

GLASTAR SERVICE BULLETIN 25

MANDATORY

Subject: Variations in wing angle of incidence

Applicability: GlaStar fuselage cage assemblies S/N 001—303 (Serial numbers for cages S/N 001—293 are stamped above the right wing pivot mounting lug; on cages S/N 294 or later, they are stamped on the outboard side of the right taildragger main gear socket. The serial number is also recorded on the Steel Parts Kit Contents List.)

Discussion: The angle of incidence of the GlaStar wings is set by the pre-welded attach lugs in the cage assembly. Several builders have discovered differences in the angle of incidence set by these lugs from the left to the right side of their cages. As a result of these reports, we have reworked our cage welding jigs and instituted new quality assurance procedures to ensure that any left-to-right variation in cages S/N 304 or higher falls within acceptable tolerances.

In consultation with our aerodynamicist, we have determined that differences from left to right of **1.0°** or less will produce **negligible** effects on the flying characteristics of the GlaStar. The vast majority of cages S/N 001—303 will fall well within this tolerance range, but a handful of cages have been reported to exceed it.

Several builders have taken steps to adjust the incidence angle of the wing on one or both sides by grinding down the wing pivot assemblies (P/N 101-02000-01) at the locations indicated by Flags 1 and 2 in Figure 1 (on the following page) and inserting washers either above or below the pivot, thereby adjusting the trailing edge of the wing up or down to bring the two sides into congruence. This modification has the desired aerodynamic effect, but it can give rise to serious structural concerns. The pivot bolt is designed to handle **shear loads only, not bending loads**. Because washers cannot carry shear loads, insertion of washers between the pivot assembly and the cage lugs has the effect of putting the pivot bolt in bending. For this reason, **a maximum of one standard, .063"-thick AN960 steel washer is permissible between the top of the pivot and the upper cage lug (at Flag 1) or a maximum of two such washers is permissible between the bottom of the pivot and the lower cage lug (at Flag 2).**

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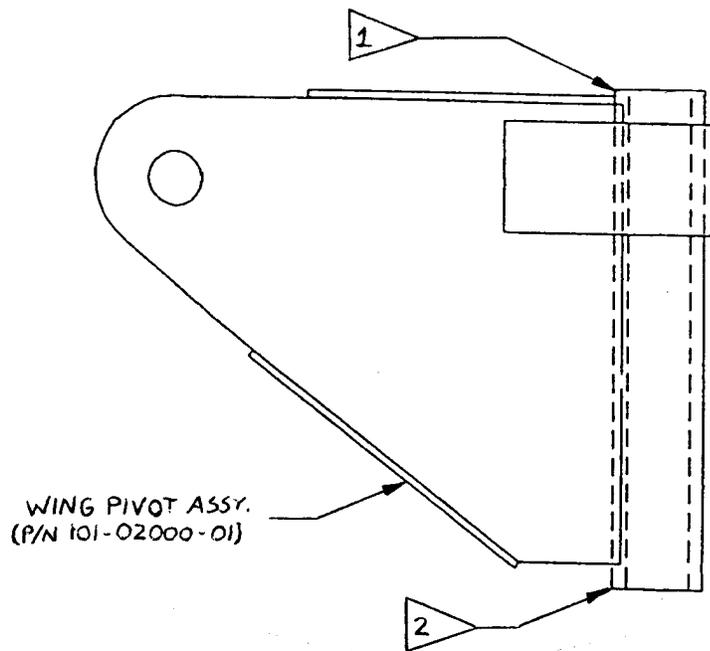


Figure 1

Recommended and Required Actions: The following actions are either recommended or required for various particular scenarios:

- A) If you have not done so, we **recommend** that you measure the difference (if any) in the angle of the wing attach lugs on the left and right sides of your cage. The easiest way to do this is to run a digital level from the top of the forward wing attach lug to the top of the wing

pivot assembly (with the pivot installed between the cage attach lugs per the instructions in the *Assembly Manual* and extended perpendicular to the direction of flight) on both sides. Note that what you are interested in here is the **difference** in the angle measured from side to side; the absolute value of the angle is unimportant.

If you measure a difference of **1.0° or less**, we **strongly recommend that you do nothing**. As noted above, differences of this magnitude are unlikely to have noticeable effects on the flight characteristics of the aircraft. In addition, many other factors, such as inadvertent twist in the wings and tail surfaces, weight differentials from left to right, engine thrust line variations, etc., all play into the flight characteristics of the aircraft, and many of these factors operating in opposite directions tend to cancel each other out. Therefore any attempt to “correct” such a slight difference in wing incidence is just as likely to make the overall problem worse as it is to improve it. Residual imbalances in the finished aircraft can easily be corrected with small ground-adjustable trim tabs.

- B)** If you measure a difference in incidence angle from left to right of **more than 1.0°**, we **recommend** that you first try to relieve the problem by modifying one or both pivot assemblies and inserting a washer or washers up to the permissible number specified on Page 1. Modify the pivot(s) by grinding away the tube portion of the assembly in the location(s) indicated by Flag 1 and/or Flag 2 in Figure 1. As the figure shows, there is more excess tube material at the bottom (Flag 2) than at the top (Flag 1), so we recommend grinding the bottom first and only grinding the top if necessary to install the maximum number of permissible washers.

Adding a single standard, .063"-thick AN960 washer above or below the pivot will change the angle of the wing by approximately **.15°**, and we expect that this will be sufficient to bring the vast majority of cages within the 1.0° tolerance range.

- C)** If you are unable to bring your wings into the 1.0° tolerance range using the permissible number of washers specified on Page 1, you are **required** to order one or more custom-welded wing pivots. Stoddard-Hamilton will provide such pivots free of charge to those builders with cages that: **1)** are outside the 1.0° tolerance range, **and; 2)** cannot be brought within the tolerance range using the remedial action prescribed in **B)** above.

If you require custom pivots, you must contact Technical Support **no later than July 31, 1997**. Please be prepared to provide the technician with the following information: **1)** your name and kit number; **2)** the side-to-side difference between your wing attach lugs to the nearest tenth of a degree, and; **3)** whether you ordered the pre-finished steel parts option. Please keep in mind that **without an accurate measurement of the actual side-to-side difference in your cage, we will be unable to manufacture custom pivots that will correct the problem for your aircraft**. You may be required to return one or both of your existing pivots prior to taking delivery of the replacement(s). We will make every effort to provide the new pivot(s) as quickly as possible, but the exact production schedule will depend on the number and variety of custom pivots required.

If you order custom pivots **after** July 31, 1997, you may be responsible for the cost of the custom pivots and/or shipping expenses at our discretion. Compliance with this service bulletin remains mandatory in any case.

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If you have already modified your pivot assemblies and have installed more than one .063"-thick AN960 washer above or more than two such washers below the pivot, you are **required to replace the pivot assemblies before further flight**. As discussed above, the excess washers have the effect of placing the pivot bolt under unacceptably high bending loads, and therefore **such an installation cannot be considered airworthy**. The required action in this case depends on how far out of tolerance your cage initially was:

- 1) If a smaller number of washers within the permissible limits specified on Page 1 **would have been sufficient** to bring your cage within the 1.0° tolerance range, then you are **required** to purchase new pivot assemblies and install them using no more than the permissible number of washers, as specified on Page 1. Because the modification you undertook was not approved by Stoddard-Hamilton, and because an approved modification (as outlined in **B**) above) **would have corrected** the problem, you are required to assume the cost of replacement pivot assemblies.

- 2) If, on the other hand, the permissible number of washers **would not have been sufficient** to bring your cage within the 1.0° tolerance range, then you are **required** to contact Technical Support by no later than **July 31, 1997**, to arrange manufacture and shipment of a custom pivot or pivots at Stoddard-Hamilton's expense, as outlined in **C**) above. Because the modification prescribed in **B**) above would not have corrected the problem, Stoddard-Hamilton will assume the cost of replacement pivot assemblies, even though the modification you undertook was not approved by Stoddard-Hamilton. If you order custom pivots **after** July 31, 1997, you may be responsible for the cost of the custom pivots and/or shipping expenses at our discretion. Compliance with this service bulletin remains mandatory in any case.

D) It has come to our attention that one or more independent vendors unaffiliated with Stoddard-Hamilton are offering custom-built wing pivot assemblies to builders whose cages are misaligned. Because Stoddard-Hamilton has neither reviewed nor approved the engineering, materials or manufacturing of any parts offered for sale by independent vendors, we **strongly recommend** that, if custom pivot assemblies are necessary, you obtain them from Stoddard-Hamilton rather than from any other source. In this regard, we draw your attention to the second paragraph under "Aircraft Design Integrity" in the GlaStar Purchase Agreement, in which you (Purchaser) agreed ". . .that any modification or substitution of any component part of the GlaStar aircraft kit by Purchaser is made without the consent of Stoddard-Hamilton, may make the aircraft unsafe, and may cause the aircraft to not receive FAA certification."

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