

OPERATION AND INSTALLATION MANUAL

FOR PROPELLER

Type: **LAK-P4-90**

Serial Number: _____

ATTENTION: This manual contains important safety and maintenance information concerning your propeller. It must remain with the propeller at time of resale.

Warning:

People who fly should recognize that various types of risks are involved, and they should take all precautions to minimize them, since they cannot be eliminated entirely.

The propeller is a vital component of the aircraft. A mechanical failure could cause a forced landing or create vibrations sufficiently severe to damage the aircraft.

Propellers are subject to constant vibration stresses from the engine and air stream, which are added to high bending and centrifugal stresses.

Before a propeller was certified as being safe to operate on an airplane, an adequate margin of safety was demonstrated.

It is essential that the propeller is properly maintained according to the recommended service procedures and a close watch must be exercised to detect impending problems before they become serious. Unusual vibration should be investigated and fixed, as it could be a warning that something is going wrong.

We urge you to read this Operation and Installation Manual thoroughly. It contains important information about your propeller. The propeller is one of the most critical parts having vital importance to the flight safety. It therefore deserves the care and maintenance called for in this Manual. Please give it your attention, especially the section dealing with inspections and checks.

Record of revisions

Any revision of the present manual must be recorded in the following table.

Rev. No	Affected section	Affected pages	Date of Issue	Approval	Date of approval	Date of Insertion	Signature

List of Effective Pages

Page	Date of Issue
1	Cover page
2	2004.05.28
3	2004.05.28
4	2004.05.28
5	2004.05.28
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8	2004.05.28

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1. General

The fixed pitch composite propeller LAK-P4-90 is built to the highest quality standards from modern composite materials.

Technical data and limitations of the propeller:

Maximum power on a propeller shaft:	21 kW;
Maximum rotational speed:	6500 RPM;
Propeller mass including propeller metal plates and attaching bolts:	0,950 kg;
Diameter of the propeller:	d = 900 mm;
Total service time:	200 hours;
Service time between main overhauls:	50 hours;
Type of propeller:	tractor;
Sense of rotation:	anticlockwise looking at direction of flight.
Operating conditions	the propeller can be operated in any normal environment conditions except hail, sand storm or similar

2. Model designation

Propeller model designation is the following:

LAK - P4 - 90
(1) (2) (3)

where:

- (1) manufacturer: JSC "Sportinē Aviācija ir Ko";
- (2) model;
- (3) propeller diameter in cm.

Propeller serial-number is identified as follows:

XXX YYYY

where:

- XXX - serial number of the propeller;
- YYYY - year of manufacture.

Propeller identification placard is located on the propeller metal plate (glued to the center part of the propeller) and additionally on a front face of the blade to ease inspection work.

Warning: *Do not use your propeller as a handle to move the airplane! The propeller is one of the most important parts of your airplane!*

3. Construction

3.1 Certification standards

Propeller LAK - P4 - 90 described herein is certified according to CS 22 Subpart J.

3.2 Construction Material

Propeller is made of GFC and CFC. It is made in moulds, which were manufactured using modern CNC technology. This made possible to have very accurate propeller geometry.

The composite propeller runs much smoother. No placards for RPM are needed because of the high damping characteristics of the plastic.

3.3 Surface finish

Carefully tested lacquer is used to protect the composite body against moisture and erosion. The special lacquer is resistant against fuel, oil and other chemical products. This type of lacquer has also an excellent flexibility. Tips can be painted red as a safety mark.

4. Installation

4.1 Check propeller type and condition. Clean propeller and let it dry.

4.2 Clean engine flange and let it dry. Oil on any of the surfaces must be avoided. Check bolts for cracks, thread and corrosion. Replace if needed.

4.3 Place parting ring p.1 (see Fig.1), propeller p.2 and front plate p.3 on engine flange. Install propeller bolts p.4. Do not push the propeller to the flange with high force. Cracks may occur. Check the reason of non-fitting if such occurs. If propeller still does not fit, contact manufacture.

4.4 Tighten propeller bolts p.4 (see Fig.1) uniformly and crosswise.

4.5 Recommended torque moment for the propeller bolts is - 20 ± 1 N*m.

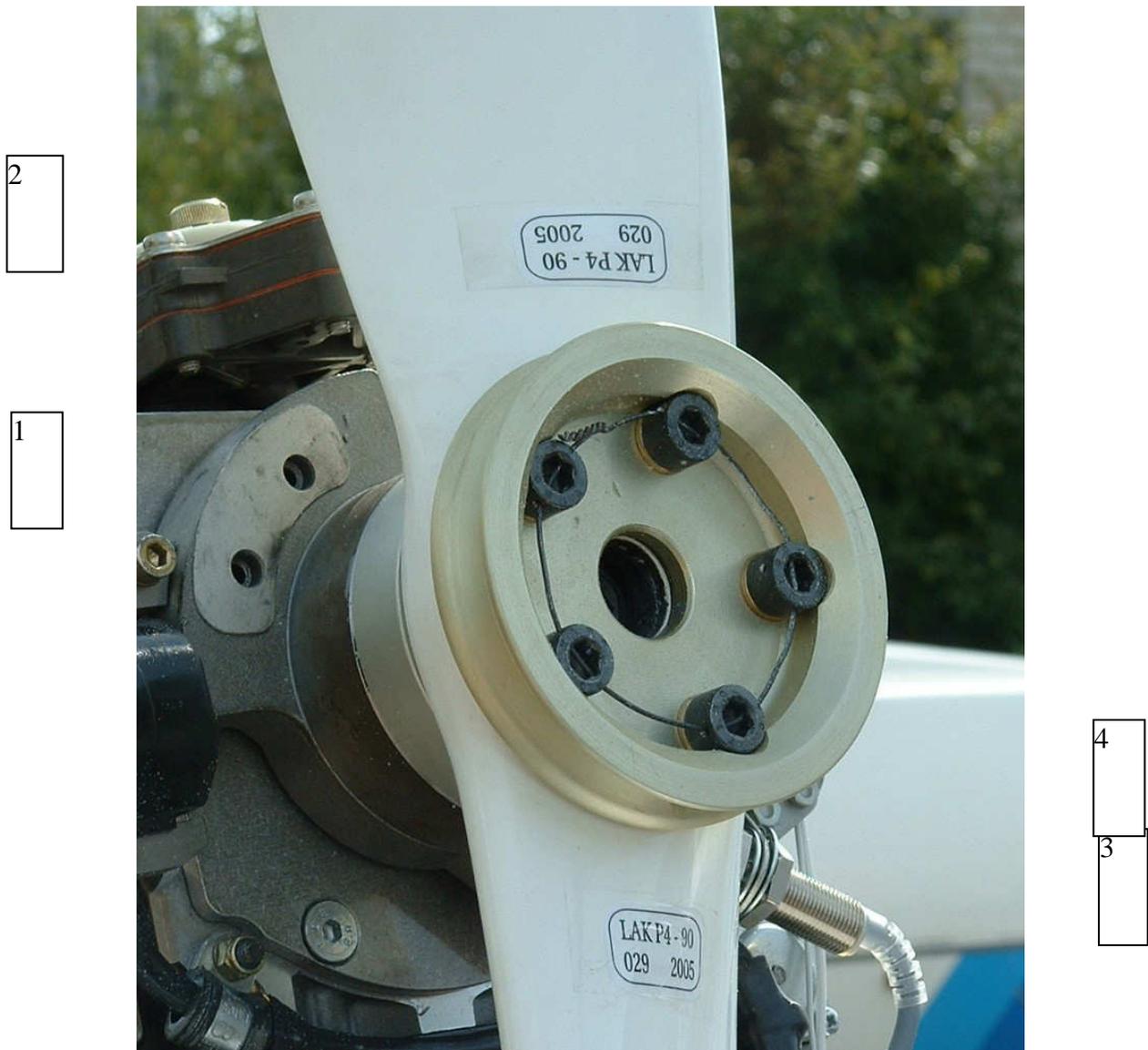


Fig.1 Propeller mounting on the engine flange

Attention: *Torque value is for dry and cleaned threads only! Torque bolts crosswise!*

4.6 Check that propeller fits to the flange or hub. No space allowed between parts.

4.7 Check torque moment after the first flight and every 25 hours and once a year.

4.8 Check blade track at the blade tip on the trailing edge. Max. permissible is ± 3 mm. If propeller is not within the limits, remove it, check for reason and mating surfaces.

Turn propeller on the flange. Different torque moments up to 2 N*m are permissible. Does this procedure not change the situation - contact the manufacture.

Warning: *Do not use any shimming material or paper to correct the track. The torque (horse power) is mainly transferred by friction!*

4.9 Removal - refer to 4.1 through 4.5 but in reverse order. If propeller fits strong, soft force only may be used to remove it from the flange. In any case, if hard tools are used, the propeller will be damaged. Use only hand force.

4.10 Protect engine flange against corrosion.

5. Inspection

5.1 Every time you go to fly, thoroughly perform preflight inspection:

- take a look at the entire propeller inspecting for damages, leading and trailing edges for possible splitting or de-lamination.
- composite propeller blades are always as good as they look. If the total blade surface show no cracks, no reconditioning or overhaul will be necessary. Pay special attention to the root part of the blade, leading and trailing edges.
- inspect central part of the propeller for possible cracks or deformations. No cracks or deformations are allowed. If such are found, remove propeller from the airplane and contact the manufacture.

5.2 The 25 hours inspection (periodically to be done up to the annual inspection):

- clean the propeller with any car wash solution or equivalent.
- make the normal preflight inspection, but especially pay attention to the center part of the propeller, leading and trailing edges of the blades for cracks and de-laminations and the lacquer surface for condition.
- inspect blades for stone damages, mark them.
- check torque moments of the propeller mounting bolts.
- check track of the propeller blades tip.

5.3 Annual inspection or inspection after up to 15 % over-speed of the rated maximum rotational speed RPM:

- inspect propeller as per instructions given under 5.2. If any crack is found, the propeller must be removed from service immediately. Send propeller to the manufacture for inspection.

5.4 Over-speed: Up to 15 % above the rated maximum rotational speed RPM inspection per 5.2 and 5.3 is required. At more than 15 % over-speed the propeller should be sent to the factory for inspection.

5.5 Service time between main overhauls is 50 flight hours. Main overhaul can be performed by propeller manufacture only.

6. Possible damages and allowables

6.1 No structural cracks or de-laminations of composite structure are allowed for the propeller.

6.2 Small cracks up to 10 mm of length in a lacquer are allowed. Make sure cracks are in a lacquer layer only and not going into the composite structure. Fine cracks in the lacquer surface across the blade axis are indications of bending vibrations. Such cracks mostly occur in the outer part of the blade. No sudden blade failure can occur due to these cracks. If such cracks do occur, the factory should be consulted regarding airworthiness, if possible together with a photo and information about operating time.

6.3 The erosion occurs due to the peripheral speed of the blade and is normal. However, always take care that the erosion never becomes so deep that FRP-coat is damaged and there is a possibility that moisture may enter into the blade body. In this case the blade must be repaired/overhauled immediately.

6.4 Stone damages. If stone damages are visible, mark them and check them periodically. Maximum size of stone damages permitted for operation is 2x4 mm large and 0,7 mm deep. Maximum number of damages allowed is one damage per 4 cm². If bigger or more damages exist on a blade, send propeller to manufacture for inspection and overhaul.

6.5 Cracks or deformations in a center part of the propeller are not allowed. If such occurs, send propeller back to manufacture for the overhaul.

7. Maintenance and repair

Note: *Serious cracks which originate from the inside of the blade, are extending through the lacquer and so are visible from outside. These cracks are radial cracks or tangential cracks. Fine cracks in the lacquer as described above, are considered of serious character, although they usually start at first in the lacquer and not in the composite structure.*

7.1 Clean propeller if necessary with any car wash solution or equivalent, but at least every 25 hours.

7.2 Normal small stone nicks are unimportant as long as there is not obvious structural damage. Scratches and nicks should be filled and protected during routine maintenance with a coating of water resistant lacquer. Allowables for damages are given in a Paragraph 6 of this document.

7.3 Broken tips and damaged blades are not reparable and have to be replaced. Small damages on the trailing edge can be repaired by manufacture.

8. Shipping and storage

8.1 No propeller should be stored by standing on the tips. If storage is required, it is recommended to use the original packing. If original packaging is not available, store it in a horizontal position on a soft padding supporting at about middle of blade or center section of the propeller.

In cold weather the propeller should not be stored close to heat source or in rooms with extreme changes in temperature.

8.2 Careful packing is the best protection against damage during shipment. Therefore the propeller is shipped from the factory in a special cardboard container. This container may be used for reshipment for overhaul. The blade tips and trailing edge should be sufficiently protected. If a wooden case is used for shipment, the propeller should be fastened through the central bore or the propeller bolts holes.