

# VARIO propeller

## Operation manual

**Hint** Online readers press F5 to see table of contents, if it is not already displayed on the left-hand side of the screen.  
Use full-option smoothing display in Adobe Acrobat™ family for best results (Edit - Preferences - General - Display)  
All schematics and pictures can be zoomed for detailed look (use Adobe Acrobat™ family zoom tool).







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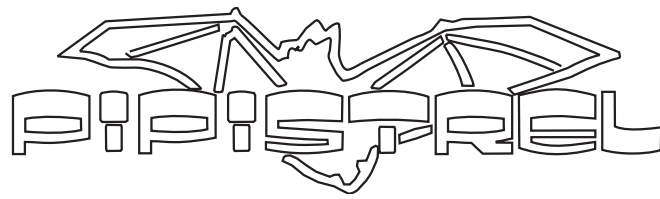
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# ***General***

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# Introduction

This manual contains all information needed for appropriate and safe use of Pipistrel VARIO propeller.

In case of aircraft damage or people injury resulting from disobeying instructions in the manual PIPISTREL d.o.o. denies any responsibility.

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**IT IS MANDATORY TO CAREFULLY STUDY THIS MANUAL PRIOR TO USE  
OF PROPELLER**

## Notes and remarks

Safety definitions used in the manual:

**WARNING!** Disregarding the following instructions leads to severe deterioration of flight safety and hazardous situations, including such resulting in injury and loss of life.

**CAUTION!** Disregarding the following instructions leads to serious deterioration of flight safety.

## Propeller description

The Pipistrel VARIO propeller is a variable pitch propeller for Ultralight and Experimental aircrafts. The VARIO propeller may be used as both, push or pull-type propeller and therefore suits all aircraft construction types.

Propeller pitch may easily be adjusted in flight (see chapter "Handling and maintenance") to achieve maximum efficiency for every flight stage and type of operation.

**WARNING!** The Pipistrel VARIO propeller does not comply with ICAO rules and regulations and is therefore used at one's own responsibility.

**CAUTION!** Always fly in such a manner that you are able to reach at least one landing-out site every moment of the flight. This especially applies to unpowered flight as ignition, engine and/or propeller malfunction may prevent you from restarting the engine and by that resuming normal flight.

# Manufacturing method

The VARIO propeller's outer skin and inside parts are made of composite materials, namely fibre reinforced plastic. Blade's base is made of aluminium and stainless steel tube, which lies within to ensure blade's safe attachment to the propeller base (hub).

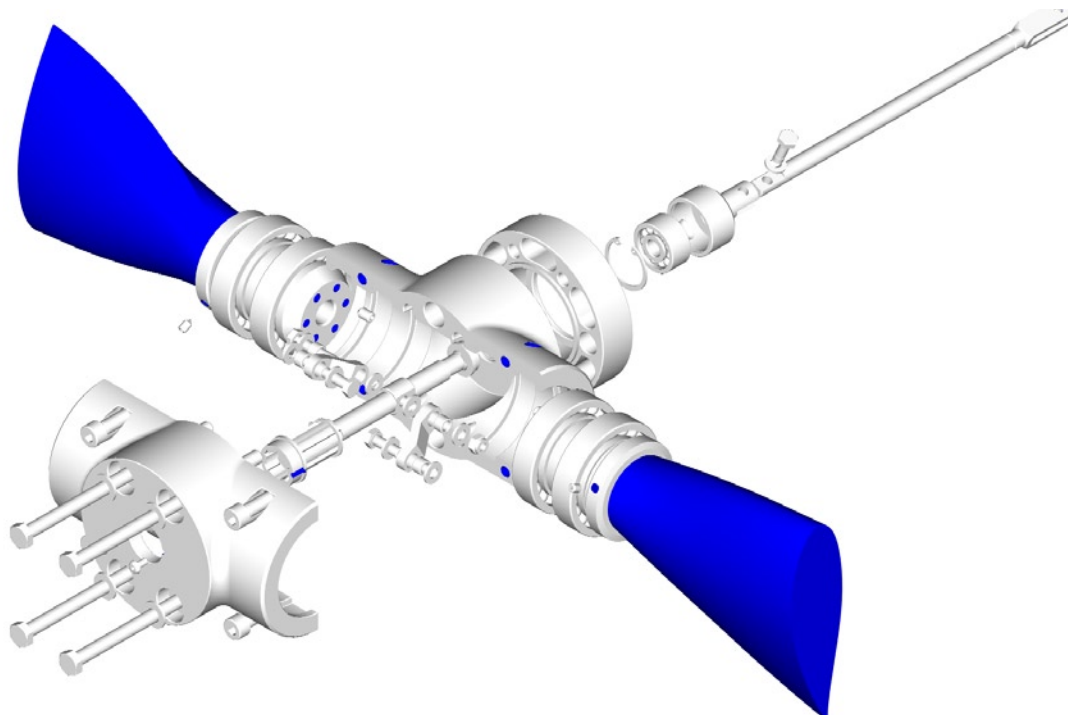
The propeller base (hub) is made of an aluminium alloy and features monolite construction. Inside, all parts are made of metal alloys.

To achieve highest levels of propulsion efficiency combined with lower noise output the manufacturer recommends a spinner to be mounted.

## Technical data and operational limitations

| Specifications                          | VARIO prop.   |
|---|---------------|
| number of blades                        | 2             |
| propeller diameter                      | 1720 mm       |
| propeller pitch at 3/4 of prop. radius  | 25° - 80°     |
| propeller pitch range w/o. feathering   | 25° - 38°     |
| blade width                             | 117 mm        |
| max. safe propeller RPM                 | 2550 RPM      |
| max. safe engine power (permanent load) | 75kW (100 HP) |
| central hole diameter                   | 1" (25,4 mm)  |
| propeller head (hub) bolts & nuts type  | M8            |
| mounting holes' circle diameter         | 75 mm         |

## 3D view of VARIO propeller





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# ***Handling and maintenance***

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**Delivery**

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**Use of VARIO propeller**

**Daily check-up**

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# Introduction

This chapter provides information on handling and maintenance of Pipistrel VARIO propeller.

## Delivery

The VARIO propeller comes preassembled and mounted onto the aircraft you own. Should you desire to mount the VARIO propeller onto an aircraft, which does not ship with VARIO propeller, contact the manufacturer for further details.

**WARNING!** Only the manufacturer and/or authorised service personnel is allowed to assemble or disassemble the propeller unit due to the complexity of operation. Under no circumstances attempt to mount, detach or inspect the internals of the unit yourself!

## Propeller pitch

The propeller pitch is regarded as the angle of attack of propellers profile and cannot be measured anywhere along the propeller chord directly.

For aircrafts that ship equipped with the VARIO propeller check the Pilot and maintenance manual for reference and recommended propeller pitch settings, otherwise you must discover the most suitable propeller pitch setting for your engine, flight stage and type of operation yourself.

## Daily check-up

Perform as follows:

Grab the **propeller blades**. Gently rock them towards the engine and back again to verify there is **no free play**.

**Rotate one blade** and make sure the adjacent blade rotates properly as well. The pitch **deflections must be smooth and undisturbed**.

Check for eventual **greasy spots** on the blades and **wipe** them off using a soft piece of cloth.

Check the **spring** (located at the engine part) for **firmness, proper setting and condition** (not deformed!). **Check also:**

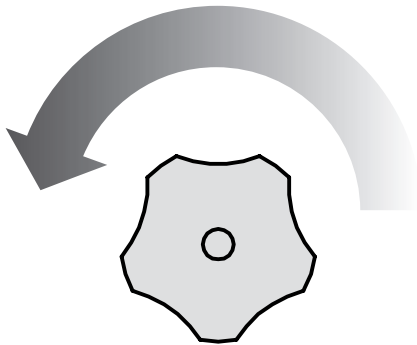
**blades' surface:** clean, no cracks, no paint and/or edge separations

**blade's base** - no damage, cracks, paint and/or edge separations

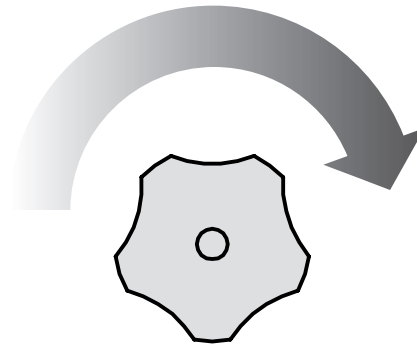
**propeller base (visible part)** - intact

**WARNING!** Should the propeller's status determined during daily check-up not comply with the stated above, flying may result in further damage and/or injury, including loss of life.

## Use of VARIO propeller (setting propeller pitch)



decreasing propeller pitch



increasing propeller pitch

The screw in the middle of the knob indicates propeller pitch status. The screw is deep inside the knob when at minimum pitch and slides out as propeller pitch is increased.

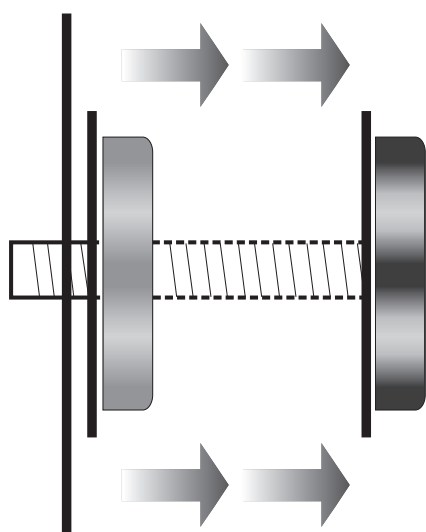
When taking-off, make sure propeller is set to minimum pitch to ensure maximum engine efficiency. To set the propeller to minimum pitch, rotate the propeller pitch knob located on the instrument panel counter clockwise until it is loose. Prior to taking-off, engine and propeller ground check must be performed. At full power and pitch at minimum, RPM must not exceed designated limits. Verify also, that the RPM drop caused by setting the pitch to maximum (not feathered!) does not exceed 400 RPM.

**CAUTION!** Verify RPM and engine parameters multiple times.

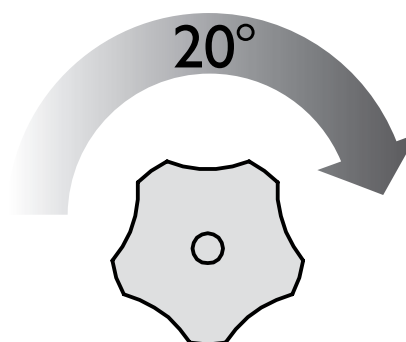
If propeller pitch is increased (rotate knob clockwise), engine's RPM will drop. Do not, under any circumstances, allow engine underrotation. Should this occur, immediately decrease prop. pitch to regain proper engine cruise parameters.

**WARNING!** Both engine under- and overrotation may cause significant damage to the engine and propeller.

## Propeller feathering



1. propeller feathering



2. secure feathered position

**WARNING!** Feather propeller only after the engine has stopped and at minimum pitch.

To feather the propeller, first reduce airspeed to 90 km/h, then pull the propeller pitch knob's metal base backwards fully and then rotate it 20° clockwise. A propeller pitch of approximately 70° is reached by doing so. To feather the propeller fully (90°), rotate the knob clockwise a couple of times until it stops.

## Propeller unfeathering

To unfeather the propeller, first reduce airspeed to 90 km/h. Now pull the propeller pitch knob's metal base slightly, then rotate it counter clockwise and gently push it all the way to the instrument panel.

**WARNING!** Do not, under any circumstances, attempt to restart the engine while the propeller is feathered. This would most definitely result in engine, propeller and/or aircraft's structural

## Avoiding damage

On ground, keep your propeller intact by putting the protection cloth onto the blades. Also, try to keep your propeller off the sun if possible, for eventual damage caused by UV radiation.

When starting-up the engine, always make sure the space around the propeller is clear.

Do not ever attempt to land on a runway covered by deep water patches for that can result in undercarriage and propeller damage.

Do not ever attempt to taxi through dense high grass for this causes propeller damage.

Be extremely careful when putting the aircraft into or out of the hangar not to damage the blades.

Do not ever attempt to move around your Ultralight aircraft by pushing or pulling it at the propeller.

# Overhauls

Overhauls must be done by the manufacturer once every 1000 flight hours.

## Maximum life span of the propeller

Until present time, no boundaries of VARIO propeller's life span are known.

# Repairs

Small damage (cracks) in the paint layer of the blades may be repaired by the owner him/herself using dabbing lacquer.

Should the blades be damaged during all sorts of transportation and/or hangaring, the individual blades can be replaced.

All damage which occurs during engine operation requires for the entire power plant and propeller to be verified for structural damage by authorised service personnel.

New, replacement blades are available at a bargain price, therefore the manufacturer recommends blade replacement in case of extensive damage. However, should you desire to repair the damage yourself from whatever reason, you should ONLY use "Schoiffler" epoxy hardener of 38% durability together with "Interglas" fiber roving of 180 and 280 g/m<sup>2</sup> density.

**WARNING!** After every repair job, the propeller must be re-balanced to prevent potentially lethal vibrations.

**WARNING!** For all repair jobs conducted by owners themselves, manufacturer denies any responsibility.

## Paint jobs

Should you desire to repaint your propeller, please consult with the manufacturer prior to painting.

# Ground handling

Use pure water and a soft piece of cloth to clean the blades. If you are unable to remove certain spots, consider using mild detergents. Afterwards, rinse the entire surface thoroughly.

To protect the surfaces from the environmental contaminants, use best affordable car wax.

**CAUTION!** Do not, under any circumstances, attempt to use rough cloth to remove durable stains. This results in scratching the surface and by that degrades propulsion performance greatly.

Storing the aircraft inside closed space, make sure there is not any dust accumulating on the blades. Clean your propeller regularly, preferably before and after each flight to maintain best propulsion performance.



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