

“True 90” Ball Link Flap Horn

1. Thank you for purchasing the “True 90”, Trailing Edge Saving, Ball Link Flap Horn. When properly installed, this horn will deflect the flaps the same number of degrees in each direction and at the same speed. The object is to start out with the flaps in neutral and both pushrods at 90 degrees relative to the pivot point. In other words, each ball link is located in the middle of its arch. The bellcrank pushrod ball link is seven degrees forward and the elevator pushrod ball link is two degrees to the rear of verticle. Of course the geometry is a little different for each airplane, but this configuration was derived at by looking at 20 plans and taking the average. With slight adjustments it will eliminate all or most of the bias in most planes. For the vast majority of planes it's much better than having the bushings directly on top of each other.

2. Another nice feature of this horn is that it is bent away from the trailing edge at 35 degrees thus eliminating the need to cut a deep notch in the trailing edge of the wing to clear the verticle when the flap is full up. Only a small notch is necessary thus saving the strength of the trailing edge.

3. The horn wire is music wire. The horn verticle piece is 4130 aircraft steel, .063” thick. Both ball link holes are tapped 4-40. The horns are brazed using an oxygen acetylene torch bringing the metal to 2000 degrees, cherry red. A 1/16” flux coated bronze brazing rod is flowed into the joint. Twenty-five seconds after the red goes out, the joint is oil quenched. This slightly softens the music wire keeping it strong, but making it tweekable.

4. Bend the horn wire using one of the commercial 3/32” music wire benders such as Harry Higley's or for 1/8” horns the K&S bender works great. Don't bend the horn wire in a vise or with ordinary pliers. Also remember there is a front and a back to this horn. Bend the horn wire towards the elevator!

5. Attach the ball link to the control horn with a 4-40 X 3/8” bolt with a #4 flat washer under the head of the bolt. Screw the bolt into the threaded hole in the horn. Put a drop of locktite on the remaining threads and put on a 4-40 lock nut.

6. If you have any questions or suggestions or need help in any way, give me a call (256) 820-6970 or email me at tom_morris@prodigy.net

