



CFC Alternative to Mod 66
Door strut repositioning
September 23, 2006

The Europa Kit Aircraft have a constant problem with the door flexing at the upper rear of the door due to the door strut positioning described in the Europa Build Manual. Positioning the strut, as described, causes the door to bulge at the upper rear corner of the doors causing air and water leaks. In 2001 Bob Berube of Flight Crafters devised a simple way to move the strut to part way down the door where the force of the strut puts less bending stress on the door. By moving the door strut to about 1/3 of the way down the door and moving the fuselage mounted ball stud of the strut to about 1 inch by 1 inch from the very corner of the door insert, the Europa doors inherent stiffness allows the door to maintain a well fitted position. Unfortunately, the method was never documented, and precise measurements were not distributed.

Europa Aircraft devised a similar method based on Bob's work but using fiberglass inserts placed on the aft end of the door. The modification was approved and became Europa Mod 66.

The EuropaMod 66 adds a molded skin with door attach to the door increasing the door thickness and weight. While accomplishing the task of repositioning the strut, this also stiffens the door preventing it from flexing. These attributes combine to make some door strut pressure insufficient to hold the door up. It also makes closing more difficult with a door seal and due to the door stiffness makes the shoot bolt insertion when locking more difficult unless care is taken in the installation to prevent misshaping the door.

While at Flight Crafters I suggested an install manual for distribution to make the installation cheaper, lighter, and easier to install. Alas, this was never done.

When I formed Custom Flight Creations, Inc. , we began a program to make a standard retrofit/initial install as Europa was in reorganization and being sold. This installation is for Custom Flight Creations customers who have interior or door fit constraints and the Europa Mod 66 may not work for them.

Parts Required:

6 inches of any 1 inch flange aluminum angle of 3/32 to 1/8 inch.
Two #4 taper head screws.

Directions:

Refer to the drawings at the end of this document.

Make two brackets out of the 1/8 inch angle stock as depicted in figure 1.

Make key holes (about 3/32") to help reinforce the bracket when epoxied in.

Taper the hole for the #4 screw in the center. This will act as a clamp until the Redux or Epoxy cures.

On the opposite face, taper the sides as shown in the drawing and make a 4.8 mm hole (3/16 inch) for the 5mm ball stud for strut attachment. It is not a bad idea to drill this hole then tap for the 5mm thread of the stud.

Position the door open with a support holding it secure so the door is 36 inches from the door flange to the cockpit sill. See figure 2.

Drill a 3/16 inch hole in the upper corner of the fuselage door rebate for the fuselage ball stud. This hole is about 1 inch down and 1 inch out from the corner of the cutout. Measure from the inset not the outer skin. The area is curved so we made a thin sheet metal tool contoured to the curve of the upper aft door rebate. But measuring from the curve center out one inch, works just as well.

Install the ball stud in the fuselage.

Position the gas strut on the bracket.

Install the gas strut and bracket on the fuselage and lay the angle bracket against the door. Ensure the bracket has the flange facing forward.

Mark the approximate location with a pen on the door.

To ensure the ball stud and strut do not hit/rub the side of the fuselage rebate,

Mark the position so it can be seen from inside the cockpit.

Remove the strut from the fuselage ball stud.

Unscrew the plastic strut end at the door and now complete this operations with bracket, ball stud and its strut end all assembled.

Remove the ball stud from the fuselage.

Make a tool out of a thin piece of aluminum (.032 works best) about 12 inches long and 1/2 inch wide. Make 3/16 inch holes in the aluminum 8 inches apart. (This is the distance of the nearly compressed strut.) or you can compress your strut and measure the distance for an exact fit if you are using some after-market strut. (Consult with us as the strut should be aero approved or tested, and have a dampener in it for compression and extension. Auto Spring Shocks are not recommended).

Unscrew the ball stud from the bracket and put one end of the thin aluminum through the threaded end of the ball stud between the bracket and hex side of the ball. Then put the other hole of the thin aluminum strip with a 3/16 bit or drift into the fuselage hole.

This sets the position of the bracket to simulate the compressed strut. See figure 3.

Set the bracket, with plastic stud retainer now attached, into the cutout in the door recess. The .032 metal tool gives some clearance but we make a small square spacer out of .032 by one inch square to keep the strut and stud retainer from hitting the aft end of the cutout and marring the paint later on after installation.

To set the position of the door strut bracket we use the marks made on the door. By closing the door, the bracket fore and aft distance can be set. We use clay to help hold

the bracket assembly up off the fuselage flange about (1/4 inch) so when the door closes the bracket is forced against the door, and a small bit of finger alignment will set it in its final position against the door.

If you have already installed the glass, this is a bit tedious without sitting in the aircraft and using a stiff ruler or similar to coax the bracket into place. Open and close the door and see how the bracket lines up. It should be very close to the alignment marks and the fore and aft position is set by your spacer.

Reopen the door and use 5 min epoxy to temporarily attach the bracket to the door and reclose with some fresh clay and check of the spacers.

When cured, remove the 3/16 inch drill bit from the fuselage hole by gaining access from the baggage bay side of the aircraft.

Open the door.

Check the position of the bracket. If alignment looks good, drill a hole through the center hole of the bracket into the door. Affix with the #4 screw.

Reinstall the fuselage ball stud temporarily.

Remove the thin aluminum strut tool from the bracket.

Attach the door strut to the bracket and fuselage ball stud and check opening for clearance.

When satisfied. Remove the bracket, clean off the 5 minute and scuff sand the area.

Install the bracket with Redux, then peel ply, and allow it to cure.

Reassemble the strut and ball stud.

Test the door for operation. If binding or clearance problems occur, break loose and reapply as before, adjusting as necessary.

When satisfied, lay two layers of glass over the bracket base using floc to smooth the edges and prevent air bubbles.

Fill, sand, prime and paint to suit. It should look like this:



