

PROPELLER INSTALLATION & OPERATION MANUAL
MODEL: GA200CN-3B



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WHIRL WIND GROUND ADJUSTABLE (GA) AIRCRAFT PROPELLER INSTALLATION – GA200CN-3B

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

3 - Propeller Blades

1- Hub (Front & Rear halves)

Mounting Bolts & Washers, for mounting hub on flange

3/8" Bolts qty: 6

3/8" Wedge-lock washers qty: 6

Clamping Bolts, for clamping hub halves together

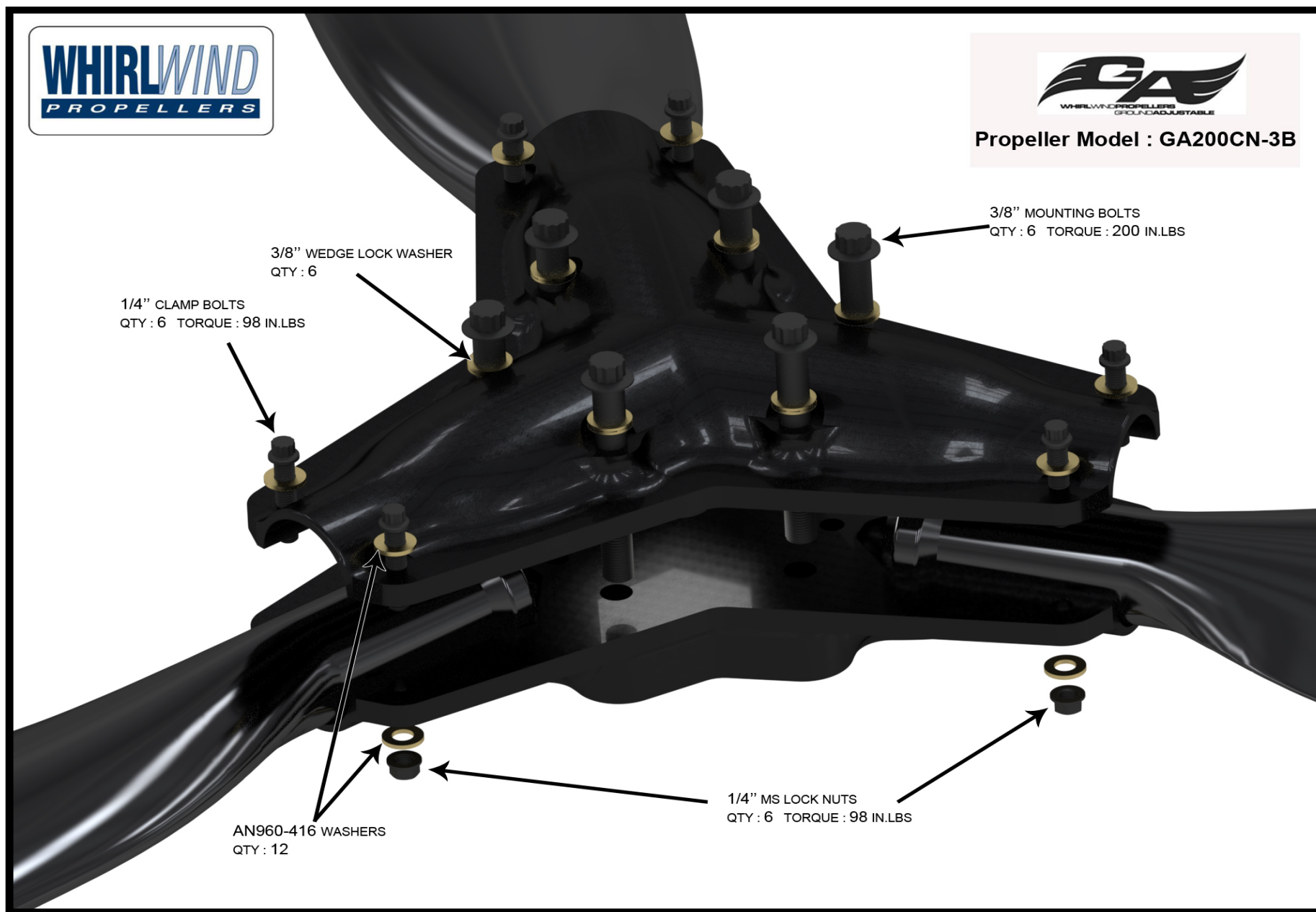
1/4"-28 X 1 1/4" Bolts qty: 6

AN960-416 Washers qty: 12

1/4"-28 MS Lock-Nut qty: 6

1 - Blade Pitch Paddle

INSTALLATION DIAGRAM



WHIRL WIND GROUND ADJUSTABLE (GA) AIRCRAFT PROPELLER INSTALLATION – O2003B

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TOOLS

A good quality calibrated torque wrench is required to properly torque clamping bolts and mounting bolts. You will also need a socket wrench. See Propeller Data Sheet for bolt size and torque.

INSTALLATION

1. Be certain that the ignition switch is “OFF”. Chock the aircraft wheels to prevent movement. Clean dirt and oil residue from the engine flange.
2. Lay Aft Hub-Half on flat surface. Install blades in hub’s blade sockets. Install Fwd Hub-Half clamping the blades between the hub halves. Install the blade clamping hardware ($\frac{1}{4}$ ”-28 bolts, AN960-416 washers, and $\frac{1}{4}$ ”-28 nuts) in the hub to secure hub halves and blades. Carefully install the propeller assembly on engine flange. Use the supplied $\frac{3}{8}$ ” bolts and wedge-lock washers to secure the propeller onto the flange. Torque the $\frac{3}{8}$ ” bolts to 200 in-lbs using a star pattern similar to that shown on Figure 1, and $\frac{1}{4}$ ”-28 bolts to a torque of 98 in-lbs.

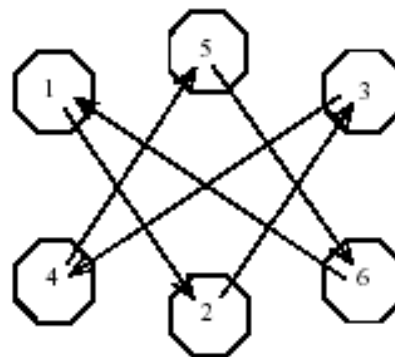


Figure 1

NOTE: Have your tachometer calibrated by a professional before performing this next operation. With the brakes on, run the engine full throttle to verify your desired static RPM. CAUTION: YOU SHOULD 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. CAUTION: YOU SHOULD NEVER MASK AN ENGINE PROBLEM WITH A PITCH CHANGE. If you are unsure, please contact the factory.

CHANGING THE PITCH

If changing the pitch is necessary, first loosen the 6 clamp bolts until the blades can be rotated by hand, then hand tighten the bolts to maintain an even hub gap in each side. (NOTE: The special lock washers will click loudly when loosened)

Adjust pitch setting using the blade paddle / protractor to 17° from vertical. Static RPM should be 300 to 400 less than Max engine RPM. Try to set the pitch of each blade within 0.2 degrees of each other.

- Decrease pitch to increase RPM.
- Increase pitch to decrease RPM.

After the blade angles have been set, torque all bolts as described above. After the correct static RPM is achieved, recheck all bolt torques.

TACHOMETER INSPECTION:

Owing to the exceptionally high stresses that may be generated by particular propeller/engine combinations at certain operating ranges, many propeller and aircraft manufacturers have established revolutions per minute (RPM) restrictions and maximum RPM limits for some models. An improperly operating tachometer can cause an engine to exceed the maximum RPM limits or allow operation unknowingly within a restricted RPM band. Since there are no post-manufacture accuracy requirements for engine tachometers, tachometer inaccuracy could be a direct cause of propeller failure, excessive vibration, or unscheduled maintenance. Proper tachometer operation and accuracy should always be checked (using the manufacturer's procedure, if available) during normal maintenance intervals. One means of checking the tachometer's accuracy is with a commercial strobe unit through which the rotating propeller is viewed.

CONTINUED AIRWORTHINESS REQUIREMENTS:

The following will help you operate your propeller safely, keep it looking good and help it to last

- Never install a propeller on an aircraft unless it is a model approved for the aircraft and the engine. The service history must be properly documented, and a pre-installation inspection must indicate that the propeller is airworthy.
- A visual Inspection is the primary defense against early failure of propellers. When inspecting propellers, it is necessary to use touch and hearing, as well as visual clues. Changes in surface roughness, unusual free play, and odd sounds give hints as to 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.
- 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 $2750 \times 1.1 = 3025$) for more than 2 minutes, you must perform the Inspection After Suspected Impact listed below. **A 20% overspeed or higher, the propeller must be removed from service.**
- 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. See Inspection After Suspected Impact below
- 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. 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. Check the leading edge for cracks and debonds. Externally check the spinner and bulkhead for security, missing fasteners, damage, and cracks. Cracks typically originate from the attachment screws. Check for looseness of the bulkhead. This could be an indication that the mounting bolts are loose and need to be torqued again. Note any indications in the logbook for future reference to determine whether an acceptable condition is getting worse.
- 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 on operation, 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. For new installations, rotating the propeller 180 degrees and reinstalling may help.
- If the bolts are ever over-torqued, they should be replaced immediately.
- If your propeller part begins to show any of the following damage, 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 .5 square inches and/or deeper than .025"
 - (f) Obvious damage or wear beyond economical repair.

INSPECTION FOR LIGHTNING STRIKE ON COMPOSITE BLADES

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.

INSPECTION AFTER 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.

- (1) A blade that tracks out of limits or out of edge alignment.
- (2) Loose blades in the hub.
- (3) Any diameter reduction (tip damage).
- (4) Visible major damage to the hub that cannot meet the Minor Hub Repairs criteria.
- (5) Visible major damage to a blade that cannot meet the Minor Blade Repairs criteria.
- (6) 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.

PAINT WEAR ON BLADE:

NOTE, 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.

MANDATORY INSPECTIONS:

INITIAL 50 HOUR & SUBSEQUENT ANNUAL INSPECTIONS

-- To 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 Clamp Bolts. -- The bolts should be dimensionally checked against one another. Any bolts that exhibit stretching, corrosion or damage such as cracks or nicks are to be replaced.
3. Remove the Hub Clamp Half and set aside.
4. Remove each blade and inspect blade shanks for any wear making sure 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:
 - a) Any hole in hollow blade shell (doesn't apply if a replacement metal erosion shield will cover hole)
 - b) Any crack deeper than .025"
 - c) Any solid tip damage that can't be trimmed off completely
6. Remove the Mounting Bolts -- The bolts should be dimensionally checked 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.

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