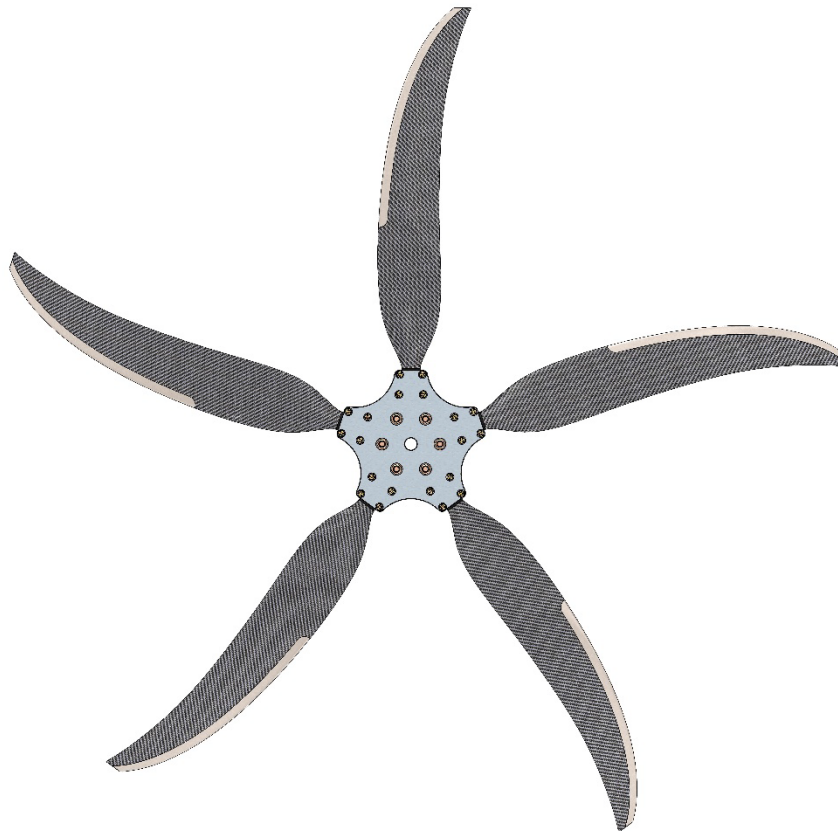




Vortex Propeller Installation and Operation Instructions

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ATTENTION

Failure to follow these instructions will void all warranties, expressed and implied. Mounting difficulties, vibration, and/or failure can result with improper assembly of the propeller blades and hub parts.

CAUTION

Rotating propellers are particularly dangerous. Extreme caution must be exercised to prevent severe bodily injury or death.

WARNING

Not following procedures or exceeding specified torques can result in permanent damage to the propeller.

Assembly Notes

As there are many different Vortex Propeller configurations, these instructions show the basic installation steps for a standard installation. Your propeller assembly may have slight variations. If you have any questions during the assembly and/or installation, please contact Sensenich Propeller

Parts List

Part	Quantity Notes
Propeller Blade	Blade quantity designated by installation
Cover Plate	1
Mount Plate	1
Spacer Inserts	6
Pitch Block Set	1 set per blade
5/16" Clamp Bolts	4 per pitch block set
Mount Bolts	6
5/16" Flat Washer	8 per pitch block set
Mount Bolt Lock Washer	6 Nordlock lock washers
5/16" Lock Nut	4 per pitch block set

Mount Bolt Length

Hub Style	Bolt Length
Standard	4"

Table 1: Parts List

Required Tools

Due to the many types of configurations, the following list is only a general representation of what tools are required for assembly.

- ✓ Ratchet
- ✓ Torque Wrench
- ✓ Various Socket Sizes
- ✓ Various Open-End Wrench Sizes
- ✓ Anti-Seize (Included)
- ✓ Digital Protractor or Angle Finder

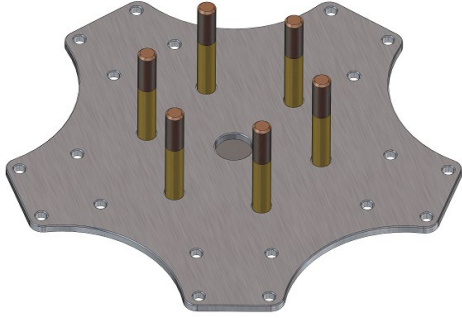
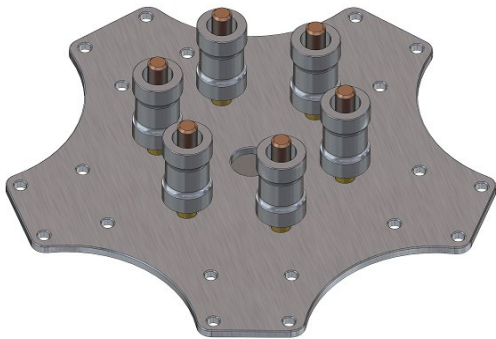
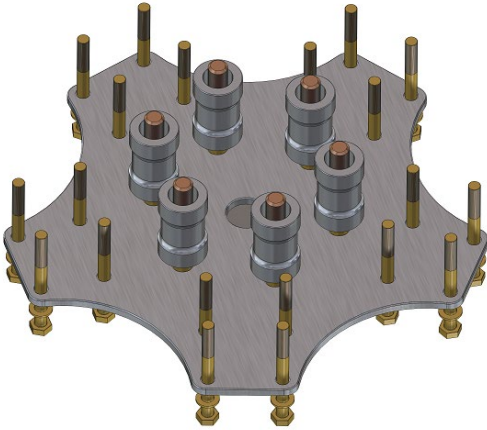
General Torque Specifications

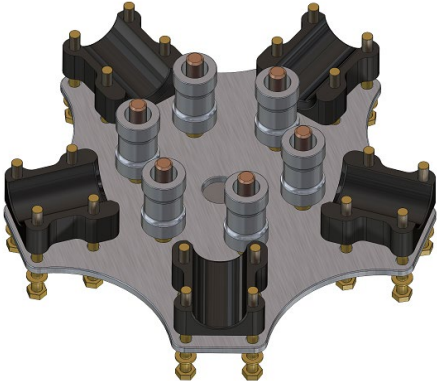
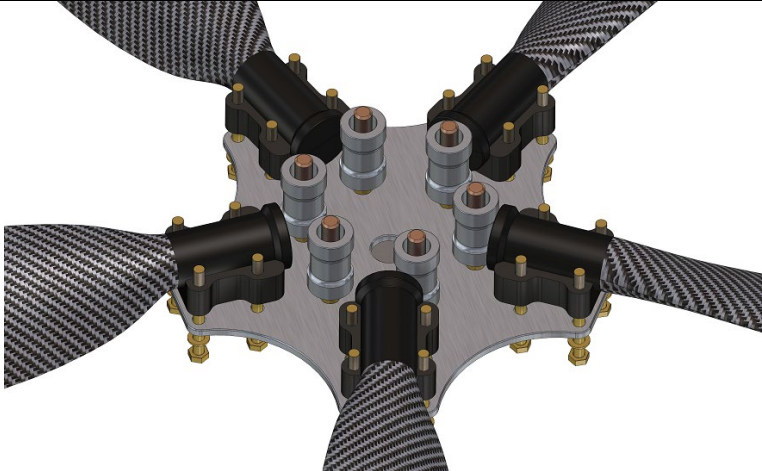
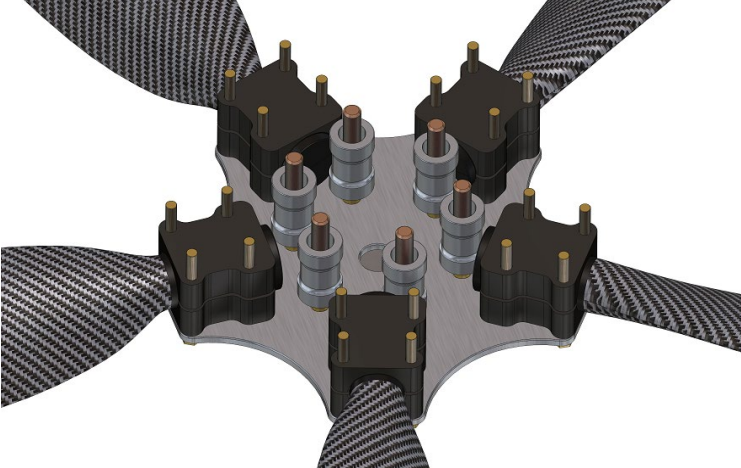
Bolt Size	Hardware Part Number	Recommended Torque
5/16" clamp bolts	Grade 8 HHCS 5/16"	18-20 lbs-ft***
3/8"	Grade 8 HHCS 3/8"	34-36 lbs-ft
7/16"	Grade 8 HHCS 7/16"	44-46 lbs-ft
1/2"	Grade 8 HHCS 1/2"	59-61 lbs-ft


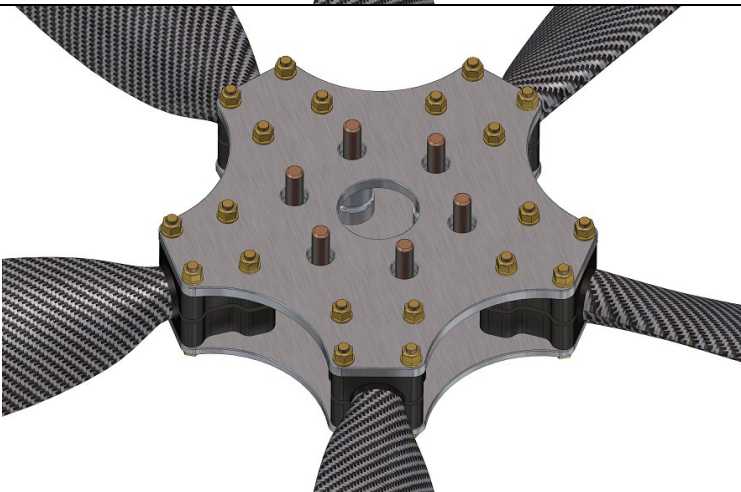
Table 2: Torque Specifications

*****Warning:** Do not exceed the 5/16" clamp bolt torque values above. The Vortex blade shank can be severely damaged or even destroyed from excessive torquing of the clamp bolts.

Assembling the Propeller

<p>Step 1</p> <p>Slide the 1/4" Cover Plate face down over the 6 Mount Bolts and Lock Washers. Apply a small amount of anti-seize to the bolt threads.</p>	
<p>Step 2</p> <p>Slide the 6 Spacer Inserts over the 6 Mount Bolts. Note, the counter-bored side of the Spacer Inserts should be facing up.</p>	
<p>Step 3</p> <p>Slide the Clamp Bolts with Flat Washers in each of the four holes.</p>	

<p>Step 4</p> <p>Slide a Pitch Block over the corresponding Clamp Bolts. Ensure the open side of the Pitch Block is facing up.</p>	
<p>Step 5</p> <p>Place a Propeller Blade in each of the corresponding Pitch Blocks. Be sure to rotate the blades according to your setup.</p>	
<p>Step 6</p> <p>Slide the remaining Pitch Blocks down on top of the Propeller Blade and Clamp Bolts.</p>	

<p>Step 7</p> <p>Slide the Mount Plate down on the existing Mount Bolts and Clamp Bolts.</p>	
<p>Step 8</p> <p>Install the Flat Washers and Nyloc Nuts on the corresponding Clamp Bolts. Do not tighten the nuts fully as the pitch will need to be set before final torque.</p>	

Mounting the Propeller Assembly to the Engine

1. Ensure that the engine flange is clean and free of any debris or rust before installing the propeller.
2. Slide the propeller assembly onto the engine flange. Hand tighten the bolts so the assembly is affixed to the flange.
3. To set propeller pitch, see “**Setting the Propeller Blade Pitch**” section.
4. Ensure the ‘Sensenich’ decals are facing towards the engine.
5. Torque the Mount Bolts to the specified torque value in **Table 2**.
6. As a final check, ensure the hub is mounted flat and firmly against the engine flange.

Setting the Propeller Blade Pitch

When setting the propeller blade pitch, ensure that you check each blade at the exact same location in reference to the boat cage. This will ensure that all blades are pitched exactly the same.

1. Loosen each of the 4 Clamp Bolts so that the propeller blade can be easily rotated with little resistance.
2. Ensure the propeller blade shank is fully seated in the pitch block. Do this by pulling outward on the propeller blade.
3. Measure out 27" from where the blade shank meets the Pitch Block, this is where the flat edge of the digital level will be placed. Note, if your blade radius is less than 27", use the blade tip for measurement.
4. For initial engine run up, set the blade pitch to 8° from vertical.
5. Tighten each of the four Clamp Bolts to the specified torque in **Table 2**.

Initial Engine Run-Up

1. Ensure everything is tight and all tools and loose items are removed from the cage/engine area.
2. Check to see the propeller blades will rotate freely within without contacting any portion of the cage or hull.
3. Start the engine and perform the initial static run-up.
4. If the resultant RPM is within the desired range, shut down the engine and re-torque all bolts.
5. If the propeller blade pitch needs to be adjusted, refer back to the "**Setting the Propeller Blade Pitch**" section.

Propeller Limitations

Sensenich composite propellers are fairly maintenance free besides an occasional torque check and cleaning of the hub and blades. The following will help you to operate your propeller safely, keep it looking good and help it to last longer.

1. Do not turn your propeller above the maximum RPM, see **Table 3**.
2. **Before riding EVERY TIME**, carefully examine the propeller blades and hub for looseness, any signs of damage, excessive wear or any other condition that would make the propeller unsafe to operate.
3. Never run up your propeller with someone standing in the plane of the propeller.
4. For maximum leading edge life, maintain a minimum of 2-3" clearance from the blade to the cage and hull. This is especially important for deck-over hulls and the transom area for fiberglass hulls.
5. The Vortex propeller is not a "hunt boat" propeller or suitable for commercial operations. It is a highly engineered blade for maximum performance and throttle response and as such requires heightened awareness of operating conditions (stay out of the weeds and do not go bushwacking). The Vortex propeller **requires** regular inspection of blade condition.

Blade Diameter	Maximum RPM	Optimum RPM Range*
66" to 74"	3000	2500 to 2900

Table 3: RPM Specifications

*** Optimum Prop RPM's are for the best all-around performance at static and on the plane, and for reasonable sound levels at cruise. Operating up to maximum rpm is acceptable but you can expect less static thrust, higher cruising rpm's and higher sound levels at cruise.**

Propeller Care & Maintenance

Taking proper care of your propeller will ensure it lasts a long time and some of the following tips will help guarantee a problem free experience.

1. **Before riding EVERY TIME**, carefully examine the propeller blades and hub for looseness, any signs of damage, excessive wear or any other condition that would make the propeller unsafe to operate.
2. Check hub clamping bolts every 25 hours of operation or at least once a year, whichever comes first. Always check in a tightening direction.
3. Keep your propeller clean. Soapy water will remove most residue, but 409 or similar cleaner can be used to remove stubborn residue.
4. Apply a good quality automotive paste wax to the blades at least once a year. Avoid liquid waxes.

Warranty

We hope you enjoy your new composite propeller. We have worked hard to ensure that your propeller will meet or exceed your expectations for years to come.

****There is no warranty for the Vortex propeller.****

The Vortex propeller was engineered for maximum performance which requires increased responsibility on the owner/operator.

As such, it is up to the owner and/or operator to follow these installation instructions completely, inspect the propeller assembly thoroughly before and after each use, and contact the factory with any questions regarding damage beyond minor chips and dings.

WARNING: Due to the variety of racing modifications and setups, there is ABSOLUTELY NO WARRANTY FOR RACING USE OF ANY KIND. The racer assumes all risks and accepts personal responsibility for any and all loss, liability, damages, or costs following such injury, permanent disability, or death.