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Manual
for propeller type
H50F

propeller type:

propeller Serial No.:

Date of Sale:

Seal and Signature of Manufacturer:

Index

1 List of Modifications

Version (Date)	Chapter	Description	Name
Version 04/2008		First Edition	Kubanek
28.04.2010	1 List of Modifications 2 Maintenance → new 7 Maintenance	Insert the Chapter "List of Modifications" Check up Operating hours, maxium running periods	TKU
28.05.2010	2 Description 3 Specification of the propeller types 5 Installation	paragraph table paragraph	TKU
20.05.2011	7 Maintenance	paragraph	TKU
02.03.2012	5 Installation	tork	TKU
18.04.2012	5 Installation	screw retaining device	TKU
23.05.2012	5 Installation 7 Maintenance	Serial number, type label, front plate, screw retaining device, position number	TKU
25.09.2012	4 Operating Limitations and Safety Advice	Minimum thrust generation	TKU
13.05.2014	5 Installation	New pictures blade position	MA
21.01.2015	3 Specification of the propeller types	Revision	MA
16.01.2015	7 Maintenance	Specific time between overhaul	RKS

Description

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

This unique combination of materials provides:

- High Thrust
- Low Noise
- Durability

Figure 1: 2-, 3- and 4-blade propeller of type H50F

The propeller blades are made from several layers of woven glass and carbon fibre, reinforced with different sorts of glass and carbon fibre tapes. These are connected with a glass fibre reinforced expanding epoxy resin in “wet in wet procedure“ with each other. The internal power transmission decisive for the firmness between the top and underside of the sheet is therefore over the entire surface. From this construction method a good vibration damping as well as insensitiveness results with damages by external effect.

The leading edges are protected normally by a PU-adhesive-tape against water effect. Optionally a metallic edge protection of nickel cobalt can be applied for the protection.

Also optionally a lightweight construction with 3-D distance fabric is used instead of the construction method with expanding epoxy resin. A high stiffness and firmness guarantees this with at the same time low weight.

3 Specification of the propeller types

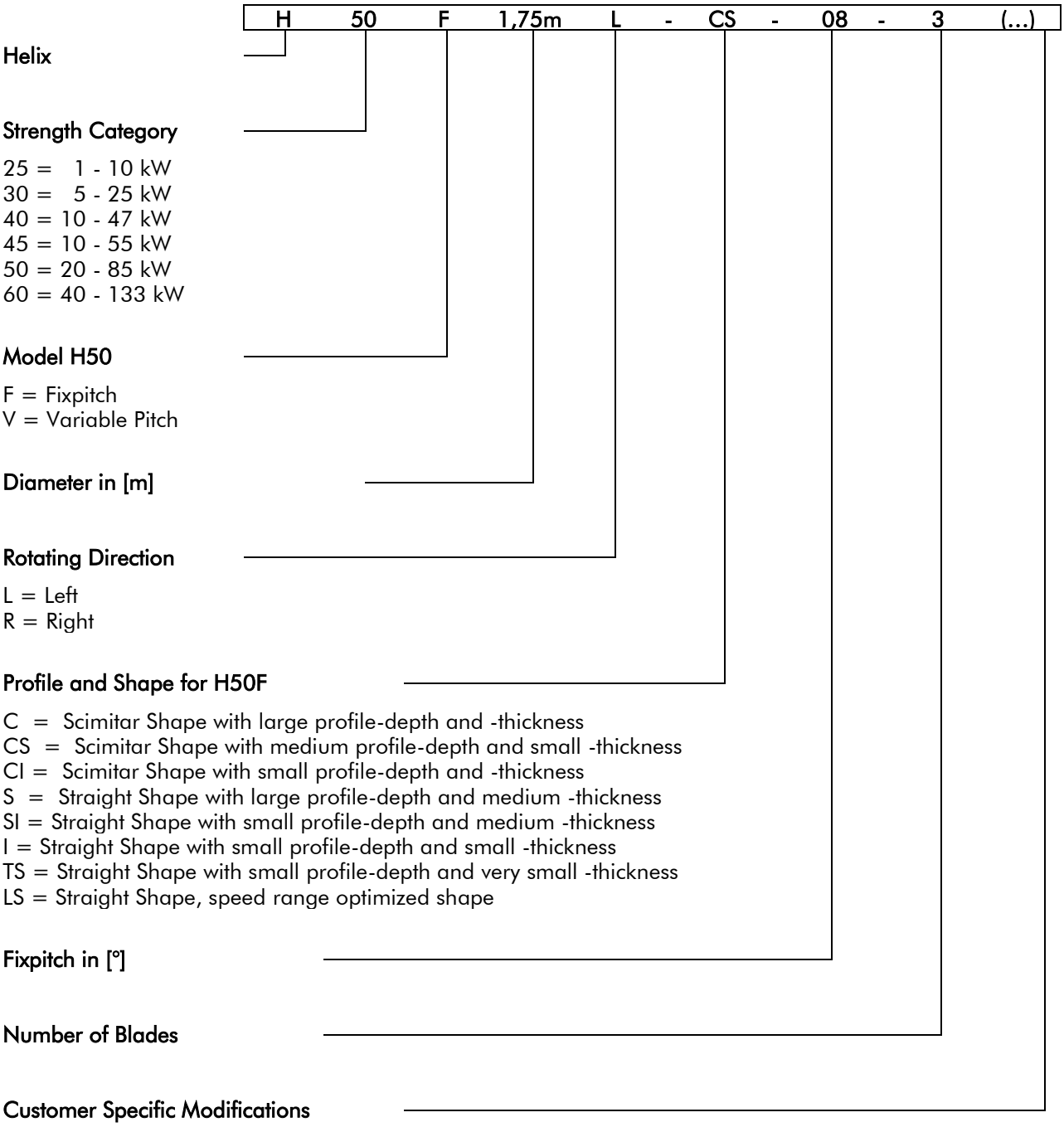


Table 1: Specification of the Propeller Type, Structure of the Helix Propeller Name

4 Operating Limitations and Safety Advice

HELIX propellers are constructed for giving thrust to aircrafts with an engine output of between 20 and 85 kW using 2-stroke, 4-stroke, rotary- or electric engines.

The operating limitations for the here described propeller types of **H50F** as 2-, 3- and 4-blade-Version in clockwise and anti-clockwise rotation are for diameters from 1,45m to 2,20m.

There is to distinguish:

For propeller of airfoil-series **C**, **N**, and **S**:

- Maximum propeller-rpm: **2.500 rpm**
- Maximum engine power: **85 kW**

For propeller of airfoil-series **CI**, **CS**, **LS**, **TS** and **SI**:

- Maximum propeller-rpm: **3.400 rpm**
- Maximum engine power: **85 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 clear to avoid any risk of accident by fly-away objects. The entire area of the rotation plane is generally avoided because of the risk of accidents by radially ejected parts .

The engine can only be hand started by qualified personnel. The hard edges of the propeller can cause severe injury if the engine starts too fast as the blades beat back.

5 Installation

2-blade propeller

The blades are composed according to Figure 2.

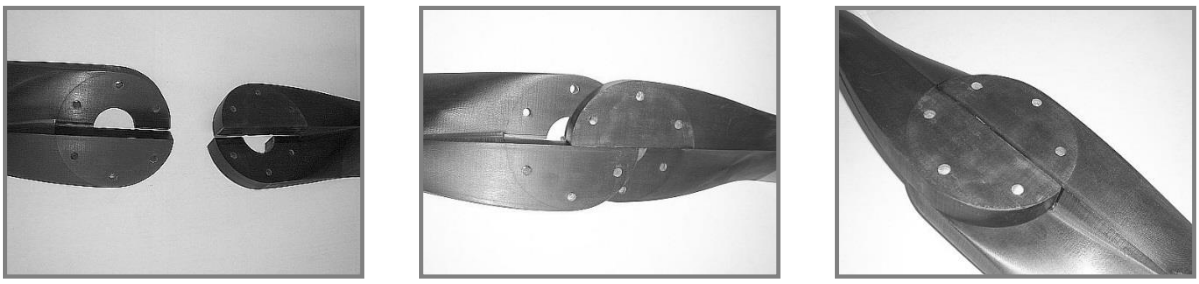


Figure 2: Mounting of the 2-blade propeller

3-blade and 4-blade propeller

The blades have to be laid on a big table. Positioning of the blades has to be done in the way, that the milling marks of blade complements conform (figure 3).

Figure 3: Blade positioning by milling marks.

Then they are put together as shown in picture 4 and 5.

Figure 4: Mounting of the 3-blade propeller (here without position numbers)

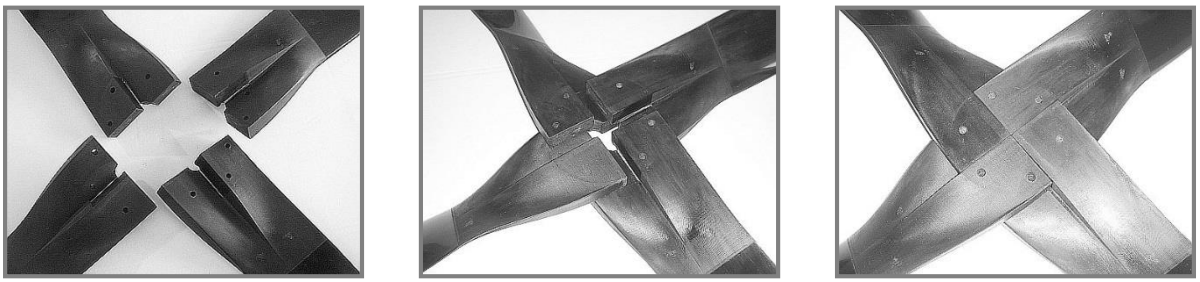
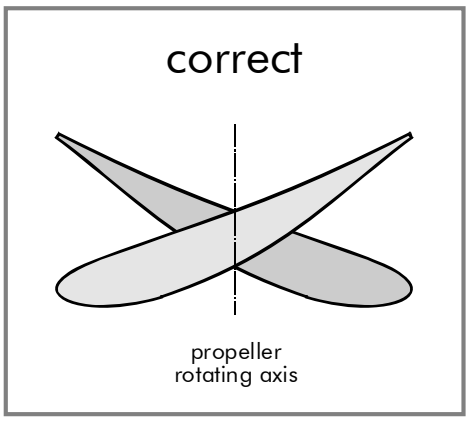
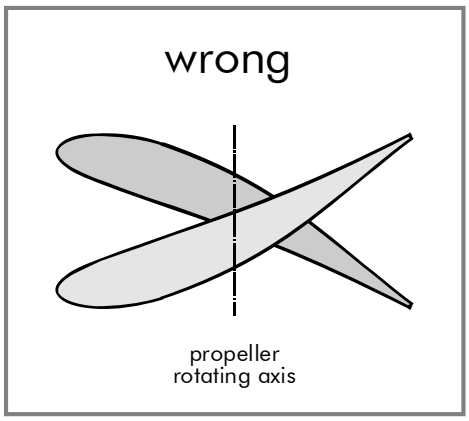


Figure 5: Mounting of the 4-blade propeller (here without position numbers)

Attention: **At this point it has to be checked that the tailing edge of all blades is in right position in turning direction – backside aligned.** (Sketches 1 and 2)



Sketch 1: Correct position of the propeller blades



Sketch 2: Wrong position of the propeller blades

On the propeller a front plate has to be mounted with a least thickness of 5 mm. All screws have to be used.

Figure 6: Front plate with screws

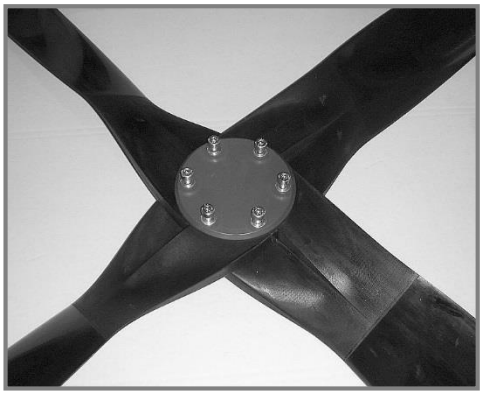


Figure 7: 4-blade propeller with mounted front plate

The front plate is put on the propeller and the screws are inserted successively.

Finally, the propeller is to be mounted onto the propeller flange of the engine.

Screw dimension and tightening torque are to be taken from the manual of the airplane manufacturer and to check.

The nominal tightening torque of retaining screws

- M8 – 8.8 amounts 23 Nm in suitable nuts

The Propeller can be certainly pursued with a tightening torque in the range of

- 19 Nm to 25 Nm for M8 – 8.8 screws

However, the nominal tightening torque for your application is influenced substantially by the used screws and its flange thread.

For the application in aluminium components 20 Nm are to be intended for M8 – 8.8 screws.

The observance of the selected tightening torque is to be guaranteed with suitable tools.

Generally, the following alternatives available to retain the screws:

- the preferred solution is to use a wire as bolt retaining device
- for propeller flanges with through holes self locking nuts can be used
- if both alternatives are not possible e.g. Loctite 243 can be used instead
- With engine flanges with through-hole threads no additional nut may be mounted at the screw end.

After 3 working hours the mounting of the propeller has to be checked and the screws retightened.

6 Pre-Flight Checks

Before every flight the following has to be checked:

- No tolerance of the propeller tips
- All blades are fixed
- blades are not damaged and have no cracks
- Check bolts for tightness
- Wire locking's are in correct state

Slight resin-flaking's by debris can be accepted, but should be repaired soon. This can be achieved by sparingly applying our special resin. If these checks are not satisfactory the operation has to be suspended immediately, and the propeller repaired.

Warning:

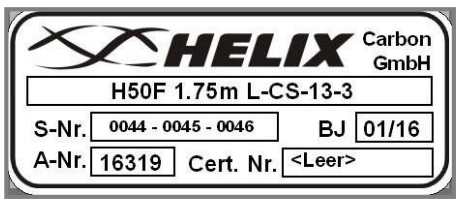
A propeller failure has more serious consequences than an engine failure! Due to damaged blades an unbalance can arise, which can cause the motor to be torn out of its bracing, thereby changing the proportions of the centre of gravity in such a way that a stable flight attitude cannot be maintained.

7 Maintenance

After flight operation the propeller is to be cleaned. This prevents the build up of dried grass, insects etc. on the blades.

Cleaning of the blades should be carried out with a soft sponge using a weak detergent solution. If it seems necessary, the blade surface can be polished from time to time with car-polish paste.

If the position numbers on the blades do not exist anymore, a guide for precise positioning of the individual blades may be obtained from info@helix-propeller.de.



A specific time between overhaul for our ultralight propeller is not required from our side. To continue the operation with no limitation with a positive result at annual inspection. Current and future technical notice will be published on our web site: http: /helix-propeller.de under Documentation / Technical releases.

Certificated propellers are identified in the type label with a suitable Cert. Number. These propeller are to be overtaken after 600 operating hours with the manufacturer. The maximum term amounts to 900 operating hours.

8 Warranty

HELIX Carbon GmbH provides a warranty for two years from the date of purchase (according to European law). This warranty covers material defects but does not cover subsequent losses.