

ROSPELLER

Edition 1/16 English

Operation and Maintenance Manual

Two Bladed Inflight Variable Pitch Propeller 2-40
Three Bladed Inflight Variable Pitch Propeller 3-40



up to model -7

Rospeller

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The ROSPELLER variable pitch propeller is a non-certified two or three bladed variable pitch propeller. A certified VLA version is available. The in-flight variable pitch propeller provides an excellent option for the advanced ultra light or home built aircraft powered by the Rotax 912 (two bladed prop) or the Rotax 914 (three bladed prop) engine. The pitch change mechanism consists of a push pull rod control linked to the prop hub through the hollow engine crankshaft. It is made specifically for Rotax engines or for any other engine with a hollow crankshaft. The ability to vary the pitch offers both enhanced aircraft performance combined with short take off capability and decreased fuel consumption.

ATTENTION: NEVER fly an aircraft equipped with this propeller under any circumstances when the pitch change mechanism is inoperative or known to be unsafe. The operator of the aircraft assumes all risk to bodily injury and aircraft damages when the propeller is operated outside the manufacturer's operating limitations. Take off and land only with fine pitch! Is your EMERGENCY STOP NUT in front of your hub properly adjusted?? Do you lubricate the prop every 50 hrs. with grease as described in page 7 ?

CONSTRUCTION:

The fork type hub is CNC-machined from quality aluminum alloy. It integrates all the other propeller parts. To prevent corrosion all aluminum parts are anodized. Two propeller blade versions are available, the composite blade from NEUFORM or the solid carbon fiber blade from HELIX.

A pusher engine version of ROSPELLER is available also. A push pull rod installed through the hollow engine crankshaft varies the pitch. A scissors type actuating mechanism is connected to the push pull rod and mounted on the rear face of the Rotax gearbox. This mechanism is driven by a 12 V DC linear actuator.

ACTUATION:

The blade pitch can be varied at any time. The scissors drive allows the blade pitch to be varied from low pitch, high RPM for take off to a semi-feather position with the engine shut down. LED's can be used to indicate the "Takeoff/Landing" and "Semi-Feather" position of the blades in the cockpit through adjustable micro switches. For repeatable power setting at different atmospheric conditions the use of a manifold pressure indicator is recommended in conjunction with the RPM indicator.

TECHNICAL DATA:

Prop diameters (special dimensions possible)	1600 / 1720mm	62.9 / 67,7"
Weight (two bladed / three bladed)	7,6 / 9,8 kg	16.7/ 21.6lbs
Weight, scissors drive	0,5 kg	1.1 lbs
Max. blade transition range	65 °	
Noise level on „Fascination“	58 dB (A)	
Max. permissible engine power	37 KW per blade	
Maximum revolutions	2600 RPM	
Two bladed Propeller on Rotax 912 S	Max. permissible continuous RPM: 2400	

Two different crankshaft flange hole-circles are provided, a 100 mm one or a 4-inch (101,6 mm) hole circle. This applies to uncertified Rotax 912 UL "2" DCDI engines or certified 912 A "2" models. However, the propeller cannot be used on Mark "3" or "4" engines as these have different crankshaft designs for the hydraulic propeller governor.

INSTALLATION OF THE ROPELLER:

- Bolt the scissors drive with its adapted Linear Actuator to the rear face of the engine gearbox using the four M6 bolts
- Insert the propeller attach bolt bushings into the crankshaft flange from the rear flange side.
- Turn the prop blades into max pitch (coarse) and mark this position on the blade root for later adjustment
- Mount the propeller to the engine. Carefully feed the push pull rod attached to the propeller through the crankshaft.
- Bolt the propeller to the engine flange, using the bolts, nuts, and washers as you find them supplied with the hub. Maximum bolt torque: 25 Nm or 18,4 ft./lbs.
- Connect the push pull rod end with an M6 bolt to the lower part of the actuation lever on the scissors drive. Do not forget to tighten the self- locking nut on the M6 bolt.

NOTE: If you want to increase the distance between engine flange and propeller hub with a spacer, you must increase the push-pull rod's length equal to the same gap as the spacer.

ATTENTION: Threads supplied on the fork end and those of the rod ends are M6 left hand threads. They are to be used ONLY on a RH rotating engine such as the ROTAX and not to be installed on a LH rotating engine one such as the AEROMAXX.

ELECTRIC WIRING: Fabricate the wiring harness per the supplied drawing if the geared electric motor is operated by toggle switch or Constant Speed Regulation "PropCon" (see picture).

ATTENTION: In case of utilizing a PropCon set the selector switch to MAN during these adjustments, otherwise the blades will automatically run in fine pitch if selector switch is in AUTO

ADJUSTING THE "TAKEOFF / LAND" PITCH STOPS:

- After an initial run to warm up the engine, shut down the engine and secure the aircraft to tie-downs in pavement with ropes before advancing to high power settings.
- Turn the self-locking M10 nut on the front of the hub at least one full turn to the left (counterclockwise) to create adequate "deadband" for the high RPM adjustment.
- Start the engine, advance to full power, and decrease RPM to 5200-5300 RPM by actuating the electric motor toggle switch or rotating the hand crank. Shut down the engine with the prop in this position.
- Adjust the LH "Takeoff/Landing" micro switch to the prop in this position.
- Perform a functional check with the engine running at full power. Move the prop to high RPM. As soon as the green LED lights up, RPM should be in the 5200-5300 range. Maximum power should be available during take off but not exceeded i.e. 5500 RPM on the ROTAX 912. Shut down the engine. Adjust the stop nut M10 on the prop hub to a gap of 0,5mm (0.020") between the stop nut and bronze bushing in the hub.

ATTENTION: This nut is provided as an EMERGENCY STOP and should never be used as the primary low pitch stop for the take off or landing position of the blades. Due to the transmission ratio of the scissors drive a tremendous force could be applied and possibly damage the entire system.

ADJUSTING THE SEMI-FEATHER (COARSE) PITCH:

The electric motor must stop PRIOR TO driving through the full blade angle to the Semi-Feather position where it would be forced to stop. Adjust RH micro switch in a way that motor will stop before marked position at the blade root is reached.

FLYING THE ROSPELLER:

The following components provide the propeller control and minimum cockpit instrumentation:

- Engine RPM indicator
- LED's for indication of pitch position
- Spring loaded toggle switch for electric actuation or PropCon or any other constant speed device

ATTENTION: If the toggle switch will be held in one position, for instance at TAKEOFF/LAND, the electrical motor will stop when this position is achieved (LED illuminates).

ATTENTION: Always take off and land with propeller pitch in fine pitch or TAKEOFF/LAND position. If a go around is necessary full power only can be obtained in TAKEOFF/LAND position.

Insure during take off that maximum RPM of the Rotax 912 engine not exceeds 5500 RPM. (5800 RPM for max. 5 min.) This is achieved during basic propeller adjustment (see manual 3).

After leveling off in cruise flight, first reduce engine RPM to your chosen cruise setting with propeller pitch control. Then adjust MAP with throttle.

ROTAX recommends the following combination of RPM and manifold pressure to insure satisfactory engine life and maximum fuel economy:

- 75% power = 5000 engine RPM and 27.2 inches of manifold press.
- 65% power = 4800 engine RPM and 26.5 inches of manifold press.
- 55% power = 4300 engine RPM and 26.3 inches of manifold press.

EMERGENCY PROCEDURE:

During flight monitor regularly pitch and manifold pressure readjust if necessary. Before landing reduce power and select TAKEOFF/LAND position (RPM will increase). If not possible, aircraft will behave as if equipped with a fixed cruise pitch propeller (good cruise performance – worse takeoff). If after transition from climb to cruise a pitch change is not possible, aircraft will behave as if equipped with a fixed climb pitch propeller (good climb – worse cruise).

In case of a collapsing main central bearing the push pull rod will break away and a sudden increase of RPM well over max take off RPM will be noticed, due to the finer pitch achieved by the emergency stop (re-pitching effect). The flight can be continued with lower speed and increased RPM to the next airfield. IF THIS HAPPENS, SWITCH PROPCON IMMEDIATELY TO "MAN".

If unsafe or irregular indications of RPM appear when operating a PropCon, select mode switch from AUTO to MAN. In that case the propeller will behave as if equipped with a standard toggle switch (no more constant speed).

ATTENTION: Always set RPM in a range where engine and propeller work smooth and without the appearance of vibrations. Vibrations always require a maintenance or repair!

Installation Instructions for ROSPELLER 2- and 3Bl. Propellers



Props will be delivered with just blade No. 1 and its root completely assembled and correctly torqued. The others are already pre-adjusted and they only need to be bolted onto the hub.



Insert hexagonal bolt M6 with Loctite 243 (blue) and place the washer between the rod end and the main axle.



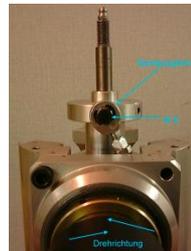
Assemble blades No. 2 and 3 to the corresponding markings on the hub.



If blade angles are not identical – then you have to correct the tiny little play between the rod end and the bolt M6 that causes this difference.



If necessary center the play between the four bolts M8 and the holes in the aluminum root bracket in order to allow contact of the front cap only to the hub, not to the brackets.



Loosen bolt M6 slightly until you are able to move the rod end (almost not noticeable) into the desired direction and tighten it again. Use blade No. 1 as a reference.

ASSEMBLY OF A TWO BLADED OR THREE BLADED ROSPELLER
VARIABLE PITCH PROPELLER**!! PERFORM THIS OPERATION WITH A MAXIMUM OF CARE !!**

1. Do not apply oil or grease at the bolt threads M8 (falsification of torque moment)
2. Torque moment for bolts M8 : 25 Nm = 18,4 ft./lbs., bolts M6: 12 Nm = 10 ft./lbs.
3. Use only torque wrenches of good quality
4. The special (Nordlock) safety washers have to be used as a pair, fine tothing always to the outside, rough tothing facing to rough tothing. They can be reused up to 4 times.
5. The propeller blades are accurately adjusted in their tapered foot receptor and properly tightened by three bolts M8 of 10.9 quality. There are markings at the bearing case and at the hub, put one blade to the corresponding marking at the hub, check carefully the correct position and movement of the blade when you connect the rod end to the inner thrust bearing housing.
6. Install the 4 bolts M8 with Nordlock washers provisionally for the moment, insert the M6 special central bolt using the wave type washers under the rod ends for the two bladed version. For the three bladed version put a standard washer under the rod end and insert the bolt with Loctite 243 (blue).
7. Go ahead in the same way with the other blade (two bladed version) and tighten the rod ends together to the thrust bearing housing with the self locking nut.
8. For the three bladed version go ahead in the same way as described at Nr. 6 with the other blades.
9. Bring the front cap in position, put a drop of machine oil at the bronze bushing and tighten the M6 bolts, using Nordlock washers.
10. Check the movement and free travel of the blades. When everything is O.K., tighten the bolts M8 to the proper torque moment.
11. Bring the self locking nut M10 in position on the front shaft as it is described at the installation instructions for ROSPELLER.
12. Installation of the propeller on your aircraft should be performed as described in the Operating Manual.

ONLY FOR THREE BLADED PROPS WITH COMPOSITE BLADES FROM NEUFORM:

The centrifugal weights may be turned 180° if necessary. The long bolts M8 for the centrifugal weights are facing in flight direction when the propeller is adjusted to take off position (bolt axis should be parallel to the longitudinal propeller axis).

MAINTENANCE INSTRUCTIONS

State all maintenance works in the logbook!

THE HUB:

The hub and the connected propeller blades don't need much care. Regularly put a drop of oil on the bronze bushing in front of hub. The galvanized parts should be prevented from corrosion by a thin film of oil.

Clean the propeller blades with water and a mild detergent. Check for cracks and dents. Once in a while polish the blades surface with a mild abrasive as used with plexiglas. Occasional spilling of grease between the blade and the hub is harmless and not an indication of a defective sealing. It happens during the first running time. Minor dents can be repaired with epoxy resin.

DAILY CHECKS:

Inspect condition of blades and spinner: Cracks, dents. Test the operational range of the actuating system with stopped engine.

50 hrs GREASING: Remove the spinner and with a lever grease gun make five to six strokes of quality multi purpose grease at the grease nipple in front of hub.

100 hrs. MAINTENANCE:

Remove the spinner and inspect all parts on condition, cracks and damage. Check the torque of the M8 hub self lock nuts (25 Nm = 18,4 ft./lbs.) Check tightness of centrifugal weight nuts. Check condition of micro switches and inspect electrical wiring and proper stopping at end stop positions.

All movable parts of the control mechanism should be oiled and the threaded spindle lubricated with grease. When TAKE OFF – LAND position is selected, take care that there is no contact between M10 self lock nut and bronze bushing at front of hub! (A gap of 0,5mm = 0,020 inch should be adjusted). At MAX PITCH make sure the electric motor stops before max. operational range. Tangential play of the scissors lever should be eliminated by carefully turning the hinge bolt clockwise (ATTENTION: There is a thread in the lever – the outer nut acts as a jam-nut only).

MAJOR OVERHAUL:

After 600 hrs. of operation or 6 years (whichever happens first) send in the propeller to the manufacturer for major overhaul. Every wear-affected part of the unit will be replaced.

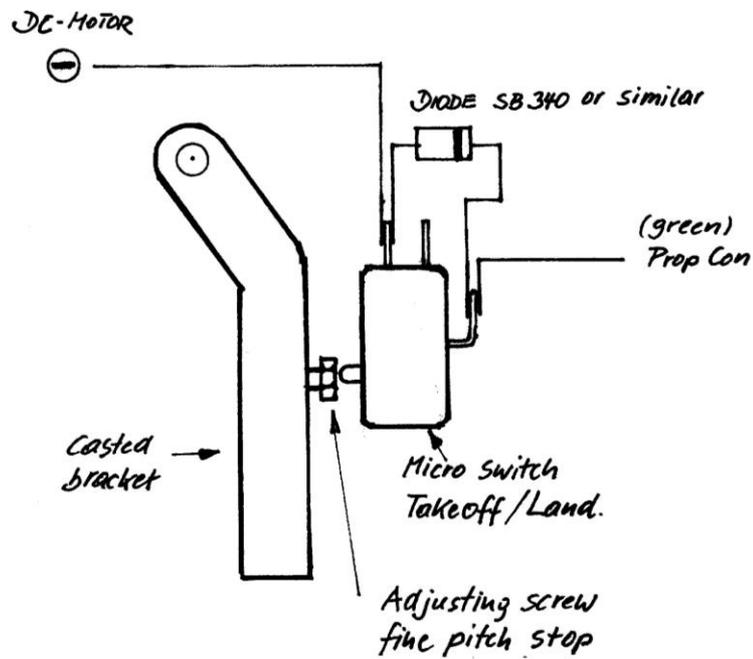
WARRANTY:

Warranty starts on the day of delivery and includes 100 hrs. or 6 months of operating time (whichever happens first). The operation of the propeller is in your own responsibility.

ATTENTION: When installing a new propeller or a repaired one readjust it always as prescribed at ROSPELLER 3

MIKROSCHALTER LINKS FÜR
START / LAND

LH – MICRO SWITCH FOR
TAKEOFF AND LAND



MIKROSCHALTER RECHTS FÜR GRÖSSTEN
BLATTWINKEL ODER SEGELSTELLUNG

RH – MICRO SWITCH FOR MAX PITCH OR
FEATHER

