

Propeller Serial Number : _____
Aircraft Serial Number : _____
Aircraft Make and Model : _____
Engine Make and Model : _____

NOTE:

For Safety and Service Directives on Aero Prop, please check <http://www.antaes-us.com> from time to time

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.

1. Disassemble prop hub, noting orientation of prop hub halves.
The stamped number on each Hub half must remain adjacent to each other during re-assembly! In more recent hubs a male metal insert has been machined that only allows hub halves to go together in one way.
2. Install propeller blades into their positions between the hub halves. Install shoulder bolts with the Nyloc pr castle nuts as provided and tighten slightly to hold blades in place.
3. Note the small-machined insert that fits into the hub (if supplied) and / or spacer. On most 2-cycle applications, this insert if provided must be installed into the hub. If you have a spacer, it too may have an insert and must be installed as well. Most 4-cycle applications have no need for the Hub insert, unless you are using a spacer. On Pusher configuration, with propeller assembly flush against the prop flange, make sure that there is at least 5” clearance between anything forward of the prop tips. If required, fit the prop spacer on the engine prop flange, followed by the prop hub onto the prop spacer.

NOTE:

On all applications, if you are using a Spinner, install the backing plate between the spacer and the hub.

4. Secure (finger tight) the prop hub and extension to the prop flange with the six M8 bolts.
5. With all bolts slightly tightened, you should be able to easily adjust the pitch on the blades. Make sure at this time that the leading edge of all blades are facing in the right direction and are not backwards.
6. Set the reference scale on the protractor to the recommended arbitrary setting and clamp scale in place:

ROTAX: 582 between -1 and -3, 912 between -1 and -3, 912S between 0 and -2 are a good start for standard pitch setting. More adjustments are usually required to dial in the “perfect” pitch setting. Clamp the scale with a side clamp Cleco or small C-clamp.

BEST PITCH:

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.

NOTE: In slower aircraft, climb pitch should be used such that on climb out full horsepower of the engine is being developed

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 takeoff 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**. 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 very high density altitude runways if shorter takeoff runs are desired

7. Fit the folded sheet metal end of the protractor into the center hole of the prop hub so that the sheet Metal ears are both touching the flat face of the hub.

8. Place the notch on the other end of the protractor against the trailing edge of a prop blade. Rotate the blade until the leading edge of the flat side just touches the rounded nose area of the notched section of the protractor. Ensure that the ears on the protractor are flush against the hub when the blade is pitched against the other end. Torque the two shoulder bolts to 4 foot lbs. to hold this blade at this setting. Then repeat the procedure for the other blades.

9. When all blades have been set, torque the Nyloc shoulder bolts sequentially with about 46 inch-lb. Increments to **185 inch-lb**. This will help to insure proper tracking. Check the pitch of all blades again, and once satisfied, begin torquing the long Hub bolt NUTS sequentially, opposing and with 45 inch-lb. increments to **175 inch-lb**. **Please note that you want to torque the NUTS not the bolts especially if the bolts are the longer bolts required for spacer installations. Bolts supplied differ according to engine type. Metric class 8.8 Nylock nuts can replace the castle nuts. Nylock nuts can be re-used only a limited amount of times, if the nylock nut can be tightened by hand, it should be replaced immediately.**

WARNING!!! THE HUB MUST SIT FLUSH AGAINST THE MOUNTING FLANGE. SOME INSTALLATIONS MAY REQUIRE A HUB SPACER

WARNING!!! DO NOT OVER OR UNDER TORQUE BOLTS! NEVER START ENGINE WITHOUT PROPER TORQUE ON BOLTS!!!

10. 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.

NOTE:

1. A colored compound (torque seal) should be used on fastening hardware so during pre-flight inspections the PIC can check for movement of the fastener. Movement of fasteners can indicate changes in pitch of a blade which can induce vibrations that may be detrimental to systems attached to the propeller. Please take this note seriously.
2. A static check of rpm's must be performed before flight. Refer to engine manual for specific instructions. **NOTE: DO NOT FLY UNTIL YOU HAVE CHECKED AND RECHECKED YOUR PROPELLER FOR PROPER MOUNTING AND PERFORMED A STATIC CHECK OF R.P.M.'s.** If you cannot reach recommended RPM, you may be Over/Under Pitched. Do not run in this condition or engine damage may result.

12. Run your propeller for approximately 5 minutes at 50% of the desired RPM. Check the clamping bolts to see if they have lost torque and make sure the prop pitch is the same as before. If they have, it is because the blades have firmly seated themselves. Tighten again to the proper torque and adjust pitch if required. **Note: This torque value and blade pitch should be checked after 1,2,4 and 8 hours of operation and every 25 hours thereafter.**

13. 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.

NOTE: If repitching is needed, loosen the prop blade clamp bolts and loosen hub bolts, twist blade shanks to new pitch setting, then re-tighten clamp bolts

14. It is recommended that for proper pre-flight inspection a torque paint mark (Tempil Markers) across the nuts and bolts be painted on so a PIC can see if the prop nuts and bolts have moved indicating loosening of critical bolts and nuts etc. Most aircraft supply houses like Aircraft Spruce carry Tempil Markers in different colors ranging from white to black.

MAXIMUM OPERATIONAL CONTINUOUS ALLOWABLE PROP SPEED/RPM: 2700
MAXIMUM PROP SPEED LIMIT: 3000
CAUTION: BEYOND 3000 PROP PROP SPEED/RPM, PROPELLER HAS TO BE REPLACED

CARING FOR YOUR PROPELLER

For the most performance and enjoyment of your prop, follow these simple steps.

1. Always keep your blades clean and remove the acid residue that results from bugs, that have met with your prop.
2. The finish is a urethane. After each cleaning, you should protect it further with a good quality wax. If the stainless steel edges become dull, you can polish them back to a clean shine with a little bit of paste wax. Avoid liquid waxes.
3. At the very tip of each blade there is a pin size hole. This hole needs to be free of obstruction, as it allows any moisture that collects inside the blades to expel. If you notice a vibration, you may want to check to see if there is an obstruction of this hole. This can cause an out of balance effect. Simply blow into the tip of the blade to make sure that the passage is clear. If it has become obstructed, push a small pin through to reopen it.
4. Recheck torque of prop bolts after 1,2,4, and 8 hours of operation and as routine maintenance every 25 hours and at annuals. Also check to make sure the prop blades are at the same pitch at these times. Never over torque and “*STRETCH*” prop bolts! The standard prop bolt for this propeller is a Class 8.8 metric M8 bolt and will fit the Rotax 75mm bolt pattern. Please respect proper torque sequence (star sequence in 45-47 inch-pounds intervals) and values. Never over or under torque.
5. Check the prop hub and blades every pre-flight for de-lamination of blades and cracks and nicks
6. Check the prop hub and blades every 50 hours with a magnifying glass for cracks and de-lamination of blades, corrosion or rust. **Visual Inspection.** The primary defense against early failure of propellers. When inspecting propellers, it is necessary to use touch and other senses, as well as visual cues. Changes in surface roughness, checking to make sure that the pitch of each blade is the same or not, unusual free play, and odd sounds give hints as to conditions that may affect airworthiness. Feel for roughness and look for small variations in color, texture changes, waviness, and changes in reflection that may signal the removal of protective coatings. Some areas may require the use of a 10x magnifying glass to identify small features or find cracking.
7. The hardware of the prop and prop blades should be replaced every 200 hours or earlier if necessary due to corrosion, nicks, chips, elongation and so on.
8. The expected life of the propeller is undetermined but at first 400 hours, a thorough and full inspection using a magnifying glass needs to be conducted and balance and tracking

checked and if necessary hub and/or blades replaced. Thereafter every annual this thorough inspection should be made to keep the propeller airworthy by replacing components as needed.

9. Operator can apply WD-40, CRC or similar water displacement chemical on the prop hub and hardware area and wipe off the excess immediately with a soft cloth to prevent against corrosion and to clean.

MAINTENANCE

DISCUSSION

When properly maintained, propeller is designed to operate safely in a high-stress environment for extended periods of time. This manual is intended to provide guidance on propeller maintenance and service methods.

PROPELLER REPAIRS

Minor repairs can be done in the field by qualified personnel, however, major repairs should be discussed with the manufacturer. Refer to Title 14 of the Code of Federal Regulations (14 CFR) part 43, Appendix A, for identification of major alterations and repairs to propellers. Generally when major repair is being contemplated on this prop, it is highly advised and even economical to simply replace the broken part.

NOTES:

1. There is a number engraved on each blade. This number is the balance number. Please note that when ordering the blade replacement and the prop model.
2. A colored compound should be used on fastening hardware so during pre-flight inspections the PIC can check for movement of the fastener. Movement of fasteners can indicate changes in pitch of a blade which can induce vibrations that may be detrimental to systems attached to the propeller. Please take this note seriously.

Type	Action	Description	Personnel Authorized
Line Maintenance	Small Nicks in Blade	The composite blade can be fixed for small less than 0.5 cm nicks by using model airplane fast acting glues and some baking powder. The result should be thoroughly sanded and painted with touch-up paint. Care should be taken to not fix larger nicks and if necessary and if any vibration is noted on engine test run-up, the propeller should be balanced by a service station after such maintenance. NOTE: It may be economically cheaper to replace a blade than to get it balanced.	<ul style="list-style-type: none"> • LSA Repairman Maintenance • A&P • Service Station
Line Maintenance	Magnifying Glass inspections (every 50 hours, Annuals)	Should be done every 50 hours using a 10x magnifying glass. For more information on how to perform inspections of composite props please refer to FAA AC 20-37E Chapter 2 FAA Advisory Circulars (AC) can be downloaded for free from	These can be done by a properly qualified operator however at annual or 100 hour mark should be part of the annual of the aircraft

		http://www.faa.gov/regulations_policies/ WARNING: Keep all Airworthiness Directives up to date by visiting manufacturer website before the inspections.	and done by authorized personnel doing the annual or 100-h inspection
Heavy Maintenance	Over speeding the propeller	<p>A propeller may have been exposed to an over speed condition and give no indication of the event. However, the event may have severely damaged the propeller due to the dramatic increase in centrifugal loads. If the propeller is suspected of having been operated in an over speed condition, it should be removed and sent to a propeller repair station to be inspected</p> <p>Over speeding the propeller (greater than 3000 RPM) introduces loads on the propeller that may cause hairline cracks and/or weaken the propeller blade, elongated holes and so on. If over speeding of the blades has happened the propeller has become non-airworthy and must be replaced</p>	<ul style="list-style-type: none"> • Propeller Manufacturer • Service Station
Line Maintenance	Replacement of Hub and/or propeller hardware due to corrosion, pitting or cracking	<p>If any corrosion on the prop hub is noticed, the prop hub should be evaluated for replacement and replacement done. The prop hardware should be replaced every 200 hours or if rust is noticed on the hardware during an annual inspection of the aircraft. No attempt on trying to “fix” the corrosion if it’s wide spread is satisfactory or safe. Please order hub and hardware replacements from the manufacturer</p>	<ul style="list-style-type: none"> • LSA Repairman Maintenance • A&P • Service Station
Line Maintenance	Lightning Strike on composite blade	In case of lightning strike, replace the blade	<ul style="list-style-type: none"> • LSA Repairman Maintenance • A&P • Service Station
Heavy Maintenance	Fire or extreme heat damage	Replace the propeller. See installation instructions	<ul style="list-style-type: none"> • LSA Repairman Maintenance • A&P • Service Station • Manufacturer appointed personnel
Heavy	Inspection	This should be the same as the 400 hour	<ul style="list-style-type: none"> • Service

Maintenance	after suspected impact	inspection. Please refer to that section. Replacement of affected parts may be necessary	<ul style="list-style-type: none"> Station Manufacturer
Heavy Maintenance	400 hour inspection	<p>This is a thorough inspection conducted with a 10x magnifying glass, dye penetrate tests and black light visual inspection if necessary. Visual checks, checks for tracking, balance, vibration during test operation should be conducted at the least. Any suspect parts (hub or blades) should be replaced. Hardware should be replaced. Balancing can be performed by appropriate service stations that have specific balance machines. For more information on recommended inspection methods for composite props please refer to FAA AC 20-37E, Chapter 2 or its equivalent. If necessary retire the propeller. FAA Advisory Circulars (AC) can be downloaded for free from http://www.faa.gov/regulations_policies/</p>	<ul style="list-style-type: none"> LSA Repairman Maintenance A&P Service Station Manufacturer

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, Aero Prop or Anatares US Corporation will repair or replace the defective material at it's place of business. Aero prop 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 Aero Prop at the address provided. The unit must be accompanied by a copy of the original (Distributor or Dealer) invoice or the make, model, year of manufacture and serial number of the aircraft that the Aero Prop came standard with, a Return Authorization Number (which can be obtained by phoning US Antares Corporation), 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 Aero Prop 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 Aero Prop to a customer or user, whether based on contract, negligence or otherwise. **IN NO EVENT SHALL AERO PROP 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.

This warranty gives you specific legal rights.