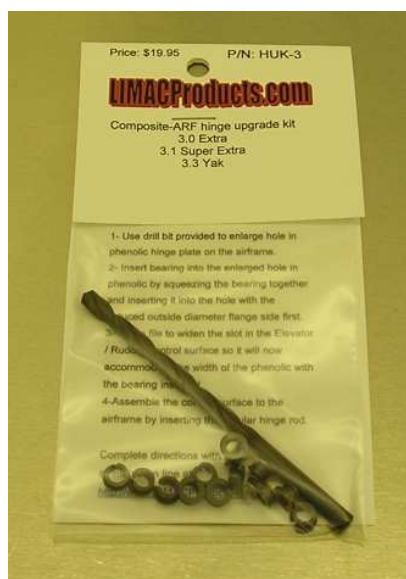


## Installation instructions for LIMAC Products Hinge Upgrade Kit HUK-1



Last updated  
9/07

## About the Kit

**Thank you** for purchasing the LIMAC Products Hinge Upgrade kit. This is the kit made by “Pilots” for “Pilots”.

The Hinge Upgrade Kit (HUK) arose out of an attempt to increase the precision of aerobatic IMAC style flying. The factory hinging method used on the Comp-ARF line of aircraft is quite good – but like anything else there is always a way to make it better for more discerning aircraft pilot.

On larger 40% sized kits the standard hinging method uses a 4mm Aluminum tube which passes through several phenolic hinge plates. The major concern here is that the aluminum is soft and the bearing area in contact with the tube will allow it to deform slightly over time and use.

This kit increases the surface area in contact with the hinge tube and rather than having Phenolic rubbing on Aluminum tubing, you now have a precision engineered non metallic bearing material riding on a 316L Stainless Steel Tube.

Properly installed, the kit removes any play laterally and axially and will allow the control surface to take more loading than before.

A word about the Hinge tube; this kit replaces the Hinge tube with a hard type 316L seamless stainless steel hydraulic tubing. This arrangement is considered “ideal” as the bearing material is designed to run on this type of surface harness and smoothness. The cost of this tubing nearly accounts for  $\frac{3}{4}$  of the cost of the kit. For lower use applications we offer the HUK-3 kit and offer the bearing upgrade at a discounted price.

The bearing is of the “self captivating” type. What this means is that the bearing is inserted into its bore and prevented from falling through by a flange on the side it is inserted from. Additionally, it has a smaller flange on the opposite side. Normally this smaller flange would prevent the bearing from being inserted, but the bearing also features a relief cut across the axis. This cut allows the bearing to be compressed enough so the smaller flange fits through the hole for installation. Once through the bearing expands and the smaller flange keeps the bearing from coming back out the hole on the inserted side. Moreover, when you install the 4 mm hinge shaft it becomes impossible to compress the bearing again and for it to come out.

Don't discount the drill bit. It was *specifically* chosen for this *exact* application. Using this drill (as described in these instructions) it creates the perfect clearance in the bearing that allows our hinge rod and control surface to have negligible play and still rotate freely. If it's opened too much you introduce slop again, and too tight and it will take excessive power from your servos to operate.

We hope you enjoy your HUK, and please send your comments to [limacproducts@limacproducts.com](mailto:limacproducts@limacproducts.com) and let us know what you think about it. Good Luck, enjoy the flying and be careful!

**Okay – Let's go to installing the kit!**

## Installing the HUK-1 Hinge Upgrade kit

### Step1:

- Tools you may need to start the job. Lacquer thinners, a good 24hr epoxy / Resin, cutoff wheel tool, rotary buffer/sander and appropriate safety equipment.



- The SS tubes are already cut to size for the larger aircraft such as the 3.1 Super Extra, but may require cutting for smaller aircraft. The Socket head cap screw comes installed on the inboard side, but the outboard end may have to be cut for your application and supplied hardware installed after cutting.



- You may have your own favorite - but we like this method and we know it works well. We use HobbyPoxy Z-Poxy Resin P/N PT-40 to fasten the hardware in the SS tubing. We suspect that Hysol, JB weld or some other quality epoxy may work equally well though.

### Step2:

- Cut hinge pins to length. Use the following chart. If your application is not listed, then measure the hinge pin you removed from you kit and use it as a template to cut the SS tube.

<b>Aircraft</b>	<b>Elevator Pin</b>	<b>Rudder Pin</b>	<b># Bearing Plates</b>	
3.0 Extra	21 3/4" (553mm)	23 1/16" (590mm)	14	
3.1 Super Extra	21 3/4" (553mm)	23 1/16" (590mm)	15	

- Cut the tube from the inside of the washer / flange that is already installed to the edge of the tube. It should be flush with the outside of the control surface when fully installed.

- Using the cut off wheel cut the SS tubing to the proper length.



- Deburr the inside of the tube with a deburring tool. Also use your rotary file to remove the burrs from the outside of the tube. If you have a buffing attachment, use that to polish the tube end smooth when you are done.



- Use the lacquer thinners, and a Q-tip to clean the inside of the tube to remove and greases and oils in preparation of gluing in the hardware. This is important for a good bond. Alternatively, you could use Nail Polish remover if you don't have access to thinners. Observe Safety precautions.
- The socket head cap screws are installed in the tube ends for you already. Here are some pictures of how it is done.

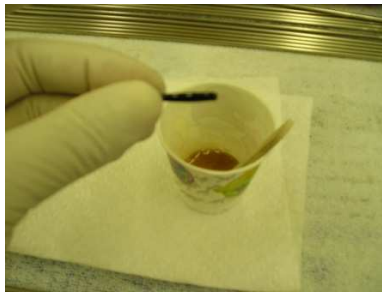


### Step 3:

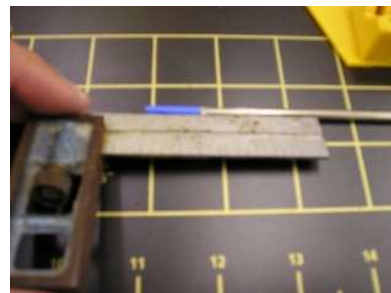
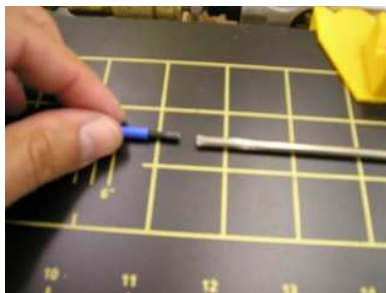
- Use the cut off tool to remove the heads of the Socket head cap screws provided. This will normally be done for you already.



- Mix up some resin in a small cup.



- Apply some epoxy generously to the shank end (End of screw where head was removed) of the screw.



- Wrap a 4" length of masking tape over 3/8" of the threaded portion of the screw (This may come done for you); this will help align the screw to the tube as the glue dries. Insert the screw into the tube, align with a straight edge and let dry. Be sure to put some wax paper down.
- Remove any excess epoxy with your rotary file. Remove the masking tape.

Step 4:

- To continue the bearing installation, please follow the instructions that come with the HUK-3 Kit.

If you have any questions or comments regarding the usage of this kit please do not hesitate to contact us. We sincerely hope you enjoy this product.

Regards,  
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