



WHIRLWIND
A V I A T I O N

Manufacturer of Composite Constant Speed Propellers

Model:	151H
Serial Number:	
Manufacture Date:	

Owner's Manual

151H Series

(Rev 2014-2)

WHIRL WIND AVIATION

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Congratulations on your propeller purchase from Whirl Wind Aviation!

Section 1: Introduction

To ensure many hours of trouble free operation of your new Whirl Wind propeller, please read and follow the operation and maintenance recommendations in this manual.

The Whirl Wind 151 Series propeller is a composite constant speed hydraulically controlled propeller. This fully constant speed propeller will automatically adjust blade pitch angle to maintain the selected engine RPM setting. A single acting piston (inside the hub) powered by engine oil changes the blade pitch. Oil pressure is adjusted and regulated by the engine driven governor. Once an engine RPM is selected, it will be held constant at all flight airspeeds and power settings by the governor automatically.

The propeller control lever is used to set the desired engine RPM. Once the engine RPM is set, it is held constant by the governor, which maintains this preset RPM by varying the propeller oil pressure automatically. Mechanical stops for high and low pitch limit the pitch change travel of the propeller.

Whirl Wind propellers are experimental class and are not subject to any Federal Aviation Administration regulations. The operator acknowledges that these are experimental propellers and agrees to assume all risk in operating them on an experimental aircraft or any other machine. Any and all information in the owner's manual, service letters and other documentation are suggestions only and may not apply to an operator's specific application.

Section 2: Overview

2.1 Description

Designed for the cruise speeds of today's contemporary kitplanes, this propeller will allow your plane to perform at its best. The 151 Series is a lightweight three-blade, hydraulically controlled, constant speed propeller designed for the most popular kitplanes using the Lycoming O-320 engine (151 - 200 hp). Refer to the original data Sheet for diameter, weight, and RPM restrictions.

WARNING: The 151 Series propeller is NOT recommended for use on Lycoming IO-360 or O-360 engines using electronic ignition or high compression pistons.

2.2 Construction

The propeller blades are constructed from advanced thermoset composite materials. The 151 Series propeller blades are equipped with nickel leading edge erosion shields. The 151 Series System includes: propeller, spinner, and all hardware needed for installation.

The 151 Series hub is CNC machined from certified aerospace aluminum alloy, which is then shot peened and anodized. The hub blade sockets are equipped with ball bearings to ensure smooth pitch change of the blades throughout the life of the propeller system.

2.3 Standard Configuration:

The 151 Series propeller is a standard, non-aerobatic hydraulically controlled propeller system. Oil pressure is required for high blade pitch (low RPM). In the event of engine oil pressure loss or governor failure, the propeller will return to flat pitch and may overspeed, which can result in catastrophic failure. If propeller overspeed occurs the throttle must be retarded immediately to avoid structural propeller failure and damage. The mechanical low pitch stop should be set to allow for continued flight at a reduced throttle setting.

Section

3

Section 3: Propeller Identification

Each Whirl Wind propeller system has a factory designated model number and serial number, which will identify the hub and propeller serial number. The propeller system blades will have individual serial numbers etched on the ferrule of each blade near the root end. All serial numbers can be found on the owner's data sheet.

Example: 151H-108

Series and Hub Style	151H
Propeller Serial Number	108
Blade Serial Numbers	112, 113, 114

Section 4: Instructions For Installation

4.1 Spinner Installation

The Whirl Wind 151 Series propeller system comes equipped with a composite spinner and spinner back-plate (bulkhead) of fiberglass construction.

Before propeller installation on the engine, install the spinner rear bulkhead on the propeller hub. Note the factory position of the spinner rear bulkhead in the spinner dome in relation to the blade cutouts to determine its required position on the propeller hub. The spinner and spinner rear bulkhead have been number coordinated to match the blade cutout openings.

Install the rear bulkhead using the supplied AN4 bolts with red Loctite 262 and torque to 98 in-lbs.

Safety wire all AN4 bolts.

4.2 Propeller Installation

WARNING! DO NOT OPERATE THE ENGINE / PROPELLER WITH ONLY THE SPINNER FILL-IN PIECES INSTALLED!

IF THE ENGINE AND PROPELLER ARE TO BE RUN WITHOUT THE SPINNER DOME INSTALLED IT IS IMPARATIVE THAT THE FILL-IN PIECES ALSO BE REMOVED. The centrifugal force will damage or destroy the fill-in pieces without the support of the spinner dome. (The engine and propeller can be operated with only the spinner rear bulkhead installed.)

Before beginning installation of the 151 Series propeller system, first inspect the O-Ring located in the propeller hub flange and make sure the O-Ring is in good condition. After lightly lubricating the O-Ring with clean oil or O-Ring lube, carefully install the propeller on the engine crankshaft.

Warning: To avoid severe damage to the hub, when tightening the propeller bolts insure that the face of the prop hub is kept parallel with the face of the flywheel. In most cases this will require tightening the propeller bolts a little at a time in an alternating pattern.

Tighten and torque the propeller bolts. Refer to the data sheet for torque (dry, non-lubricated) values (65 ft-lbs for ½" hardware or 47 ft-lbs for 7/16" hardware). Safety wire the flange bolts in pairs with 0.32" nickel safety wire after installation.

After the propeller is installed on the engine, install the spinner dome onto the propeller hub and rear bulkhead. The spinner and spinner rear bulkhead have been number coordinated to match the blade cutout openings.

The spinner dome has a forward bulkhead with a flanged hole that must engage the cap on the front of the propeller hub. The fit of the forward bulkhead to the cap is to be snug BUT NOT SO TIGHT that excessive force is required to push it on. If the fit is too tight, sand the inside of the forward bulkhead flange. If the fit is too loose, apply the provided Teflon tape to the cap. In some cases a combination of these processes will be required to obtain the proper fit.

Fasten the spinner dome and blade cutouts to the rear bulkhead using the supplied screws and nylon washers.

IMPORTANT: Periodically verify that the spinner screws are tight during the first few hours of operation.

**** For safety reasons always turn the propeller opposite of the usual direction of rotation.***

4.3 Governor Installation

- Clean governor and engine governor mating surfaces.
- Place gasket on governor side.
- Align governor spline to engine drive and push governor up to seat against engine drive pad.
- Install governor mounting hardware and torque to 150 in-lbs.
- Attach control cable to the governor control arm with the appropriate hardware.

Note: *The control arm is spring loaded to the high RPM. Make sure the control arm moves freely through 45 degrees of travel.*

Section 5: Propeller System Operation

WARNING: Operation of this propeller over maximum RPM is strictly prohibited and may result in a catastrophic structural failure of the propeller system. Any type of structural failure may result in death or severe bodily injury. Refer to your propeller data sheet for maximum RPM.

Be sure to limit engine power settings when performing ground run-up. Engine and propeller manufacturers do NOT recommend high engine power settings on the ground because it can result in excessive engine temperatures and propeller blade foreign object damage.

5.1 First Run-Up

To ensure proper first run-up of your new Whirl Wind 151 Series propeller system, refer to your engine's operation manual for the proper run-up power setting. At the proper run-up power setting pull the propeller control lever back until the RPM drops by 300 - 400 RPM. Push the propeller control lever forward and observe RPM increase. Cycle the pitch three times to purge air out of the system. After first run-up refer to "Section 5.2" for inspection.

NOTE 1: For the first 3 to 6 hours of operation the propeller may not immediately return to fine pitch when cycling due to the tightness of the newly shimmed blades. This will loosen within the first 6 hours of operation.

NOTE 2: Static full power run-up RPM should be 2500 to 2600 RPM. If RPM is higher than 2600 the low pitch stop should be adjusted (3/4" nut located on front of the 151 Series hub). One turn in the clockwise direction is approximately 100 RPM decrease.

5.2 Inspection After First Run-Up

1. Inspect the propeller system blades and spinner for any nicks, cracks, or chips.
2. Inspect each aluminum blade ferrule and blade intersection (located at the root end of blade where the silicone sealant is visible) for movement and/or signs of chafing. There should be no movement between aluminum ferrule and blade. Notify Whirl Wind Aviation immediately if movement is detected.
3. Gently shake each propeller blade to feel for blade movement in the hub. Blade shake movement is allowed up to 1/8 inch, measured from the tip. Radial play of up to 2 degrees is acceptable. If the check shows values above these tolerances contact Whirl Wind Aviation immediately. Movement is only allowed between the aluminum blade ferrule and the propeller hub, not as described in item #2 above.
4. Inspect the nickel leading edge erosion shield. The nickel erosion shield should not be loose or have any cracks. Small paint cracks parallel to and along the edge of the shield where the nickel and paint meet are acceptable.
5. Check spinner dome and the aft and forward bulkheads for cracks of any kind or looseness.
6. No grease or oil leaks should be detected. NOTE: A small amount of grease leakage may occur in new propellers (first 2 to 5 hours) or in hot climates with high RPM conditions.
7. Before every flight the prop-control should be cycled at least twice to circulate the engine oil. In cruise flight any number of RPM settings are possible within engine and propeller limitations. The RPM restrictions from the engine and propeller manufacturers must be strictly observed.

Your Whirl Wind Propeller System has been statically balanced at the factory. However, it is recommended to have the engine/propeller dynamically balanced before the first flight.

Repeat the same inspection after balancing as for first run-up. All engine RPM and power settings limitations must be followed when operating the Whirl Wind 151H Series propeller. Refer to your Whirl Wind propeller data sheet for propeller operation limitations.

5.3 Overspeed Warning

It is possible to overspeed the propeller by rapid throttle advancement. Therefore, always adjust the power and RPM lever slowly and smoothly to avoid the possibility of overspeed.

If an overspeed occurs:

Overspeed Occurrence	Required Action
up to 110 % of the max RPM	A 50 hours inspection must be performed immediately by a certified A&P mechanic
111% to 120% of the max RPM	A mandatory teardown inspection at the factory is required
above 121% of the max RPM	<u>No further use of the propeller is permitted!</u> The propeller must be returned to the factory for inspection.

WARNING: Failure to adhere to these guidelines may lead to a catastrophic propeller structural failure. Any type of structural failure may result in death or severe bodily injury.

5.4 **Warning – Electronic Ignition / High Compression Pistons**

The 151 Series propeller is NOT recommended for Lycoming IO-360 or O-360 engines using electronic ignition or high compression pistons.

5.5 **RPM Recommendation**

It is recommended to avoid continuous operation of the 151 Series propeller in the RPM range between 2050 to 2300 RPM and 2600 to 2700 RPM.

Section 6

Section 6: Propeller System Inspection

6.1 Preflight Check

1. Inspect the propeller system blades and spinner for any nicks, cracks, or chips.
2. Inspect each aluminum blade ferrule and blade intersection (located at the root end of blade where the silicone sealant is visible) for movement and/or signs of chafing. There should be no movement between aluminum ferrule and blade. Notify Whirl Wind Aviation immediately if movement is detected.
3. Gently shake each propeller blade to feel for blade movement in the hub. Blade shake movement is allowed up to 1/8 inch, measured from the tip. Radial play of up to 2 degrees is acceptable. If the check shows values above these tolerances contact Whirl Wind Aviation immediately. Movement is only allowed between the aluminum blade ferrule and the propeller hub, not as described in item #2 above.
4. Inspect the nickel leading edge erosion shield. The nickel erosion shield should not be loose or have any cracks. Small paint cracks parallel to and along the edge of the shield where the nickel and paint meet are acceptable..
5. Check spinner dome and the aft and forward bulkheads for cracks of any kind or looseness.
6. No grease or oil leaks should be detected. **NOTE:** A small amount of grease leakage may occur in new propellers (first 2 to 5 hours) or in hot climates with high RPM conditions.

7. Before every flight the prop-control should be cycled at least twice to circulate the engine oil. In cruise flight any number of RPM settings are possible within engine and propeller limitations. The RPM restrictions from the engine and propeller manufacturers must be strictly observed.

6.2 Inspection After First 10 Hours

1. **BLADES:** Inspect the propeller system blades for any nicks, cracks, or chips. Inspect blades for cracks in the composite skins and nickel leading edges. No cracks are allowed in either. If cracks are present return propeller for repair to a Whirl Wind Aviation service center.
 - Inspect the cambered side of each blade for chord-wise cracks and the entire blade for any delamination of the composite skin or obvious discoloration.
 - Small cracks parallel along the nickel edge are allowed as long as the leading edge is not loose. Scratches or chips should be sealed up as soon as practicable.
 - In case of any questionable conditions, please contact the service department of Whirl Wind Aviation.
2. **BLADE FERRULES:** Inspect each aluminum blade ferrule and blade intersection (located at the root end of blade where the silicone sealant is visible) for movement and/or signs of chafing. Gently flex the blade at the tip to check for any movement between the aluminum ferrule and blade root. No movement is allowed. There should be no movement between aluminum ferrule and blade. Notify Whirl Wind Aviation immediately if movement is detected.
3. **BLADE MOVEMENT:** Gently shake each propeller blade to feel for blade movement in the hub. Blade shake movement is allowed up to 1/8 inch, measured from the tip. Radial play of up to 2 degrees is acceptable. If the check shows values above these tolerances contact Whirl Wind Aviation immediately. Movement is only allowed between the aluminum blade ferrule and the propeller hub, not as described in item #2 above.

4. **LEADING EDGE:** Inspect the nickel leading edge erosion shield. The nickel erosion shield should not be loose or have any cracks. Small paint cracks parallel to and along the edge of the shield where the nickel and paint meet are acceptable.
5. **SPINNER:** Remove spinner and check for nicks, cracks or chips. Check spinner dome and the aft and forward bulkheads for cracks of any kind or looseness. Also inspect for any signs of chafing.
 - Ensure secure attachment to the hub.
 - Torque AN4 bolts on aft bulkhead to 98 in-lbs.
 - Safety wire AN4 bolts.
6. **GREASE:** No grease or oil leaks should be detected. NOTE: A small amount of grease leakage may occur in new propellers (first 2 to 5 hours) or in hot climates with high RPM conditions.
7. **FLANGE BOLTS:** Check propeller flange bolts for tightness (65 ft lbs).
8. Before every flight the prop-control should be cycled at least twice to circulate the engine oil. In cruise flight any number of RPM settings are possible within engine and propeller limitations. The RPM restrictions from the engine and propeller manufacturers must be strictly observed.

6.3 50 Hours Inspection

9. **BLADES:** Inspect the propeller system blades for any nicks, cracks, or chips. Inspect blades for cracks in the composite skins and nickel leading edges. No cracks are allowed in either. If cracks are present return propeller for repair to a Whirl Wind Aviation service center.
- Inspect the cambered side of each blade for chord-wise cracks and the entire blade for any delamination of the composite skin or obvious discoloration.
 - Small cracks parallel along the nickel edge are allowed as long as the leading edge is not loose. Scratches or chips should be sealed up as soon as practicable.
 - In case of any questionable conditions, please contact the service department of Whirl Wind Aviation.
10. **BLADE FERRULES:** Inspect each aluminum blade ferrule and blade intersection (located at the root end of blade where the silicone sealant is visible) for movement and/or signs of chafing. Gently flex the blade at the tip to check for any movement between the aluminum ferrule and blade root. No movement is allowed. There should be no movement between aluminum ferrule and blade. Notify Whirl Wind Aviation immediately if movement is detected.
11. **BLADE MOVEMENT:** Gently shake each propeller blade to feel for blade movement in the hub. Blade shake movement is allowed up to 1/8 inch, measured from the tip. Radial play of up to 2 degrees is acceptable. If the check shows values above these tolerances, contact Whirl Wind Aviation immediately. Movement is only allowed between the aluminum blade ferrule and the propeller hub, not as described in item #10 above.
12. **LEADING EDGE:** Inspect the nickel leading edge erosion shield. The nickel erosion shield should not be loose or have any cracks. Small paint cracks parallel to and along the edge of the shield where the nickel and paint meet are acceptable.

13. **SPINNER:** Remove spinner and check for nicks, cracks or chips. Check spinner dome and the aft and forward bulkheads for cracks of any kind or looseness. Also inspect for any signs of chafing.
- Ensure secure attachment to the hub.
 - Check AN4 bolt on aft bulkhead for tightness.
14. **GREASE:** No grease or oil leaks should be detected. NOTE: A small amount of grease leakage may occur in new propellers (first 2 to 5 hours) or in hot climates with high RPM conditions.
15. **FLANGE BOLTS:** Check propeller flange bolts for tightness (65 ft lbs).
16. Before every flight the prop-control should be cycled at least twice to circulate the engine oil. In cruise flight any number of RPM settings are possible within engine and propeller limitations. The RPM restrictions from the engine and propeller manufacturers must be strictly observed.

Section 7: Propeller System Maintenance

There is no special maintenance schedule for the Whirl Wind propeller system beyond the usual inspections listed in Section 6 and the teardown inspection schedule listed below. It is recommended that the operator apply a high quality paste wax on glossy finish blades at least once a month to aide in protection from the elements - it is important that the blades are always sealed from outside moisture. Automotive materials such as Acryluathane paint and Epoxy resin can be used to repair most small scratches and chips.

7.1 Teardown Inspection Schedule

Refer to the original propeller data sheet for the recommended teardown inspection schedule. If the original data sheet cannot be found, please contact Whirl Wind Aviation directly to confirm the recommended schedule for your propeller.

7.2 Use of Propeller Log Book

1. Proper maintenance of this logbook is the owner's responsibility. It is an important record designed for the owner's information and protection.
2. If the propeller is sold or installed on another aircraft, the logbook should be transferred with the propeller. New owner information should be registered with Whirl Wind Aviation by calling 440-275-1540.
3. It is recommended that maintenance release tags and work orders be attached inside the back cover of this book. If a copy of the work order is not available, the repair station and work order numbers should be referenced in the logbook entry.

Section 8: Propeller Log Book

8.1 Maintenance & Service History

Date:	Total Propeller Time	Total Time Since Overhaul
Description of Work		Repairman & Repair Station Certificate Numbers

Date:	Total Propeller Time	Total Time Since Overhaul
Description of Work		Repairman & Repair Station Certificate Numbers

Date:	Total Propeller Time	Total Time Since Overhaul
Description of Work		Repairman & Repair Station Certificate Numbers

Date:	Total Propeller Time	Total Time Since Overhaul
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Date:	Total Propeller Time	Total Time Since Overhaul
Description of Work		Repairman & Repair Station Certificate Numbers

Date:	Total Propeller Time	Total Time Since Overhaul
Description of Work		Repairman & Repair Station Certificate Numbers

8.2 Transfer of Ownership

Please complete this form upon transfer of ownership and return to Whirl Wind Aviation, PO Box 190, Austinburg, OH 44010 U.S.A.

Propeller Model: **151H**

Propeller Serial No: _____

Date Transferred: _____

Original Owner

Name: _____

Address: _____

City, State, Zip: _____

Phone No: _____

Notes:

New Owner

Name: _____

Address: _____

City, State, Zip: _____

Phone No: _____

Notes:
