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Manual for Propellertype H30V

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1 Description

HELIX propellers have been built since 1990 using composite materials such as carbon fibre, epoxy-resin, epoxy-resin foam and aluminium.

This combination of materials provides:

- High Thrust.
- Low Noise.
- Durability.

The pitch of the propeller can be adjusted prior to installation making it suitable for many engine configurations.

1.1 Blades

The propeller blades are made from several layers of woven carbon fibre, reinforced with different sorts of carbon fibre tapes. They are bonded with epoxy resin foam reinforced by glass fibre. This method of construction ensures the load is distributed throughout the whole of the blade and reduces vibration. The root of the blade is reinforced by an aluminium ring.

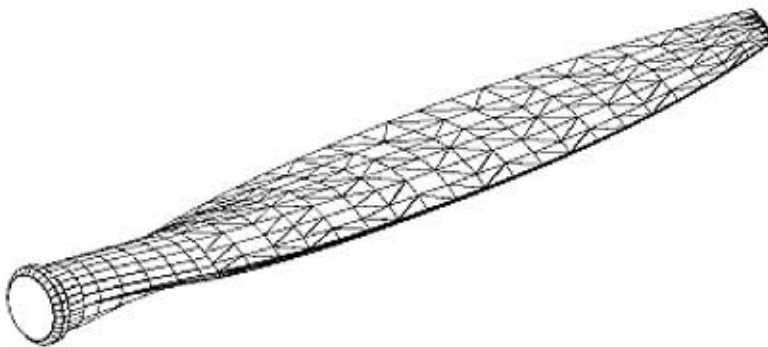


Figure 1: Propellerblade H30V

1.2 Hub

The hub is milled from an aluminium block using a CNC process. This allows the weight of the hub to be minimised whilst the cylindrical design reduces aerodynamic drag. The hub has a hard anodised finish providing good corrosion resistance. Spacer rings are available to enable the propeller to be fitted to a great number of installations.

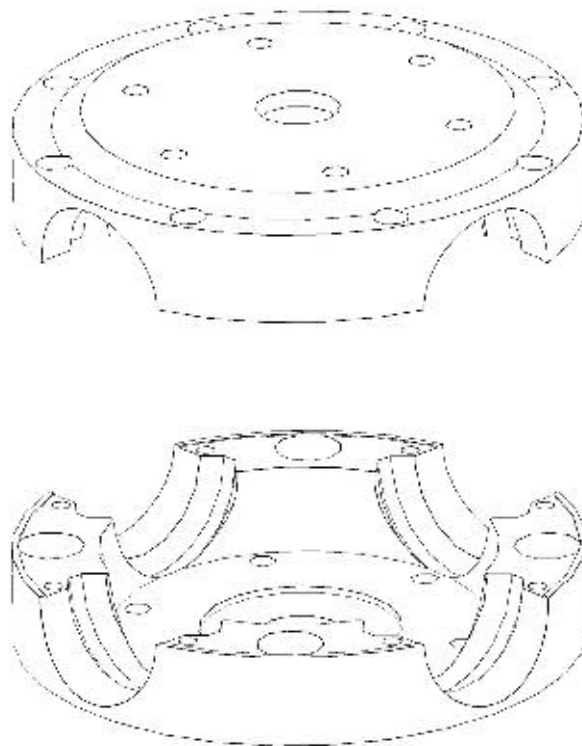


Figure 2: Hub

2 Operating Limitations

HELIX Ultralight Propellers are constructed for giving thrust to aircrafts with an engine output of between 10 and 85 kW using 2-stroke, 4-stroke, wankel- oder electric engine.

The operating limitations for the here described propellertypes as 2-, 3- and 4-Blade-Version in clockwise and anti-clockwise are for

- Typ H30V 1,00m
 - Typ H30V 1,10m
 - Typ H30V 1,25m
-
- Maximum propeller-rpm: 4300 U/min
 - Maximum engine power: 25 kW

For Propellers of the following types it is valid:

- Typ H30V 1,30m
 - Typ H30V 1,40m
 - Typ H30V 1,60m
-
- Maximum propeller-rpm: 3000 U/min
 - Maximum engine power: 25 kW

Warning:

If the maximum operating values are exceeded the propeller, engine or gearbox may be damaged. If the propeller becomes damaged its balance will be affected which can cause failure of the engine mountings.

Before starting the engine, the pilot must ensure that the area around the propeller is free from debris to avoid any impacts on the blades by foreign objects.

The engine can only be hand started by qualified personnel.

3 Installation

- Mount the blades in one half of the hub ensuring that the numbers on the blades match the position numbers on the hub.
- Fit the other half of the hub ensuring that the letters stamped into the hub line up.
- Loosly tighten the external M6 bolts securing the two halves of the hub together.
- Attach the propeller to the aircraft using the inner M6 bolts. Loosely tighten the bolts.
- Now the propeller is ready for adjustment. It is strongly recommended to do this on the aircraft because it achieves the highest precision.

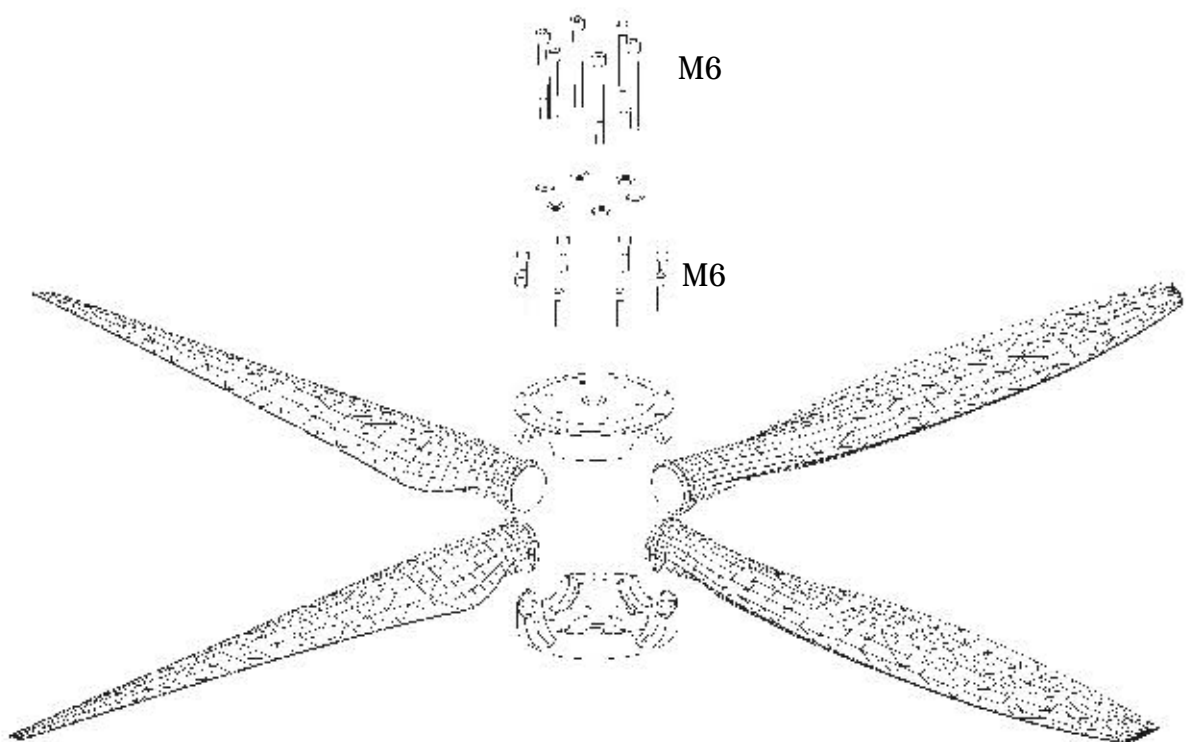


Figure 3: Composing of the Propeller

4 Setting Up

Adjustment occurs via an optional clinometer. The appropriate adjusting angle is recommended by your dealer. This information does not substitute for thorough control via revolution counter. During static test a maximum engine speed has to be attained, which should be about 10% below rated speed. Only measurements during the flight can result in a final adjustment after corrections to the adjusting angle. The adjustment has to be made by an water-level. Your dealer advises the optional setting angle.

1. Turn the propellerblade into horizontal position.

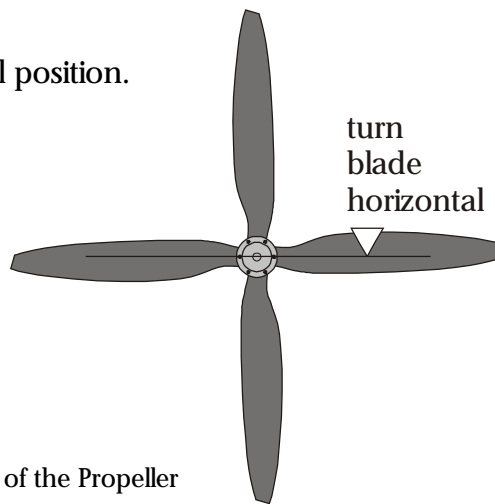


Figure 4: Align of the Propeller

2. The following alternatives can be chosen for setting up:
 - A) The flange and the aircraft respectively has to be aligned horizontal and the wanted angle adjusted.
 - B) The flange and the aircraft respectively has not to be aligned horizontal. Now the angle between the flange (aircraft) and the horizontal has to be allow for the setting up.

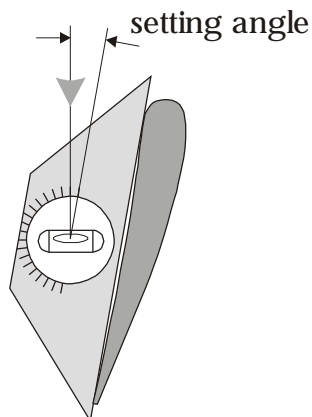


Figure 5: Adjust of the angle at the gauge

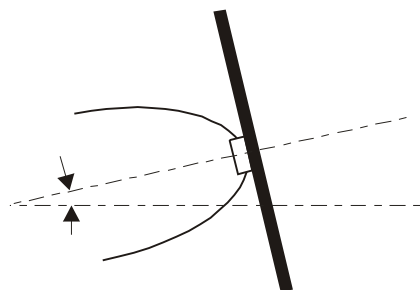


Figure 6: Motor-flange angel refering to the horizontal

- 3.
4. The pitch of the propeller blades is adjusted by means of a template located 5 cm from the blade tip.

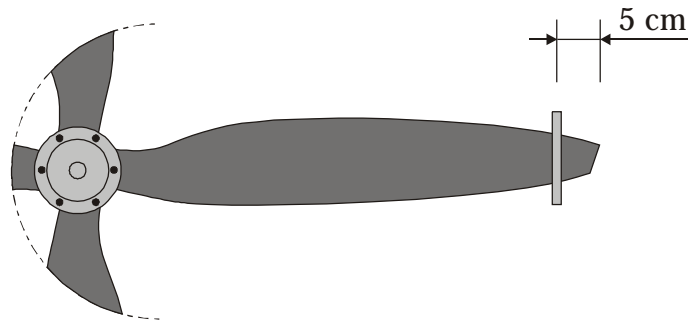


Figure 7: How to put the gauge on the blade

5. After loosen the M6-screws turn the blade to central position of the spirit level and tighten the screws loosely hand-screwed once again. Strongly bending to front and back simplifies the turning of the blade.
6. Repeat the adjusting procedure on all blades.
7. Controll the adjustment of all blades again. Inexactness more than a half degree causes a to heavy aerodynamic unbalance.
8. Tighten the inner M6 bolt to a torque of 12 Nm cross-over.
9. Tighten the external M6 bolt to a torque of 12 Nm cross-over.
10. As the screws interact repeat these both procedures.

After controlling the maximum ground engine speed the interim setting up is done for a test flight. Please note that possibly not the complete engine power is available or otherwise the engine can be overwind during faster flight.

Ensuring that the aircraft is restrained against forward motion, start the engine. Once the engine has reached its normal operating temperature, slowly open the throttle up to its full value. Observe the maximum engine r.p.m.. The maximum engine r.p.m. stated by the manufacturer should not be exceeded. With the aircraft at rest the engine r.p.m. shouldnot exceed 95% of the manufacturers recommended maximum.

After the setting up the propeller-screws have to be retightened again after three operating hours and secured with Loctite and nut-lock-wire respectively. Through-holes in steel-flanges could be secured with self-locking nuts.

5 Pre-Flight Checks

Before every flight the following has to be controlled:

- Check blades for security of mountings.
- Blades cannot be turned by hand.
- Check engine / Gearbox bearings for excessive play.
- Blades are not damaged and have no cracks
- Hub without cracks
- Check bolts for tightness and security of wire locking.
- Check clearance between propeller-blade tips and propeller guard.

Simply slight resin-flakings by debris can be accepted, but should be repaired shortly. The repair can be done with economical application. If the check is not satisfactorily the handling has to be stopped and the propeller repaired.

Warning:

A propeller failure has more serious consequences than an engine failure! Due to damaged blades an unbalance can arise, which can cause the motor to be torn out of its bracing, thereby changing the proportions of the centre of gravity in such a way that a stable flight attitude cannot be maintained.

6 Maintenance

The propeller should be cleaned at the end of each days operation. This prevents the built up of dried grass and insects etc. on the blades. Cleaning of the blades should be carried out with a soft sponge using a weak detergent solution.

Spaced, the propeller should be polished professionally. It is recommended that this is carried out by a respected coachbuilder or similar facility.

7 Guarantee

HELIX - Kunststofftechnik guarantees the propeller for six months from the date of purchase. The guarantee covers material defects but does not cover subsequent losses. The operator flying with this propeller does so at his / her own risk.

Any claim will only be considered if the propeller has been installed and used in accordance with this manual.