



EZ-PITCH COMPOSITE AIRCRAFT PROPELLER INSTALLATION AND OPERATION INSTRUCTIONS

DOC#: COMP-AC-CF-REV-1a 11-26-08

CAUTION: *Failure to follow these instructions will void all warranties, expressed and implied. Mounting difficulties and increased vibration will result with improper assembly of the propeller blades and hub parts.*

PACKING LIST

Propeller Blades and Two Piece Hub
Mounting Bolts, for mounting hub on engine
Clamping Bolts, for clamping hub halves together
Drive Bushings
Lock Nuts and Special Lock Washers
Pitch Cylinder

Tools

A good quality torque wrench is required to properly torque clamping bolts and mounting bolts. Other tools needed: open end wrench and socket wrench. See **Table 1** for wrench and socket size.

ATTACH MOUNTING HUB HALF

1. Be certain that the magneto switch is "OFF" and that both magnetos are grounded. Chock the aircraft wheels to prevent movement. Clean dirt and oil residue from the engine flange. Refer to **Figures 1 - 3** for views of the two piece hub, blade, and pitch cylinder.

2. Place rear spinner plate (if used) and the hub mount half, as shown in **Figure 1**, on the engine or reduction unit mounting flange. (Vertical orientation of the hub is recommended.) Insert drive bushings through the back face of the engine flange and into the hub mount half. Check for proper bushing and pilot stub fit into the hub mount half. The hub must sit flush on the mounting flange. Place lock washers on bolts and insert into the 6 mounting holes inside the hub mount half. Place lock washers and lock nuts on the bolt threads and torque the 6 bolts using a star pattern. See **Table 1** or hub decal for mounting bolt torques.

Note: The hub must sit flush against the mounting flange. Some installations may require a hub spacer kit

or trimming of the drive bushings for proper fit on the engine flange. Bolt breakage will occur if not flush.

INSERT BLADES IN HUB MOUNTING HALF

3. Insert the pitch cylinder into the hub mount half, aligning the blade pin slots with the hub barrels. Each blade has a round side and a flat side, with the round side facing forward into the wind. *The next operation will require two people to accomplish.* Insert one blade at a time into the hub mounting half, taking care to insert the blade pitch pin into the blade pin slot, then rotating the blade shank fully into the hub.

4. Place the hub cover half over the blades. Place lock washers on clamp bolts and insert into the hub cover half. Hand tighten the clamp bolts into the threaded clamp bushings, taking care to maintain an even gap between hub halves on all sides. Grasp each blade shank and firmly pull outwards to seat each blade in the hub.

5. Set blade pitch by grasping each blade shank and twisting the blades in opposite directions. Align the index mark on the pitch cylinder with the appropriate pitch setting (1, 2, ... 5) on the hub, as indicated in **Table 2**.

ALTERNATE METHOD: A propeller protractor may be used to set blade pitch. Since some blades have high performance round airfoils, the protractor can not be placed at the blade tip. Mark a straight line from leading edge to trailing edge approximately 3" in from each tip and use protractor to set individual blade angles. Set each blade within ¼ degree to each other.

6. Using a torque wrench and rotating from bolt to bolt, tighten the bolts evenly to the proper torque given in **Table 1**. This may take several passes around the bolts.

Check the blade pitch setting for rotation away from your desired pitch setting. Once properly torqued, a small gap

may remain between hub halves. Check the propeller blades for track. The blades should track within 1/8" of each other at the tip. Setting the pitch accurately is more important than track from blade to blade.

7. Run your propeller for approximately 5 minutes at 50% of the desired RPM. Check the clamping bolts to see if they have lost torque. If they have, it is because the blades have firmly seated themselves. Tighten again to the proper torque. **Note: This torque value should be checked after the first 5 hours of operation and every 25 hours thereafter.**

8. Run up the propeller to check your pitch for desired maximum RPM. Remember, the propeller will pick up RPM at full throttle/level flight. If your RPM's are too low, adjust the blades to a lower pitch setting. If the RPM's are too high, adjust the blades to a higher pitch setting. See **Table 2** for approximate starting pitch settings and **Propeller RPM Limits**.

Repitching

If repitching is needed, loosen the clamp bolts, twist blade shanks to new pitch setting, then re-tighten clamp bolts according to **Table 1**.

NOTE: The special lock washers will click loudly when loosened.

Continued Airworthiness Requirements:

Sensenich composite propellers are nearly 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.

- ❑ **Do not spin your propeller above the Propeller RPM Limits given in Table 2.**
- ❑ Check hub clamping bolts every 25 hours of operation. **Always check in a tightening direction.**
- ❑ Before each flight, 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.
- ❑ When the propeller is not in use, place the propeller in a horizontal position (or upside-down "Y" for 3 blades) and if it is exposed to weather, cover it with a waterproof cover.
- ❑ Do not use the propeller as a tow-bar to move your aircraft.
- ❑ Apply a good quality automotive paste wax to the blades at least once a year. Avoid liquid waxes.

- ❑ Avoid running-up in areas containing loose stones and gravel.
- ❑ Finish loss off the leading edge is a normal wear item, and is dependent on the amount of operation in rain and grit.
- ❑ Assume that your propeller is un-airworthy after any kind of impact until it has been inspected by qualified personnel.
- ❑ Check bolt torque whenever there is evidence of roughness on operation. For new installations, rotating the propeller 180 degrees and reinstalling will often help.
- ❑ If your propeller begins to show any of the following damage, it must be repaired (if possible) or retired from service:
 - (a)Cracks in the metal hub or bolts,
 - (b)Loose metal leading edge,
 - (c)A crack across the blade,
 - (d)A long or deep crack along the blade length,
 - (e)Any portion of composite material missing,
 - or (f)Obvious damage or wear beyond economical repair.

NOTE: There is no specified overhaul time. The propeller is removed from service when it does not meet the Continued Airworthiness Requirements.

Propeller Performance

In selecting a propeller, keep in mind that both aircraft and engines of the same model may vary in performance, and that operators may want different performance characteristics. For instance, one person may require a high climb rate while another seeks maximum cruising efficiency.

STANDARD PITCH / NORMAL FLYING

For normal or cross country flying, a propeller that turns between rated engine RPM and 50 prop RPM over rated at full throttle level flight at sea level will give best all-around performance.

CRUISE PITCH

A cruise propeller will turn 50 to 100 prop RPM under rated engine RPM at full throttle level flight. While cruise pitches will provide 4-6 mph higher airspeeds at cruise power rpm's, maximum level flight speeds are no better than climb or standard pitches, and the take-off and climb performance will noticeably suffer.

CLIMB PITCH / HIGH ALTITUDE OPERATION

For improved take-off and climb performance, use a climb pitch propeller that will turn 100 to 150 prop RPM over rated engine RPM at full throttle level flight (*refer to your particular aircraft Type Certificate for propeller limitations*). Climb pitches will typically reduce flight speeds by 4-6 mph at cruise power RPM's. A climb pitch is also recommended for aircraft operating from high density altitude runways.

LIMITED 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.

We offer a one year limited warranty on any defect in materials and workmanship.

In the event a unit does not conform to this express warranty, Sensenich Composites will repair or replace the defective material at it's place of business at Plant City , FL USA. Sensenich Composites will decide which remedy, repair, or replacement it will provide. Any replacement of a unit or a part of a unit during the warranty period will not extend the warranty beyond the original duration. The remedy of repair or replacement is exclusive and does not include the cost of shipping, removal, or installation, all of which are the customer's responsibility.

Procedure For Obtaining Warranty Service

Units or parts that are defective must be shipped prepaid to Sensenich Wood Propeller Company at the address listed on page 1. The unit must be accompanied by a copy of the original (Distributor or Dealer) invoice, a Return Authorization Number (which can be obtained by phoning Sensenich Composites), and a brief description of the defect.

Conditions, Exclusions, and Disclaimers

This limited warranty applies only to units that have been installed, used, and maintained properly in strict accordance with our specifications, instructions, and recommendations. It does

not cover units that show abuse, alterations, improper installation, improper maintenance or repair, or improper packaging for shipment; and it does not pertain to damage due to object strike, or excessive blade wear due to operation. Racing use of any kind or use on or with engines or equipment not approved by Sensenich Composites automatically voids this warranty.

This limited warranty is the only warranty provided with respect to covered units, and **THERE ARE NO OTHER WARRANTIES, REPRESENTATIONS, CONDITIONS OR GUARANTEES, EXPRESS OR IMPLIED, WITH RESPECT TO THE COVERED UNITS OR THE MANUFACTURE THEREOF, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

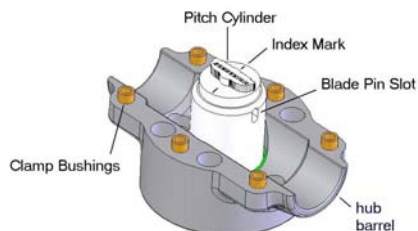
Repair or replacement of a nonconforming unit or part is the exclusive remedy for breach of this limited warranty, and shall constitute fulfillment of all liabilities of Sensenich Composites to a customer or user, whether based on contract, negligence or otherwise. **IN NO EVENT SHALL SENSENICH COMPOSITES BE LIABLE FOR ANY OTHER EXPENSES, CLAIMS OR DAMAGES OF ANY KIND HOWSOEVER CAUSED, INCLUDING (WITHOUT LIMITATION) ANY OTHER PRODUCT REPLACEMENT OR INSTALLATION COSTS AND/OR ANY DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES.**

The purchaser of the covered units has read, understood and, by purchasing the units, agrees to be bound by the above terms and conditions.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitations may not apply to you.

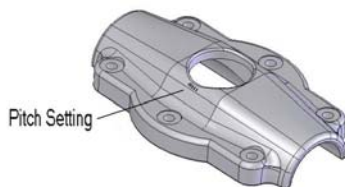
This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Figure 1:



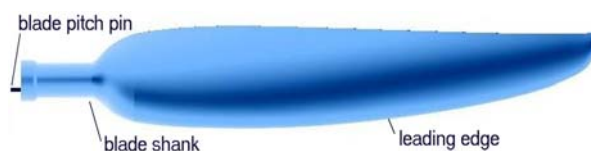
Hub Mount Half

Figure 2:



Hub Cover Half

Figure 3:



Blade

**TABLE 1:
INSTALLATION TORQUE FOR MOUNTING BOLTS AND CLAMPING BOLTS**

Bolt Part Number	Recommended Wrench Torque	Hex Bolt Socket Wrench Size (inches)	Nut Open End Wrench Size (inches)
AN5-15A	240-265 in-lbs 20-22 ft-lbs 27-30 N-m	1/2	1/2
AN5-30A			

Notes:

Check mounting bolt torque at least once a year or if vibration occurs.

Hubs use hex head mounting bolts with special lock washers. Each lock washer works in pairs with the "ramped" sides facing each other.

Table 2: Pitch Setting Guide

These are approximate settings for initial setup. Your final setup may vary due to configuration of your particular aircraft and desired top RPM. Low pitch will produce higher climb rates while high pitch will produce higher speeds at cruise RPM's.

Propeller: Limits	Blade Model	blade style	prop dia	Approved Engines	RPM Limit
	R70D (long shank) R70E (short shank)	"Power Sweep" Low-medium airspeed	66-70"	Rotax 912, 912S, 914 reduction drives only!	5800 engine
	R64H (short shank)	"Power Sweep" High airspeed	60-64"	Rotax 912, 912S, 914 reduction drives only!	5800 engine
	R64Z (short shank)	"Power Sweep" High RPM	60-64"	Jabiru 2200/3300 direct drive	3300 propeller

Engines	"D & E" SERIES LONG POWER SWEEP BLADES		"H" SERIES HIGH SPEED POWER SWEEP BLADES		"Z" SERIES HIGH RPM POWER SWEEP BLADES	
	no. of blades	approx. pitch setting	no. of blades	approx. pitch setting	no. of blades	approx. pitch setting
80 – 115 HP Rotax 912, 912S, 914 Reduction Drive	2	3	2	3.5	---	---
150-200 HP Subaru Reduction Drive	3	4	3	4.5	---	---
80-120 HP Jabiru 2200, 3300 Direct Drive	Not suitable for direct drive	---	Not suitable for direct drive	---	2	4