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## **USER MANUAL UM – 01 EN**

### **AIRCRAFT PROPELLER Type: V-218B**

**Serial No:**





# USER MANUAL

## V-218B Aircraft propeller

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### 1. List of Valid Pages

Page	Revision	Date of issue	Page	Revision	Date of issue
1	0	25.2.2009	11	2	15.10.2015
2	2	15.10.2015	12	1	20.2.2014
3	3	19.02.2016	13	1	20.2.2014
4	1	20.2.2014	14	1	20.2.2014
5	1	20.2.2014	15	1	20.2.2014
6	3	19.02.2016	16		
7	1	20.2.2014	17		
8	3	19.02.2016	18		
9	2	15.10.2015	19		
10	2	15.10.2015	20		

### 2. List of Revised Pages

Changes or revisions to this manual may only be made by the propeller manufacturer.

Any change should be recorded in the table below.

New or revised text on a revised page will be marked by a black vertical line on the right side of the page. Date and number of the revision will be listed at the bottom edge of the page.

Revision	Date of issue	Revised pages	Date of insertion	Signature
1	20.02.2014	2 to 15		
2	15.10.2015	2, 3, 8, 9, 10, 11		
3	19.02.2016	3, 6, 8		



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### 2.1. Introduction

Before putting the propeller into service, please read this manual carefully to obtain basic information about operational safety.

When you do not understand the contents or if in doubt, always contact the propeller manufacturer – Woodcomp Propellers s.r.o.

We wish you many a pleasant flight with Aleš KŘEMEN – WOODCOMP propellers.

### 3. Manufacturer

#### **Woodcomp Propellers s.r.o.**

Vodolská 4, Dolínek  
250 70 Odolena Voda,  
Czech Republic

Legal form: Limited Liability Company, registered in the Trade Register maintained by City Court in Prague, section C, file 80616

Company ID: 018 93 351  
VAT No: CZ01893351  
Phone: +420 283 971 309  
Fax: +420 283 970 286  
e-mail: [info@woodcomp.cz](mailto:info@woodcomp.cz)  
<http://www.woodcomp.cz>

### 4. Type Certificate Holder

#### **Aleš KŘEMEN Company**

Vodolská 4, Dolínek  
250 70 Odolena Voda  
Czech Republic

Legal form: Natural person authorized to perform business according to Law on Entrepreneurship, registered in the Trade Register maintained by City Court in Prague, section A, file 58514

Company ID: 279 52 428  
VAT No: CZ6006101046  
Phone: +420 283 971 309  
Fax: +420 283 970 286  
e-mail: [ales.kremen@seznam.cz](mailto:ales.kremen@seznam.cz)

### 5. Serial Number

Please state the correct type designation and serial number of the propeller each time you contact the manufacturer.

These data are specified on the first page of this User Manual, on Warranty Certificate and on Product label.

### 6. General Information

The V-218 ser. propellers are reliable and field tested in long lasting operation, however problems might occur as with any product.

Although it is impossible to eliminate all the risks involved just by reading the manual, they can be minimized by applying the information presented and using the propeller properly.

Information and descriptions in the manual are valid at the time of publication. Users of Aleš Křemen propellers may be informed of changes or mandatory measures by publication in the form of service bulletins at Woodcomp Propellers website (<http://www.woodcomp.cz>).

Illustrations in this manual are for information only and do not replace drawings in technical documentation.

Technical data are specified in SI metric system.

The manual may be translated from Czech to any other language, but the original Czech text will held decisive validity.

### 7. Operating Safety

- ❖ Aerobatic flights are prohibited.
- ❖ Use the propeller only on the specific engine and airplane which are mentioned in the Propeller Logbook.
- ❖ Never exceed the Maximum Permissible Rotational speed of propeller/engine.
- ❖ Never operate the propeller in ice accretion conditions and during strong rain.
- ❖ Never push or pull the aircraft by outer sections of propeller blades. Only the root sections of blades at the spinner or hub may be held during ground move of the aircraft.
- ❖ Before starting the engine, always check the condition of propeller and its mounting.
- ❖ Before starting the engine, always ensure that the propeller and its surroundings are clear.
- ❖ Record all data concerning operation and repairs in the Propeller Logbook.
- ❖ Never store the propeller on the blade tips.
- ❖ Do not store the propeller in an area with high humidity and do not leave the propeller in rain longer than necessary.

### 8. Technical Descriptions

The V-218 are two bladed fixed propellers designed for aircraft powered by piston engines up to 55kW (74HP) and maximum permissible rotational speed of the propeller up to 2 760 RPM.

The basic model of the V-218 propeller is manufactured in counter-clockwise tractor configuration.

The propeller is made of high-quality ash or beech wood, which has to pass many strength and quality tests during selection. Outer sections of leading edges of blades are protected against damage by metal sheet or sheath of cast polyurethane resin. For higher lifetime the propeller surface is protected by a system of polyurethane lacquer. The blade tips are painted yellow to improve visibility when in motion.

Back sides of the propeller blades have mat black colour. Colour scheme of the propeller is optional according to customer wish.

The propeller is connected to the engine flange using screws.

#### 8.1. Product Label

The following product label is located on propeller blade No. 1:

<b>WOODCOMP</b> <small>CZECH REPUBLIC</small>		Woodcomp Propellers s.r.o. Czech Republic <a href="http://www.woodcomp.cz">www.woodcomp.cz</a>		CZ 21G.0055 CZ 145.0082
Manuf.	Woodcomp Propellers	TCDS		
Model		S/N		
Date	WO		Insp.	

Where:

TCDS - Type Certificate No. (EASA.P.177)

Model - Propeller Model

S/N - Serial Number

Date - Date of manufacture

WO - Work Order

- Abbreviations: NEW – New product; OH –Overhauled; REP – Repaired;  
INSP – Inspected/Tested; MOD - Modified

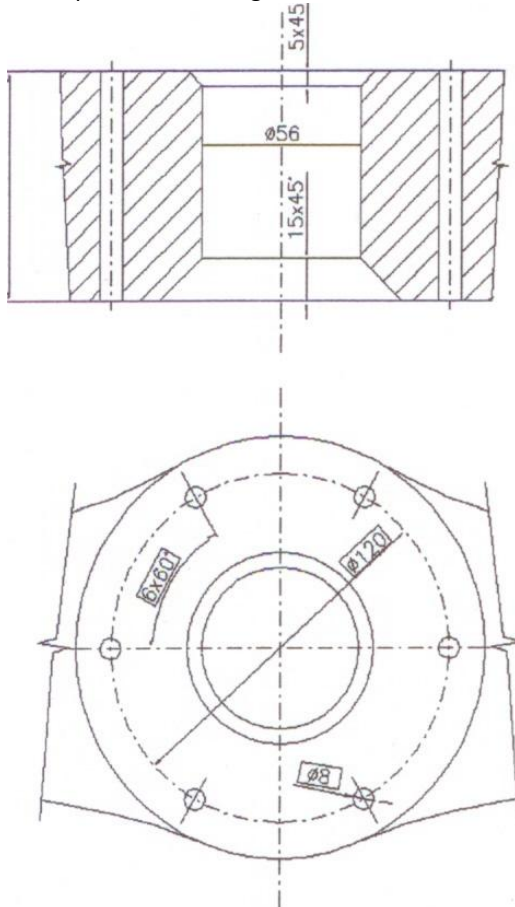
Insp. - Personal number of the Certifying Staff

### 9. Design Data

Propeller diameter ..... 1 500 ± 3mm

Maximum propeller weight without the spinner ..... 3,4kg

The dimensions correspond to the flange of the Mikron III aircraft engine.





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## 10. Operation Instructions

### 10.1. Airworthiness Limitations

#### A – Service life, lifetime

Propeller lifetime is set to **20 years** from the date of sale given in Warranty certificate. If the propeller is repaired on bonded parts, this time will be determined individually by the manufacturer depending on the conditions of the repaired parts.

#### B – Parts with limited service life

No part on the V-218 propeller has limited service life shorter than 20 years. If the propeller is repaired on bonded parts, this time will be determined individually by the manufacturer depending on the conditions of the repaired parts.

#### C – Operation of the propeller in ice accretion conditions is not permitted.

### 10.2. Operating limitations

Maximum propeller speed .....	2 760min <sup>-1</sup>
Maximum Take-Off power .....	55kW (74 HP)
Ceiling.....	0 – 5 000m MSA
Operating temperature range .....	- 25°C to + 38°C
Relative humidity.....	30 – 98 %
Max. operational multiples of acceleration .....	+ 5,3g to -2 ,65g
Max. velocity of nose-dive flight .....	230km/h EAS

### 10.3. Propeller Installation

The propeller could be installed on the PN 662110 flange or on the catch driver supplied by the manufacturer of Mikron III engine. Connection in the flange is provided by six M8 bolts, ring, and castle nuts.

Tighten the nuts working step by step acc. to Fig. 1 in three stages. In the first stage, all the nuts tighten in order of Fig. 1 with the torque moment 5Nm, in the second stage with torque moment 12Nm and in the third stage with torque moment 17.5Nm.

Subsequently dismount all engine plugs and secure the aircraft against motion.

Use a position mark (chair, petrol can etc) to measure the deviations of blade tip from the plain of rotation of the propeller – see Fig. 2. The difference between blade



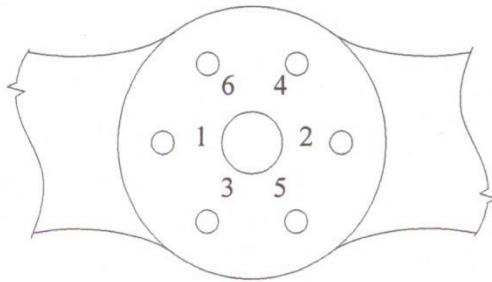
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### V-218B Aircraft propeller

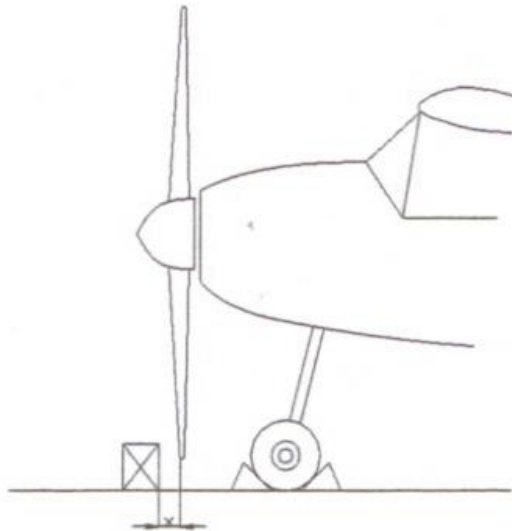
tips must be less than 3mm. Greater differences have to be corrected by tightening related nuts up to the maximum torque moment 20Nm but the minimum permitted torque moment is 17.5Nm. If compliance with measures is not achieved all nuts must be loosen and the above mentioned tightening routine repeated.

Use torque wrench with valid calibration.

After successful propeller mounting secure the castle nuts using  $\phi$  1mm stainless steel wire in correspondence with to Regulation AC 43.13-1B, Chapter 7, Section 7 and install back all engine plugs.



*Fig. 1 – Nuts tightening scheme*



*Fig. 2 – Measure the deviations of blade tips from the plain of rotation of propeller*



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### 10.4. Handling, Transport and Storage

Handle the propeller with care to protect it from any damage, e.g. from shock.

During transport of disassembled propeller, blades should be protected with protective cloth sleeves. To make transport even safer, we recommend storing the parts in strong packing (cardboard, plywood). Propeller stored in horizontal position should be supported by the hub.

During storage, blades should be covered with protective cloth sleeves. In long-term storage, we recommend cleaning and preserving the propeller body with liquid paint wax.

During transporting the propeller has to be put horizontally on a pad supporting its hub or hang over the centre hole in the hub.

## 11. Inspection and Maintenance

Performing below mentioned inspection (except pre-flight inspection) is obligated to record into the Propeller logbook

### 11.1. Basic maintenance

Clean propeller surface after operation. Soiling may be removed carefully using damp cloth soaked with detergent. Wet or damp surface of propeller should always be wiped dry.

### 11.2. Pre-flight inspection

Check all visible propeller parts, flange and spinner. Remove common contaminants from the surface of the blades, preferably with warm water and assess their condition and status of the leading edge.

### 11.3. 50hrs Inspection

Performing periodically after **each 50 operational hours** until finishing technical lifetime or at least **once per calendar year** (may be combined with the annual inspection of the aircraft). Inspection must be carried out by propeller manufacturer or an authorized maintenance organization. It is not necessary to remove the propeller from the airplane.

### 11.3.1. Propeller Blades Inspection

Critical defects on blades exhibit cracks in the lacquer on the surface of blades or cracks in the material of the propeller. Cracks in lacquer occurring in the central and rear parts of the depth of blade tip with longitudinal orientation, i.e. towards the center of the propeller, indicate possible torsional vibration of the blade. In such cases, the propeller must be handed over for inspection to the manufacturer or authorized maintenance organization.

Lacquer cracks with a transverse orientation occurring in any part of the propeller, i.e. the depth direction of the sheet from the leading to the trailing edge are very serious. It shows damage of the blade body and requires immediate send of the propeller to check to the manufacturer or authorized maintenance organization. Violent damage must be repaired by the manufacturer or an authorized maintenance organizations, as well as any repairs of the glued parts.

### 11.3.2. Check tightening of fastening nuts

Due to the safe operation of the propeller shall be checked the fastening castle nuts for tightening. Before this inspection remove securing wire from the nuts. During the checking shall be carried out also the axial position of the tips of the blades so as to meet the requirements of 10.3. After the inspection secure the castle nuts using  $\phi$  1mm stainless steel in correspondence with to Regulation AC 43.13-1B, Chapter 7, Section 7.

## 11.4. Special Inspections

### 11.4.1. 25hrs Inspection

Performing periodically **after first operational hours** of new propeller and **after each new installation** on the aircraft.

Check tightening torque of castle nuts according to article 11.3.2.

This inspection must be done by manufacturer or authorized maintenance organization. The propeller is not necessary dismantled from the aircraft.

### 11.4.2. Other Special Inspections

Other special inspections must be done:

- When major damage to blade by impact of foreign object (stone, bird, hail, etc.) is detected
- In case of careless or prohibited handling;
- In case of overspeed the propeller by more than 200rpm;
- In case of lighting strike;
- In all cases of operating the propeller outside the conditions/ranges stated in this manual.

### 12. Shipment and Storage

Propellers must not be stored so that they stood leaning on the blade tips. Propeller must be stored hanging or sleeve through the central hole in the spine. It is also allowed to store the propeller freely placed in the horizontal position so that it touches the contact surface with the pad only in the central hole. In cold weather the propeller should not be stored near heat sources, or mainframe heat.

The propeller should be stored at a normal temperature in a climate controlled environment (temperature 15°C and relative humidity 40 to 70%).

Careful packing propeller is the best protection against damage during shipment. Therefore, the propeller is sent from the factory in a special cardboard package. This container can be used for the return of the propeller for repair. Blade tip and trailing edge should be sufficiently protected. If it is used for transportation a wooden box, the propeller should be fixed through the central hole or through holes for fastening screws.

### 13. Repairs

Only small repairs which are allowed to be done by the owner are presented here. The owner is obligated to make a record into the Propeller logbook about each repair and used technology. Other damages shall be repaired either by manufacturer or an authorized maintenance organization only.

#### 13.1. Repairs of Propeller Blades

Repairs of small scratches and cuttings which appear at the location above the blade radius  $R = 250\text{mm}$  may be done by owner. Maximum 3 repairs may be done on one blade. Damages which appear at the root section of the blade shall be repaired either by manufacturer or an authorized maintenance organization only.

Maximum permissible depth of a damage that may be repaired by the owner at the leading or trailing edge is 2mm. The minimum distance between two damaged locations is 80mm and the length must be equal to 60mm or less.

Maximum permissible depth of a damage that may be repaired by the owner at the top or bottom side of blade is 0.7mm. The minimum distance between two damaged locations is 100mm and the area of each of them must be less than  $1\text{cm}^2$ .

Repair procedure:

1. Clean and dry the damage location.
2. Use fine sand paper or a file to smooth the damage location.
3. Apply epoxy-based filler to the location.
4. Shape the solid filler to the form of blade surface by a file or sand paper.
5. Coat the location by a layer of polyurethane or nitrocellulose-based lacquer.

### 13.2. Repairs of Propeller Hub

Maximum permissible depth of small deformations, small scratches and locks which appear at the propeller hub is 0.8mm. Repairs shall be made the same way as in article 13.1.

## 14. Troubleshooting

If troubles are persistent and the following instructions do not bring improvement, contact please the propeller manufacturer or approved maintenance organization.

<b>Problem</b>	<b>Possible cause</b>	<b>Solution</b>
Propeller vibrates	Damaged propeller	Check visually the surface integrity of the propeller and its accessories. Repair the damage or contact manufacturer.
	Improper installation	Check propeller-to-engine attachment and securing. If any imperfection is found repeat the propeller installation and secure it by a new wire.
	Unbalanced propeller	Dismantle and check balance, or contact manufacturer for repair propeller balancing.
	Defective engine	Follow instructions from Engine Operational Manual.

## 15. Warranty Conditions

### 15.1. Warranty period

Producer warrants from the date of sale to the first consumer, every propeller, sold as new and unused, for a period not more than 24 consecutive months.

### 15.2. Warranty conditions

The user must present the manufacturer with completed Propeller logbook and stamped/signed Warranty certificate, along with proper records of propeller installation and operation.

### 15.3. Realization

Defective product within the warranty period, the manufacturer based on the defect will repair and / or replace defective parts with new ones free of charge for new parts and related work.

All original defective parts become the property of the manufacturer.

### 15.4. Exclusion – Not covered by Warranty

- ❖ Normal wear on all items.
- ❖ Replacement parts and/or accessories which are not genuine parts and/or accessories.
- ❖ Damage resulting from the installation of parts other than genuine parts.
- ❖ Damage caused by failure to provide proper maintenance as detailed in this User manual.
- ❖ Damage to the propeller resulting from running on the engine and/or gearbox not approved in writing by manufacturer.
- ❖ Damage to the propeller resulting from engine accident.
- ❖ Damage resulting from accident, fire or other casualty, misuse, abuse or neglect.
- ❖ Damage resulting from stones / fauna / flora collide.
- ❖ Damage resulting from service by unqualified mechanic.

### 15.5. Responsibility

The warranty does not cover possible secondary damages.

All legal relationships resulting from purchase of the propeller by the user, from services provided by the manufacturer during maintenance, and also all legal relationships resulting from propeller operation, especially those resulting from responsibility for propeller faults, responsibility for damages, and remuneration of property and other damages related to propeller operation, propeller accident, and related events, will be assessed according to Czech law, and will be decided according to it by applicable court in the Czech Republic.



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### WARRANTY CERTIFICATE

**Manufacturer:** **Woodcomp Propellers s.r.o.**  
Vodolská 4, Dolínky  
250 70 Odolena Voda  
Czech Republic

**Propeller Type:** **V-218B**

**Type Certificate:** **EASA.P.175**

**Serial Number:**

**Date of Sale:**

**Supplier's Stamp and Signature:**

Product warranty is subject to warranty conditions listed in Chapter 15 of this User Manual.