

## Warp Drive Loaner Propeller

Custom Flight Creations, Inc.

In the event a customer of Custom Flight Creations, Inc. has minor propeller damage or is grounded pending an Airmaster Propeller purchase for his Rotax engine, if there is a significant delay in propeller delivery, or the owners existing propeller is unsafe to fly, the loaner prop is available to ferry their aircraft to Custom Flight Creations for an Airmaster installation. I will loan a complete Warp Drive, wide chord 64 inch HPL propeller and a 10 inch spinner to the customer for a period not to exceed 8 weeks.

Failure to return Loaner Propeller in flyable non-damaged condition will result in a charge to the customer for repairs or replacement. Custom Flight Creations, Inc. will pay outbound shipping for consumer convenience awaiting an Airmaster Propeller. It is the responsibility of the recipient to return the prop with shipping.

Return via Mail must be insured for \$1265 and sent to:

Custom Flight Creations, Inc.  
4012 Canter Ct.  
Valrico, FL 33596  
USA

Installation Instructions are straight forward. However, spinner installation does vary depending on type. Occasionally damage requires Custom Flight to change the spinner type.

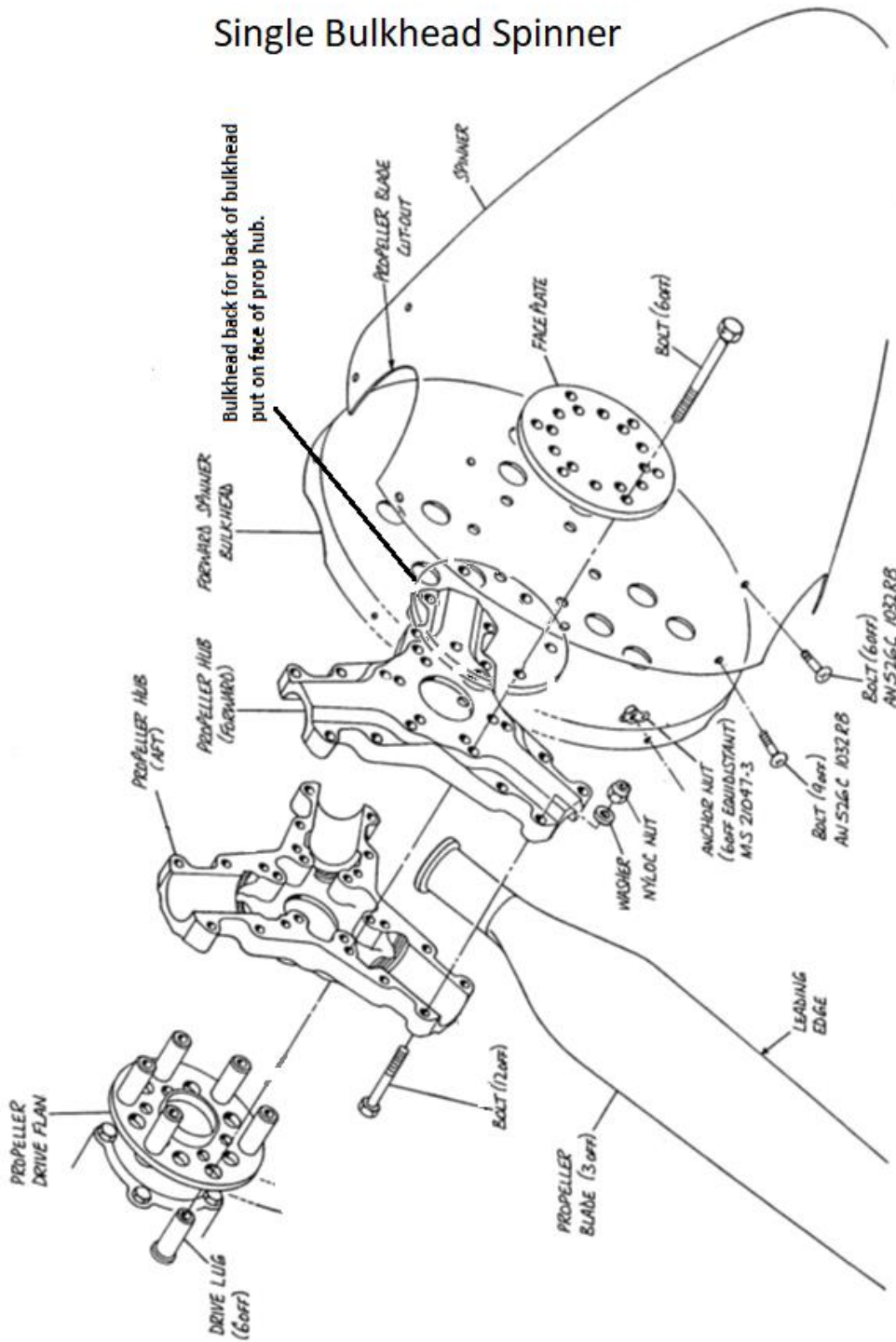
Typical instructions for the two bulkhead spinner and prop are printed on the following pages.

*Note: A single bulkhead spinner may be attached or a two bulkhead spinner (front and rear of prop) and drawings for each is supplied. These blades were statically balanced and weighted, so care must be taken to install the blades into the proper hub location as marked, and the spinner and bulkhead mounted in the proper orientation as marked also.*



Single Bulkhead spinner mounting:

## Single Bulkhead Spinner



Assembly of the Warp Drive with 8mm lugs and bolts:

Lay one half of the HPL hub flat, set the matching blade in each arm .  
Put on the ¼ inch bolts a washer and nylock nut on each arm and snug.  
Set blade pitch to 17 degrees for 912S or iS and 21 degrees for 914 engines.  
Snug ¼ inch bolts to gently lock blades at the desired angles.  
Always use a proper propeller protractor.

Set the predrilled backplate on the Rotax hub equipped with Rotax Drive Lugs.  
Please use anti-seize on the drive lugs, and pull the drive lugs snug to the back side of the hub.

Install the HPL hub and blades on the drive lugs. Next the front bulkhead on a two bulkhead spacer.  
Note a second spacer is provided for the front spacer spacing, or on a single bulkhead spinner support,  
to take up the difference in propeller spacing. Last, install the final spacer the bolt heads will rest on.  
Insert the 8 mm bolts and hand snug firmly.

The bulkhead and spinner is held on by the six propeller to prop shaft bolts. Normally the front bulkhead is held on with the aluminum spacer, but some bulkheads require more space to get to the ferrule bolts or to properly snug up to the spinner. If that is the case, put the spacer on first then the forward bulkhead. If this is done, each 8mm bolt will need a washer. Any 8mm hardware washer will do. The bolts may be drilled head or plain. If the bolts are plain, use the Nordlock washers to prevent the bolts from loosening.

At this time it is best to check the blade angle again at 17 degrees at the tip for the 912ULS, or iS engine and 21 for the 914 and the blade tracking. Then re-tighten the ferrules on the blade retention to the proper torque if necessary, and torque the 8 mm bolts to the final torque.

Always use torque seal paint to determine if the bolts have loosened.  
Ensure the 8mm bolts have a small amount of the thread (1-2 threads) protruding out of the back of the drive lug or are even. If there is more than that be sure the bolts are not bottomed out in the lug which would mean the prop is not snug against the hub.  
If too many threads are showing or not enough, you need to adjust your spacers.

*Warning:*

*Torque the prop as follows: ¼ inch bolts are 10 Ft. Lbs. and 8mm bolts are 15 Ft. Lbs.*

*Always torque evenly in 20 inch pound increments and in a crisscross pattern.*

Spinner installation is straight forward. Make sure the bulkhead snugly fits the propeller. No slop is permitted as the spinner will buckle, warp or be improperly supported. The spinner should run true. Once the spinner is fitted, be sure the screw holes are aligned. Rotate the spinner backplate to the appropriate blade hole marked on the backplate make sure the blade holes are aligned all around, then insert the spinner screws and tighten to snug. Always use a fiber or nylon washer to prevent scratching the fiberglass or metal spinner. If the screws are loose, use Loctite 243 or medium strength thread locker to assure they are secure. Do not overtighten the spinner screws. Any scratches or over-torqued spinner screws can crack the fiberglass. Do not fly with a cracked spinner.

*Warning: A dynamic balance is required.*

*Follow Up the initial torque after initial run up and propeller balancing. (First hour)*

*Follow up torque again after 5 hours.*

*Check or Retorque routinely after 10-15 hours religiously for the first 25 hours.*

Nordlock washers will stay tight with proper torque. If unsure, replace the plain head bolts with drilled bolts and safety wire.

Dynamic Balancing:

If your loaner prop will be fitted with your Airmaster 13" supplied bulkhead and spinner, The spinner backplate of an Airmaster propeller is drilled every thirty degrees or so, therefore no drilling of the backplate is necessary, so use them for the balance weights. The 10 inch fiberglass spinner backplate is not drilled but is statically balanced. Normally if dynamic balance is 0.07 pps or less, no other weights are necessary. Never install permanent balance weights on the spinner itself. This will fatigue the spinner and cause premature failure. Spinner failure can result in aircraft damage, severe airframe vibration, and even propeller failure. Propeller failure can lead to loss of the aircraft. If unsure of the propeller installation, stop and seek proper assistance.

Remember, if the blade angles are off slightly, the prop will not balance. If the blades were not indexed properly, it will not balance because the static balance is off. Index the blade properly and make sure the spinner spins true.