



GA-200CN (70"- 72")

Installation and Operation Instructions (11.3" and 12" Spinners)

*Continental O200 and Lycoming 233 / 235
Engines*



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GA200CN-2B Propeller Models

These instructions apply to the following propellers:

Hub Models	Diameter(s)
200CN	70"-72"

Torque Values	
3/8" Bolts	25 ft-lbs

(Table 1)

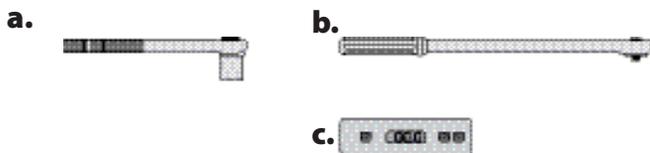
Packing List for GA200CN-2B

Part	Qty.
Blades	2
Hub (forward & aft halves)	1
Mounting Bolts AN6-37A (3/8")	4
Mounting Wedge Lock Washers (3/8")	6
Inner Mounting Bolts AN6-37A (3/8")	2
Clamping Bolts (AN6-20A)	4
Clamping Wedge Lock Washers (3/8")	4
Blade Pitch Paddle	1

Required Tools

You will need the following tools to assemble your propeller:

- a. Deep Socket and Ratchet (see Table 2)
- b. Torque Wrench
- c. Digital Protractor



Hub Models	Bolt Type	Size	Socket
GA-200CN	Clamping	3/8"	9/16"
	Mounting	3/8"	9/16"

(Table 2)

NOTE: WD-40 is recommended to clean the prop flange before installation.

Description & Installation

Description

Congratulations! You have purchased one of the finest ground adjustable propellers on the market today. Each WWPC propeller is manufactured to meet or exceed ASTM quality standards and is proudly made in USA. The blades are manufactured of pre-pregged carbon fiber and protected with a high quality finish then, each blade is equipped with an electroformed nickel leading edge shield. The Hubs are CNC 3-D milled out of 6061T6 Aluminium.

Limitations

1. MAX RPM : 2750 (do not exceed by more than 10% for 2 minutes)
2. Min / Max Pitch : +15° / +17.5° at Pitch Paddle Distance. Major Periodic Inspection: 2000 hours (see pg. 7 for inspection requirements).
3. Recommended Major Periodic Inspection : 2000 hours (see pg. 10 for inspection requirements).



WARNING:

Exceeding the noted RPM limitation for an extended period of time may lead to **CATASTROPHIC FAILURE.**

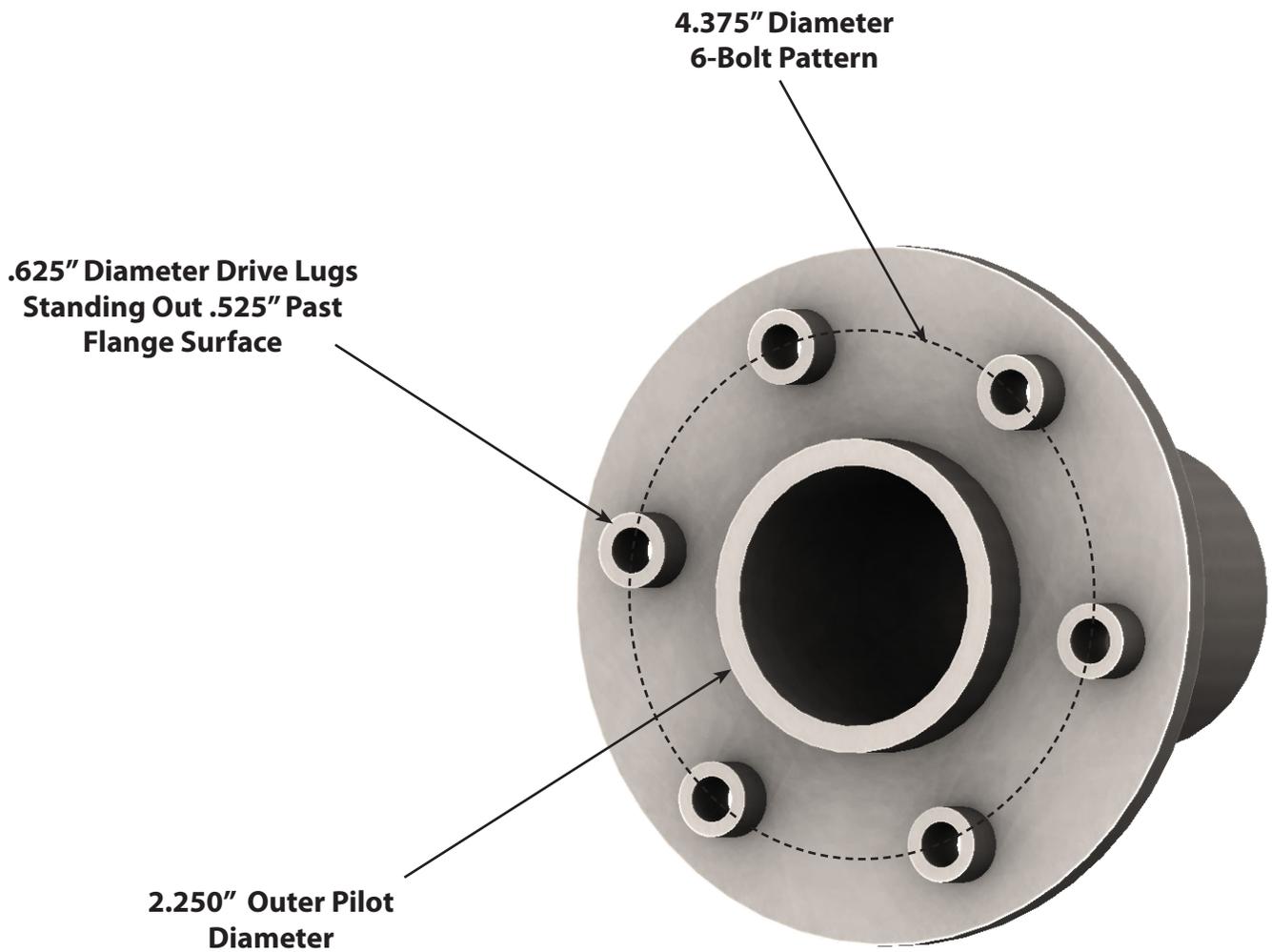
General Propeller Installation Guidelines

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.

1. Verify the magneto (ignition) switch is "OFF" and that both magnetos are grounded.
2. Chock the aircraft wheels to prevent movement.
3. Clean all dirt and oil residue from the engine flange.
4. Always use a calibrated torque wrench when tightening mounting or clamping bolts, and torque to the listed value for your propeller.
5. Take inventory of hardware and tools. Ensure that you have the correct number of pieces with the appropriate sizes and lengths.
6. Slide washers onto their corresponding bolts so they are ready for installation
7. Never modify the propeller hub

O200 Engine Flange



Installation Instructions

Install Propeller

1 If installing spinner place the aft bulkhead on the engine flange or spacer (if installed) making sure to line up the blade cut outs with the flush drive lugs. Check to make sure the protruding drive lugs stand out at least .200" beyond the spinner bulkhead

2 Place aft hub half on the crankshaft sit over the flush drive lugs and line up with the aft bulkhead blade cut outs (if installed). Secure aft hub half with the two short mounting bolts and Wedge-Lock washers. Hold the aft hub half in place by inserting two long mounting bolts and place a sturdy length of wood (roughly the length of the torque wrench being used) in between them to apply counter torque.

Torque Bolts to Appropriate Values (Table 1, Page 1).

! **NOTE:** we recommend using Loctite 242 or 262 on the internal mounting bolts as they cannot be safety wired

3 Now the forward hub and blades can be installed. This is easier with two people however if you are installing the propeller by yourself;

- Start by placing the blades hub hardware and tools within arms reach of the mounted aft hub.
- Next turn the aft hub until the blade sockets are aligned vertically.
- Place the top blade in first (with one hand) and hold it in place using the forward hub half (with the other hand).
- Now angle the hub half so that it holds the top blade but provides a large enough gap to insert the bottom blade and forward hub half.
- Once both blade are in, lightly secure the propeller assembly with the mounting and clamping bolts.

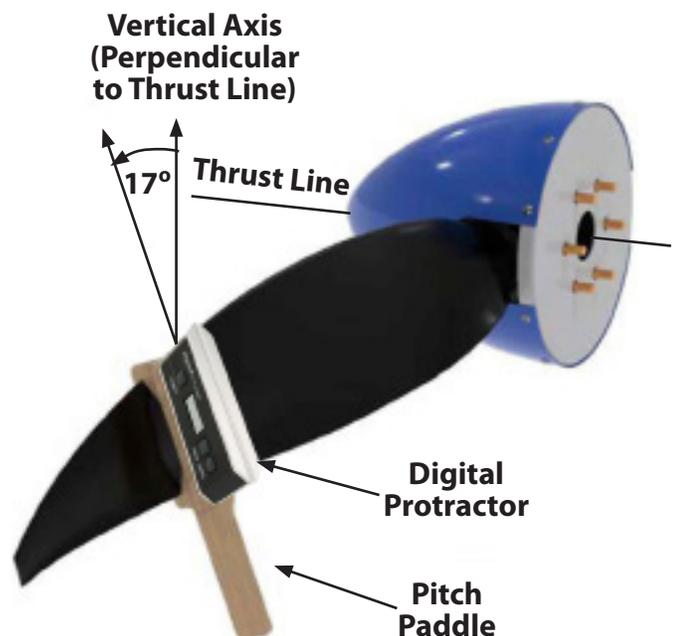
- Make sure there is an even gap between the two hub halves. The blades should be secure but easily rotated.

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

! **NOTE:** Certain aircraft manufacturers limit the total pitch range to comply with aircraft design regulations.

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

1. Rotate the propeller so that the blades are horizontal, or level with the ground.
2. Calibrate protractor by placing it on an exposed flat portion of the forward hub half and zeroing read out.
3. Slide the pitch paddle and protractor on the blade as shown. Make sure the pitch paddle is parallel with the Blades cord line.

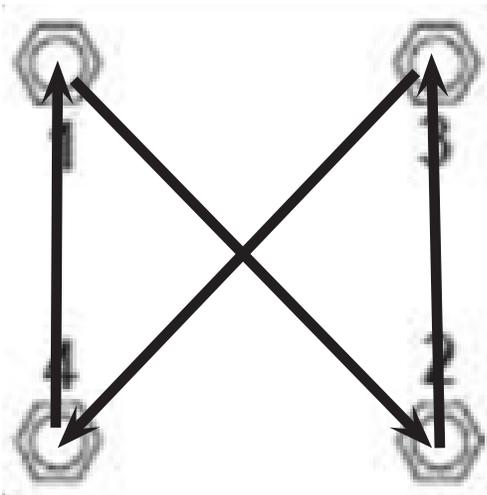


Typical - O200 - 100Hp

Installation Instructions

4. Rotate the blade to a recommended starting angle of 17°. Both blade/angle combinations generate a static RPM of roughly 2200-2500.
5. Rotate propeller 180° and repeat Steps 1-3 for the other blade.
- 5 After the blade pitch is set on both blades, **torque the Clamping Bolts to the appropriate Value** (Table 1, Page 1). Follow the symmetrical pattern and tightening each bolt 1/8 to 1/4 turn at a time. It is important to maintain an even gap between the hub half to prevent a change in pitch angle.

! **NOTE:** after all mounting and clamping bolts



have been properly tightened, Check the blade angles again to make sure they have not changed.

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

! **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

! **NOTE:** both pitch angles should be within

0.20 degrees of each other.

! **NOTE:** After every 25 hours of use check bolt torques

- 6 If installing a spinner, Install and secure spinner forward bulkhead with the supplied #8 screws (for 13" model only). Then install Spinner Dome over the bulkhead using #8 screws .

Installation Instructions

7 Before operation, **Verify Static RPM**

 **WARNING:** Exceeding a Limitation for an extended period of time may lead to a **CATASTROPHIC FAILURE and BODILY INJURY OR DEATH.**

 **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 static RPM should 2300 to 2400 during straight and level flight.

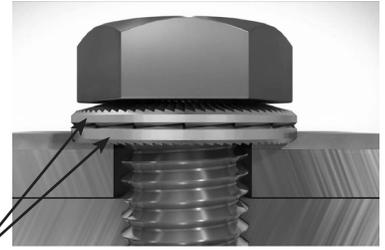
 **WARNING:** NEVER EXCEED THE MAXIMUM RPM RATING FOR YOUR ENGINE. If you are not seeing your correct static RPM, be certain the tachometer was properly calibrated.

2. After the desired static RPM is achieved, re-check all bolt torque values (The ideal pitch setting will allow the propeller to reach (with out exceeding) maximum RPM at full throttle in level flight.)

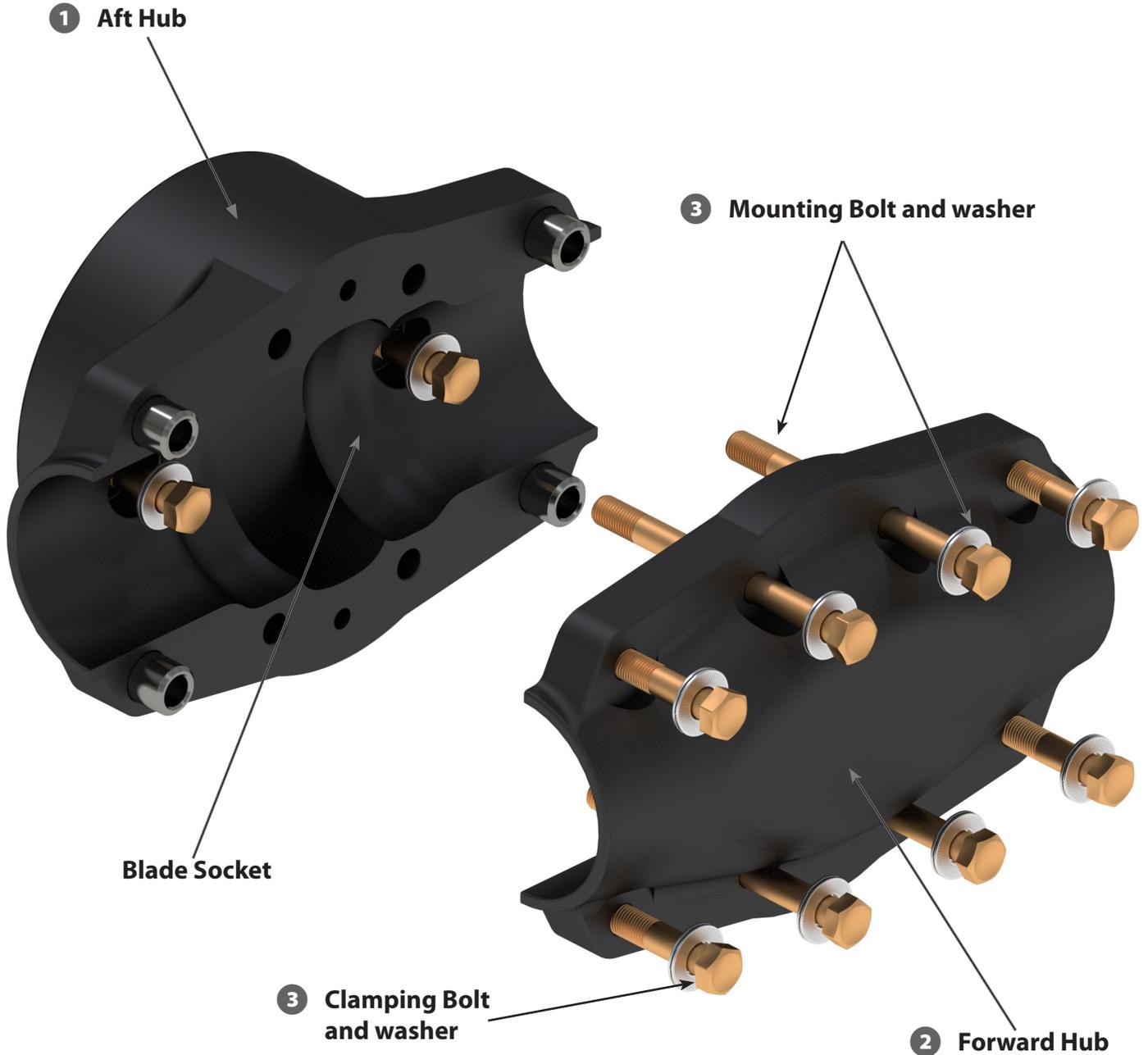
 **WARNING:** Do not operate your propeller above the recommended engine RPM. If your propeller has been subjected to an over speed condition of 10% over the maximum rating ($2750_{RPM\ MAX} \times 1.1 = 3025$) for more than 2 minutes, you must land and perform a 100 hour inspection. **After Suspected Impact or an overspeed condition of 20% or higher, the propeller must be removed from service and returned to the manufacturer for inspection.**

Installation with 12" Spinner

Hub	Bolt Type	Size	Socket	Torque Values	
				3/8" Bolts	25 ft-lbs
GA-200CN	Clamping	3/8"	9/16"		
	Mounting	3/8"	9/16"		



One Wedge-lock Washer
(2 Pieces with ramped
sides facing each other)



Note, Blades Omitted for Clarity

Inspections

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.

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 of blades for cracks and debonding.
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 retightened.
5. Note any indications in the logbook for future reference to determine whether an acceptable condition is getting worse.

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

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 and at 2000-Hour). 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 Forward Hub-Half and set aside.
4. Remove each blade and inspect blade shanks for any wear. A thorough visual inspection is recommended together with a coin tap inspection of each composite blade, including the nickel 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.
 - 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

Inspections

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 Wedge-lock washers.
10. Reinstall the assembly per the above installation instructions.

2000-hour Major Periodic Inspection Must be accomplished by an A&P or IA.

1. Remove Spinner Dome and examine it for damage, and cracks. If necessary, replace the spinner dome.
2. Remove Clamping Bolts and washers and retire both sets from service.
3. Remove the Hub Clamp Half and set aside.
4. Remove Mounting Bolts and washers and retire both sets from service.
5. Remove the Hub Mount Half .
6. Remove the rear spinner bulkhead and examine for missing fasteners, damage, and cracks. If damaged, replace the spinner bulkhead.
7. Send both hub half's and all 3 blades to an **Approved Propeller Repair Center** for the remaining 2000 hour inspection.

! **NOTE:** These blades do not have life limitation. There is no specified over haul time. The propeller parts are removed from service when they can no longer meet the Continued Airworthiness Requirements

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.

! **IMPORTANT:** After any propeller strike the bolts should be replaced.

Lighting 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 unairworthy. Return the blade to the factory or an approved propeller repair center for further examination.

Inspections

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.v

Propeller Removal

- 1.** Safe engine ignition system for maintenance by disconnecting the aircraft battery.
- 2.** Perform installation procedure as illustrated on page 5 in reverse order of operation.

Continued Airworthiness Requirements

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 will 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 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 engine 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.

Approved Engine/Propeller Combinations and Limitations

Model	Diameter(s)	Weight	Engines	Limits
GA-200CN	70"- 72"	12 lbs	Continental O200, Lycoming 233/235	2750 RPM MAX (Propeller) 100HP

Propeller Performance

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 up to maximum continuous engine RPM at full throttle level flight will give best all-around performance.

CRUISE PITCH

A cruise propeller will turn 150 to 250 engine RPM less than a standard pitch propeller. 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 200 engine rpm more than a standard pitch propeller (Refer to your particular aircraft operating manual 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.

PITCH NOTES AND LIMITATIONS

The faster the airplane the higher the pitch setting that will be required to keep the engine from overspeeding at Wide Open Throttle (WOT). While the propeller may be structurally operated at any pitch setting from +15° through +17.5°, the take-off RPM at WOT must meet the aircraft manufacturer's recommended limits to ensure safe flight. The propeller RPM should never exceed the engine manufacturers recommended maximum RPM.

! **NOTE:** Certain aircraft manufacturers limit the available propeller pitch range to comply with aircraft design regulations.

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

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