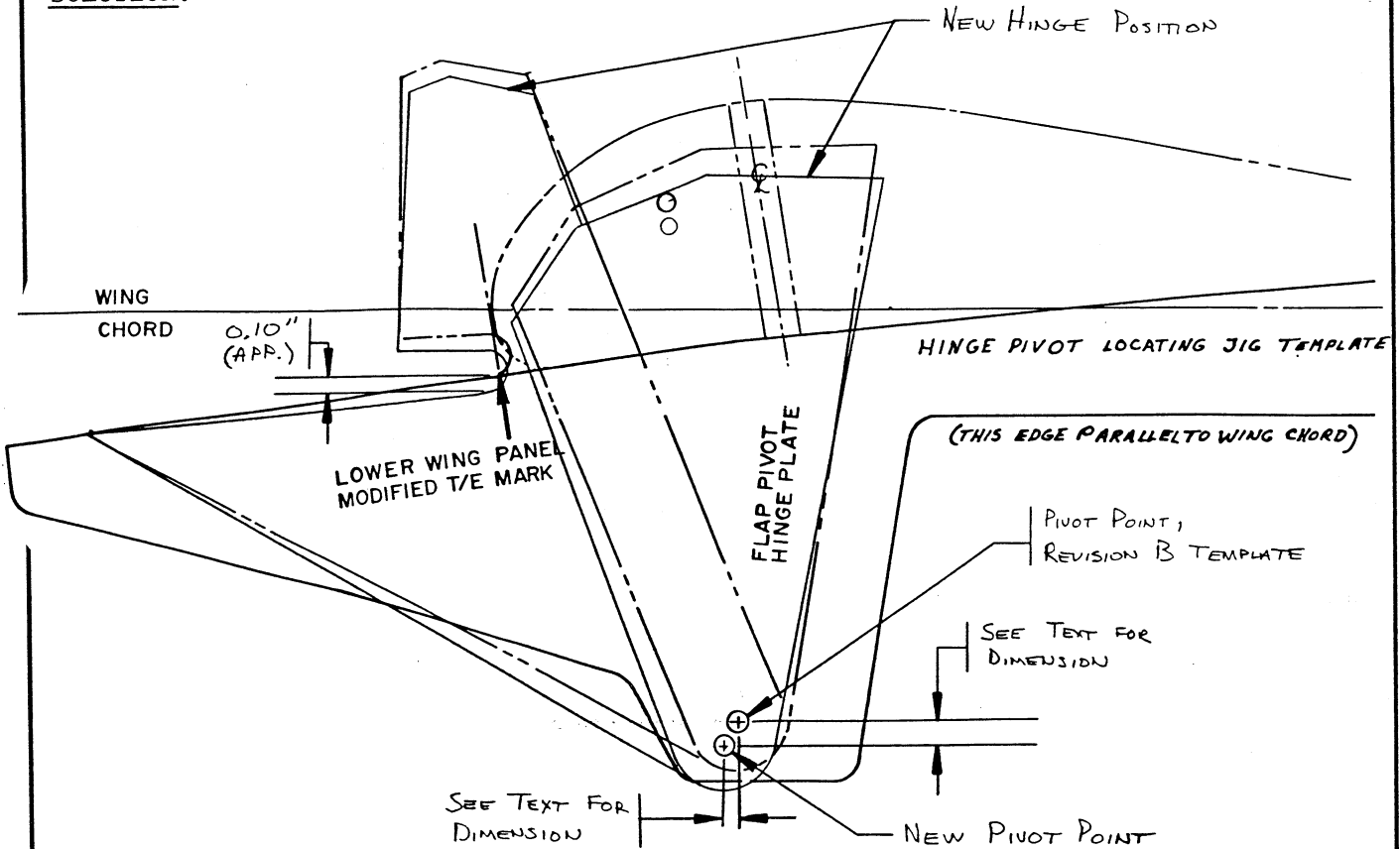


FIGURE (1)

If you experience a problem with the flap actuator rod-ends protruding above the upper surface of the flap, the only thing you can do is to lower the flap hinge pivot point to get everything back inside the flap without changing the lever arm for the actuator. Try locating new hinge pivot points on the Revision B Hinge Locating Jig Templates, as shown in FIGURE (1) and as described in the following table:

Glasair I, II, and II-S:

- Inboard Hinge: locate the new hinge pivot point .16" below and .13" forward of the existing pivot point shown on the Revision B Hinge Locating Jig Template.
- Outboard Hinge: locate the new hinge pivot point .16" below and .11" forward of the existing pivot point shown on the Revision B Hinge Locating Jig Template.

Glasair III:

- Both Hinges: locate new hinge pivot points .22" below and .08" forward of the existing Revision B Hinge Locating Jig Templates.

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MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
GLASAIR	SERVICE BULLETIN 98		2/01/91		2 of 4

To achieve the new hinge point position, rest the leading edge of the wing attach plate against the lower surface of the wing and rotate the aft end down. This will require trimming some material off the notch cut in the attach plate to clear the lower spar cap, and will leave approximately a 0.1" gap between the lower wing skin and the wing attach plate at the modified wing trailing edge. If you trim the wing attach plates, be sure to remove all sharp edges and scratches in the relieved areas. Accomplish this at both the inboard and outboard hinge plates. This modification should be enough to get the flap hinge pivot plate back inside the flap.

If you do not experience this problem, then your installation should be OK.

NOTE: Builders shipped slotted flap kits after November 1, 1990, who had some of their hardware back-ordered will receive redesigned wing attach plates that may not require the trimming mentioned above. Locating the hinge pivot points for the redesigned wing attach plates also may not result in the 0.1" gap between the attach plates and the lower wing skin.

For those who are still having various other problems, here are some parameters within which to work and some goals to aim for:

1. The lower leading edge of the flap should touch the modified wing trailing edge and form a gap seal when the flap is retracted.
2. The lower leading edge of the flap should be flush with the lower surface of the wing when the flaps are retracted, although a dramatic undersize condition can be worse than an oversize flap for aerodynamic efficiency.
3. The trailing edge of the flap should be aligned with the aileron trailing edge. (Located on the chord line for the Glasair I, II, and II-S; located 3° above the chord line for the Glasair III.)
4. The 5" distance between the hinge pivot point and the hole that the flap push rod attaches to on the inboard flap pivot plate must be maintained for proper leverage.
5. The upper surfaces of the wing and the flap must blend smoothly.
6. When retracted, the doubler between the flap hinge pivot plates must contact the wing attach plate evenly to act as an up-stop at all three hinge positions simultaneously.
7. The flap travel should be 0° to 40° (±1°) for the Glasair I, II, and II-S. The flap travel should be -3° to 37° (±1°) for the Glasair III.
8. When the flaps are fully extended, the extended upper surface of the wing trailing edge must overlap the leading edge of the flap by at least 1% of the total wing chord length (including the length of the flap). (This is approximately 0.5" at the inboard end and 0.4" at the outboard end.) Refer to FIGURE (27) in the Slotted Flap Instructions.



MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
GLASAIR	SERVICE BULLETIN 98		2/01/91		3 of 4

9. The gap opening between the leading edge of the flap and the wing upper surface trailing edge, when the flaps are extended, should be the same from end to end. (The gap on our prototype slotted flap installation varies by about 0.1" over the span of the flap without problems, but the variation should be kept to a minimum.)
10. The leading edge of the flap should be filled and smoothed so the air isn't tripped when passing over it.
11. All the hinge pivot points must be in alignment. The hinges are designed to be strong enough for any loads induced by wing deflection in addition to the aerodynamic loads.
12. The hinges must operate smoothly with no side loads or binding throughout the full range of travel.

The above are the goals you are aiming for. The Hinge Pivot Locating Jigs were an attempt to achieve all these goals for you, but, due to small differences in each wing, they don't always work perfectly. If, to achieve these goals, you have to move the hinges around some relative to the positions shown on the templates, it's OK. The wing attach plates do not have to be tight against the lower wing surface as long as minimum edge distances to the upper edges of the plates are maintained when drilling rivet holes.

When building an airplane, or any such large project, it is important to understand what criteria or parameters are important and which ones may vary somewhat to achieve the same goal. We have tried here to give you an idea of which parameters are important.

Read your Slotted Flap Instructions carefully and study the illustrations. Don't forget to study the Revision Notes. Cut out your Hinge Pivot Locating Jigs using the Revision B templates, and relocate the hinge pivot holes as described on page 2 of this Service Bulletin. Trial fit the hinges. If you still have a problem, please call the builder support hot line.

NOTE: Some builders have reported finding fairly deep scratches in some of the gold anodized parts. If you find parts with unacceptable scratches, please contact our shipping department for a vendor return number to return the parts for replacement. We are temporarily out of stock, but expect that replacement parts will be available by February 15, 1991.



MODEL	ASSEMBLY NAME	REVISION	DATE	VOLUME	PAGE
GLASAIR	SERVICE BULLETIN 98		2/01/91		4 of 4