GA-RW3B Propellers
Installation and Operation Instructions
(GA-RW3B-70 and GA-RW3B-STOL75)
For Rotax 912 / 914 Engines
Propeller Models

These instructions apply to the following propellers:

<table>
<thead>
<tr>
<th>Model</th>
<th>Diameter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA-RW3B-70</td>
<td>68&quot;, 70&quot;</td>
</tr>
<tr>
<td>GA-RW3B-STOL</td>
<td>75&quot;</td>
</tr>
</tbody>
</table>

Packing List

Non-Threaded Flange

<table>
<thead>
<tr>
<th>Part</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blades</td>
<td>3</td>
</tr>
<tr>
<td>Hub (front &amp; rear halves)</td>
<td>1</td>
</tr>
<tr>
<td>Mounting Bolts (5/16&quot; x 2 3/4&quot;)</td>
<td>6</td>
</tr>
<tr>
<td>Mounting Lock Washers (5/16&quot;)</td>
<td>6</td>
</tr>
<tr>
<td>Mounting Lock Nuts</td>
<td>12</td>
</tr>
<tr>
<td>Clamping Bolts (12-pt, ¾&quot;-28 x 1 ¾&quot;)</td>
<td>6</td>
</tr>
<tr>
<td>Clamping Washers (AN960-416)</td>
<td>12</td>
</tr>
<tr>
<td>Clamping Lock Nuts (¼&quot;)</td>
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</tr>
<tr>
<td>Blade Pitch Paddle</td>
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<tr>
<td>Hub (front &amp; rear halves)</td>
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</tr>
<tr>
<td>Mounting Bolts (8mm x 70mm)</td>
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</tr>
<tr>
<td>Mounting Lock Washers (8mm)</td>
<td>6</td>
</tr>
<tr>
<td>Clamping Bolts (12-pt, ¾&quot;-28 x 1 ¾&quot;)</td>
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Torque Values

<table>
<thead>
<tr>
<th>Bolts Description</th>
<th>Torque Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Bolts (for mounting hub on engine)</td>
<td>170 in-lbs</td>
</tr>
<tr>
<td>Clamping Bolts (for securing two Hub halves together)</td>
<td>98 in-lbs</td>
</tr>
</tbody>
</table>
**Required Tools**

You will need the following tools to assemble your propeller:

- a. 8mm Socket and Ratchet
- b. 12-Point, 5/16” Socket and Ratchet
- c. Torque Wrench
- d. Digital Protractor

![Tool Images]

**Description & Installation**

**Description**

Congratulations! You have purchased one of the finest ground adjustable propellers on the market today. Each WWP is manufactured to meet or exceed ASTM quality standards and is proudly made in USA. The blades are manufactured of pre-pregnated carbon fiber and protected with a high quality automotive finish then, capped with a pre-formed nickle leading edge. The Hub is CNC milled out of 6061T6 Aluminium to exacting tolerances.

**Limitations**

1. MAX RPM : 5800 (do not exceed by more than 10% for 2 minutes)
2. Min / Max Pitch : +10° / +45° at 11 inches from blade tip.
4. Mass Moment of Inertia : 4150 kg.cm²

**General Propeller Installation Guidelines**

Read and follow these guidelines to ensure a safe, successful propeller installation.

**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.

5. Verify the magneto (ignition) switch is “OFF” and that both magnetos are grounded.
6. Chock the aircraft wheels to prevent movement.
7. Clean all dirt and oil residue from the engine flange.
8. If applicable, the propeller hub and spacer must sit flush on the engine mounting flange and the rear spinner bulkhead. **NOTE:** Bolt breakage will occur if the hub and spacer are not flush.
9. Each blade has a camber, round side (usually with a decal) and a flat side. When installing a blade between hub halves, ensure the round side of a blade is facing forward.
10. Place special lock washers, under the bolt heads. Each special lock washer works in pairs with the “ramped” sides facing each other.
11. When hand tightening hub clamping bolts into threaded bushings, take care to maintain an even gap between hub halves on all sides. **NOTE:** Clamping bolts are usually hand tightened until the blade pitch is set.
12. Always use a calibrated torque wrench when tightening mounting or clamping bolts, and torque to the listed value for your propeller.
13. When installing a hub to an engine flange, follow a symmetrical (star) pattern. Tighten

**NOTE:** WD-40 is recommended to clean the prop flange before installation and anti-seize compound should be used on all hardware.
**Description & Installation**

the bolts in 1/8 to 1/4-turn increments (this will take several passes) until the proper torque value is reached. It is important to maintain an even gap between the hub halves.

14. Wedge-lock washers are good for several torque cycles. Nord-lock washers are good for up to 12 cycles before being replaced.

15. IMPORTANT: After the first 5 hours of operation, or any blade angle (pitch) change, re-check all hub mounting bolt and blade clamping bolt torque values.

**WARNING!**: Exceeding a set or noted limitation for an extended period of time may lead to CATISTROPIC FAILURE.

### Installation

**Blade and Hub Assembly**

1. Set the Aft Hub-Half on a flat surface.
2. Place all three blades into hub blade sockets.
3. Place the Forward Hub-Half over the blades and Aft Hub-Half. Gently lift the blade tips and seat the hub halves.
4. Secure the Hub Halves together using the Clamping Bolts, Washers and Lock Nuts as shown.
   - 6 Bolts (12 pt, ¼”-28 x 1 ¼”)
   - 12 Washers (AN960-416)
   - 6 Lock Nuts (¼”)
5. Hand tighten the 6 Clamping Bolts so the blades are firmly held in the hub, but the blades can still be smoothly rotated. These bolts will be torqued after pitch setting.
**Installation**

**Install Propeller (Threaded Engine Flange)**

1. Place the Aft Spinner Back Plate flush against the engine flange. Align blade cutouts with hub.

2. Install the Hub (with blades) on engine flange using Mounting Bolts and Lock Washers. **Torque to 170 in-lbs.**
   - 6 Bolts (8mm X 70mm)
   - 6 Wedge-Lock Washers (8mm or AN960-416)

3. Set the blade pitch angles (refer to the **Set Blade Pitch Angle** section on Page 6) and ensure all Clamping Bolts are **torqued to 98 in-lbs.**

4. Install and secure Spinner Dome using the supplied #8 screws.

**NOTE:** Follow a symmetrical (star) pattern when tightening Mounting Bolts.
Installation

Install Propeller (Non-Threaded Engine Flange)

1. Place the Aft Spinner Back Plate flush against the engine flange. Align blade cutouts with hub.

2. Install Hub (with blades installed) on engine flange using Mounting Bolts and Lock Washers on the Hub side, and Lock Nuts and Washers behind the flange. **Torque to 170 in-lbs.**
   - 6 Bolts (8mm X 70mm)
   - 6 Wedge-Lock Washers (8mm)
   - 6 Lock Nuts and 6 Washers (for securing bolt behind flange)

⚠️ **NOTE:** Follow a symmetrical (star) pattern when tightening Mounting Bolts.

3. Set the blade pitch angles (refer to the **Set Blade Pitch Angle** section on Page 6) and ensure all Clamping Bolts are **torqued to 98 in-lbs.**

4. Install and secure Spinner Dome using the supplied #8 screws.

5. Before operation, verify the Static RPM for your engine (refer to the **Verify Static RPM** section on Page 6).
Set Blade Pitch Angle

Once the propeller is mounted on the prop flange, you are ready to set the initial blade pitch.

⚠️ **NOTE**: If the Clamping Bolts have already been torqued, loosen the bolts so the blades can rotate smoothly in the hub. The lock washers will click loudly when loosened.

1. Rotate the propeller so one of the blades is horizontal, or level with the ground.
2. Slide the pitch paddle and protractor on the blade as shown.
3. Rotate the blade to an angle of 17° from vertical for a 70” blade, or 15° from vertical for a 75” blade. Both blade/angle combinations generate a static RPM of 5200 to 5300.
4. Repeat Steps 1-3 for each blade.

⚠️ **NOTE**: All pitch angles should be within 0.20 degrees of each other.

5. After the blade pitch is set on all three blades, **torque the Clamping Bolts to 98 in-lbs**.

Operation & Limitations

**WARNING**: A Limitation that if exceeded for an extended period of time may lead to a catastrophic failure.

Verify Static RPM

After setting the blade Pitch Angle, verify the static RPM for your engine.

⚠️ **NOTE**: Have your tachometer calibrated by a professional before performing this next operation.

1. With the brakes on, run the engine at full throttle and note the static RPM on the tachometer. (The ideal pitch setting will allow the propeller to reach maximum RPM at full throttle in level flight.)

   **The static RPM should be 400 to 500 less than the maximum engine RPM.**

   **WARNING**: NEVER EXCEED THE MAXIMUM RPM RATING FOR YOUR ENGINE. If you are not seeing your correct static RPM, be certain the tachometer was properly calibrated.

   ⚠️ **NOTE**: To lower RPM, increase the blade pitch. To increase RPM, decrease the blade pitch. NEVER MASK AN ENGINE PROBLEM WITH A PITCH CHANGE. If you are unsure, please contact the factory.

2. After the desired static RPM is achieved, re-check all bolt torque values.

Tachometer Inspection

An improperly operating tachometer can lead to propeller failure, excessive vibration or cause an engine to exceed maximum RPM limits established by manufacturers.

Proper tachometer operation and accuracy should always be checked (using the manufacturer’s procedure, if available) during normal maintenance intervals.
Inspections

Pre-Flight Inspection

Perform this inspection before every flight.
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.

The pre-flight walk-around is an important element of the process of airworthiness maintenance. It should not be merely a superficial look, but a studied review of the condition of everything that might give trouble during the forthcoming flight.

1. Carefully examine the propeller assembly for looseness, any signs of damage, excessive wear or any other condition that would make the propeller unsafe to operate.
2. Check the leading edge for cracks and debonds.
3. Check the spinner and bulkhead for security, missing screws, damage and cracks. Cracks typically originate from the attachment screws.
4. Check for looseness of the bulkhead. This could be an indication that the mounting bolts are loose and need to be torqued again.
5. Note any indications in the logbook for future reference to determine whether an acceptable condition is getting worse.

Initial 50-Hour Inspection and Annual (100-Hour) Inspections

Must be accomplished by an A&P or IA.
In addition to the recommendations for the Pre-Flight Inspection, the propeller and spinner should be visually examined in detail after the first 50 hours (also annually). This will require the removal of the spinner for a detailed examination.

Initial 50-Hour / 100-Hour or 12 calendar month annual inspection:
1. Remove Spinner Dome and examine it for damage, and cracks. If necessary, replace the spinner dome.
2. Remove Clamping Bolts and dimensionally check against one another. Any bolts that exhibit stretching, corrosion or damage are to be replaced.
3. Remove the Hub Clamp Half and set aside.
4. Remove each blade and inspect blade shanks for any wear, ensuring the pin is still tight in the blade. A thorough visual inspection is recommended together with a coin tap inspection of each composite blade, including the metal erosion shield on the leading edge (see AC 43-5). No dents in the metal erosion shield should be deeper than 1/8”. No dents should puncture the metal erosion shield. There should be no excessive wear on the leading edge. (If further inspection is required, return the blades to the factory or an approved propeller shop for further examination.)
5. Conditions requiring blade replacement:
   - Any hole in hollow blade shell (doesn’t apply if a replacement metal erosion shield will cover hole)
   - Any crack deeper than .025”
   - Any solid tip damage that can’t be trimmed off completely
6. Remove Mounting Bolts and dimensionally check against one another. Any bolts that exhibit stretching, corrosion or damage such as cracks or nicks are to be replaced.
7. Remove the Hub Mount Half. Inspect both hub halves for corrosion.
8. Remove the rear spinner bulkhead and examine for missing fasteners, damage, and cracks. If damaged, replace the spinner bulkhead.
9. REPLACE the special lock washers.
10. Reinstall the assembly per the above installation instructions.
**Inspections**

**Suspected Impact**

Propellers that have been involved in a known or suspected static or rotating impact with relatively solid objects (e.g., ground, maintenance stands, runway lights, birds, etc.) or relatively yielding objects (e.g., snow banks, puddles of water, heavy accumulation of slush, etc.) should be inspected for damage before further flight.

If the inspection reveals one or more of the following listed indications, the propeller should be removed and sent to Whirl Wind Propellers for evaluation.

- A blade that tracks out of limits or out of edge alignment.
- Loose blades in the hub.
- Any diameter reduction (tip damage).
- Visible major damage to the hub that cannot meet the Minor Hub Repairs criteria.
- Visible major damage to a blade that cannot meet the Minor Blade Repairs criteria.
- Operating changes, such as vibration or abnormal RPM.

⚠️ **NOTE**: The bolts should be magnetic particle inspected per STM E 1444 or replaced after any propeller strike.

**Lightning Strike**

Any Whirl Wind composite blade suspected of lightning strike should be inspected and may require repair or replacement.

Lightning strikes usually enter a composite blade through the metal erosion shield. If a lightning strike is present, a darkened area and possible pitting, usually in the proximity of the tip, will be noticeable.

If a lightning strike is suspected or detected, consider the blade un-airworthy. Return the blade to the factory or an approved propeller shop for further examination.

**Paint Wear On Blade**

Wear is inevitable on the metal erosion shield. The wear rate depends on several factors, including high operating RPM’s in rain or sandy areas, FOD on taxiways and runways, etc.

**Propeller Removal**

1. Safe engine ignition system for maintenance by disconnecting the aircraft battery.
2. Perform installation procedure as illustrated on p.4 or p.5 in reverse order of operation.
The following recommendations will help you operate your propeller safely, keep it looking good and help it to last.

**NOTE:** There is no specified overhaul time. The propeller parts are removed from service when they can no longer meet the Continued Airworthiness Requirements.

- Never install a propeller unless it is a model approved for the aircraft/engine. The service history must be properly documented, and the propeller must pass a pre-installation inspection.
- A thorough visual inspection could catch a dangerous flight condition. Use touch and hearing as well as visual clues. Changes in surface roughness, unusual free play, and odd sounds indicate conditions that may affect airworthiness. Feel for roughness and look for 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.
- The pre-flight walk-around is very important, and should be a studied review of any condition that might give trouble during flight. Refer to the Pre-Flight Inspection section for details.
- Do not operate your propeller above the recommended engine RPM. If your propeller has been subjected to an over speed condition of 10% over the maximum rating (example 5800 X 1.1 = 6380) for more than 2 minutes, you must land and perform a 100 hour inspection. **After Suspected Impact or an overspeed condition of 20% or higher, the propeller must be removed from service and returned to the manufacturer for inspection.**
- Do not paint over areas of corrosion on hub parts.
- Do not operate any aircraft after a propeller has been subjected to an impact without a thorough inspection. Refer to the Inspection After Suspected Impact section for details.
  - 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 running-up in areas containing loose stones, sand, and gravel, to reduce erosion and/or damage to the leading edges and blades.
  - Finish loss off the leading edge is a normal wear item and is dependent on the amount of operation in rain and grit.
  - Whenever there is evidence of roughness, check bolt torque on both the clamping and mounting bolts, and check the propeller blades for track. The blades should track within 1/8” of each other at the tip. Rotating the propeller and reinstalling may help.
  - If the bolts are inadvertently over-torqued, they should be replaced immediately.
  - If your propeller blade(s) or hub assemblies begin to show any of the following conditions, it must be repaired by an approved propeller shop or retired from service:
    a. Cracks in the metal hub or bolts,
    b. Loose metal leading edge,
    c. Any crack across the blade,
    d. Any crack along the blade length,
    e. Blade impact damage with missing composite material larger than 0.5 square inches and/or deeper than 0.025”
    f. Obvious damage or wear beyond economical repair.
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, Whirl Wind Propellers Corporation will repair or replace the defective material at its place of business in El Cajon, CA, USA. Whirl Wind Propellers Corporation 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 Whirl Wind Propellers Corporation at the address listed below:

Whirl Wind Propellers
1800-C Joe Crosson Dr
El Cajon, CA 92020

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 or emailing wwpc@whirlwindpropellers.com), 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. Overspeed of any kind or use on or with engines or equipment not approved by Whirl Wind Propellers Corporation 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 Whirl Wind Propellers to a customer or user, whether based on contract, negligence or otherwise. IN NO EVENT SHALL WHIRL WIND PROPELLERS CORPORATION 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.

Whirl Wind Propellers Corporation
Whirl Wind Propellers
1800 Joe Crosson Drive, Ste C
El Cajon, CA 92020
(619) 562-3725
www.whirlwindpropellers.com