

Use and Inspection Manual for the ground adjustable propellers manufactured by "Kievprop".

ATTENTION: Failure to follow these instructions will void all warranties expressed and implied.

CAUTION: Rotating propellers are particularly dangerous. Extreme caution must be exercised to prevent severe bodily injury or death.

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Propeller packing list for Rotax 912; 914

Item	Description	Qty	Item	Description	Qty
1	Half of the hub with 47 mm hole	1	9	Pitch measuring tool	1
2	Half of the hub with hole 1"	1	10	Propeller blades	3-6
3	Mounting bolts M8; L100 mm	6	11	M8 Nylock Nuts At use of 40-80 mm spacer	11-14 +6
4	Clamping bolts M8; L50 mm	6	12	Washers 8 mm At use of 40-80 mm spacer	17-20 +12
5	Spacer 40-80 mm (if required)	1	13	Blade protective covers	3-6
6	Mounting bolts M8 L40mm for 40-80 mm spacer	6	14	Spinner's backing plate (if required)	1
7	Spacer 30 mm (if required)	1	15	Spinner dome	1
8	Mounting bolts M8 L130mm for 30 mm spacer (instead of L100 mm)	6	16	Spinner dome screws M5	6

Propeller packing list for Rotax 503; 582; 618.

Item	Description	Qty	Item	Description	Qty
1	Hub halves with 1" hole	2	7	Pitch measuring tool	1
2	Drilled head bolts M8; L90 mm (installing without a spacer)	6	8	Propeller blades	3 – 6
3	Clamping bolts M8 L50 mm	5-8	9	Washers 8 mm At use of a 40-80 mm spacer	11-14 +12
4	Spacer 40-80 mm (if required)	1	10	Blade protective covers	3 – 6
5	Drilled head bolts M8 L30mm for 40-80mm spacer	6	11	Spinner's backing plate (if required)	1
6	Mounting bolts M8; L100 mm for use with 40-80 mm spacer (instead of L90 mm)	6	12	Spinner dome (if required)	1
7	Spacer 30 mm (if required)	1	13	Spinner dome screws M5	6
8	Drilled head bolts M8 L120mm for use with a spacer 30mm (instead of L90 mm)	6	14	M8 Nylock Nuts At use of a 40-80 mm spacer	5-8 +6

1. Introduction .

The ground adjustable propellers manufactured by Kievprop are intended for operation with engines in power range from 40 to 130 hp in 3 and 4-blade version, and from 50 to 180 hp in version with 5 and 6 blades, equipped with a gearbox and absorber of torsional oscillations.

2. Design description and features.

Design of propellers manufactured by Kievprop, represents a multicomponent product consisting of blades clamped between two hub halves by means of clamping bolts.

The propeller intended for installation on a gearbox flange of the engine by means of mounting bolts. The blades of Kievprop propellers are made using aerospace materials on the basis of fiberglass cloth and epoxy compound. Blade design represents a hollow monocoque structure made in autoclave within one processing method, under total pressure of 6 ATM.

All new blades sets produced since August, 2014 are filled inside with foam. The finish on the blades is two-component acrylic enamel which provides perfect protection against different atmosphere factors and UV.

The brass leading edge protection is pre-formed and placed into mould before a hardening process in autoclave.

Advantage of such design is the combination of low moment of inertia with high strength and flexibility vesting the Kievprop propellers with high comfort, low noise, excellent endurance and high operating characteristics.

3-blade Kievprop hubs for the ground adjustable propellers are made of aluminum alloy AK6 by method of hot-stamping, with following heat treatment, machining and anodic oxidation.

4- 5- and 6-blade hubs are made of aluminum alloy 2024 by machining method with following anodic oxidation.

Adjustment of blade pitch must be performed by means of a provided pitch measurement tool.

Weights and mass moments of inertia for different propeller types.

Propeller types	163 263	173 273	183 283	164 264	174 274	184 284	165 265	175 275	185 285	166 266	176 276	186 286
Weights	4.0 kg	3.9 kg	4.1 kg	4.8 kg	4.7 kg	5 kg	6.3 kg	6.2 kg	6.5 kg	7.3 kg	7.2 kg	7.4 kg
Mass moments of inertia	3700 kg/cm ²	3500 kg/cm ²	4050 kg/cm ²	4950 kg/cm ²	4700 kg/cm ²	5400 kg/cm ²	6000 kg/cm ²	5800 kg/cm ²	6800 kg/cm ²	7400 kg/cm ²	7000 kg/cm ²	8100 kg/cm ²
Propeller types	243	244	245	246	293	294	295	296				
Weights	3.8 kg	4.6 kg	6.1 kg	7.0 kg	4.2 kg	5.1 kg	6.6 kg	7.5 kg				
Mass moments of inertia	3000 kg/cm ²	4000 kg/cm ²	5000 kg/cm ²	6000 kg/cm ²	4800 kg/cm ²	6400 kg/cm ²	8000 kg/cm ²	1050 kg/cm ²				

* Bolts weights are included.

3. Instruction for assembly, installation, adjustment, disassembly and storage.

Required Tools: calibrated newton-meter or inch-pounds torque wrench, 13 mm socket, 13 mm open end wrench, allen key 6 mm.

Important: before propeller assemblage all blade numbers in the set must be identical.

Prop assemblage must be performed on flat and cleared surface.

a) Place the engine half of hub on prepared surface, with inserted clamping bolts from below. Put the blades in hub sockets and cover them with closing half. Don't allow foreign objects to be clamped between blade shanks and hub sockets. Place the washers over bolts, screw the Nylock nuts by a hand.

IMPORTANT: The marks "0" on external surfaces of both hub halves must be aligned lining up. Place the washers over clamping bolts followed by the Nylock nuts and finger tighten.

BE CERTAIN: before prop installation the ignition must be switched off!

b) Properly clean any possible pollutions on the engine flange.

Rotax 503; 582; 618 - installation without spacer: joint a spinner's backing plate (if required) with assembled propeller, align the holes, insert mounting bolts with washers and place all assembly on engine flange, screw and tighten up the bolts by fingers.

Installation with Kievprop spacer 40-80 mm: Install spacer by means of short mounting bolts. Clamp them with torque of 2.5 kg/m (220 inch/pounds; 18 ft-lbs). Joint spinner's backing plate (if required) with assembled propeller, insert a long mounting bolts with washers, place all assembly on spacer using 8 mm holes for bolts, screw and tighten up the Nylock nuts by fingers behind of spacer flange. **NOTE: in no event the bolts must penetrate the spacer flange through big holes!**

Installation with Kievprop spacer 30 mm: joint a spacer with spinner backing plate (if required) and assembled propeller, insert long mounting bolts with washers through 8 mm holes of a spacer, place all assembly on engine flange, screw and tighten up the bolts by fingers.

NOTE: in no event the bolts must penetrate the spacer flange through big holes!

Rotax 912; 914 - installation without spacer: Joint spinner's backing plate (if required) with assembled propeller, align holes, insert mounting bolts with washers, place all assembly on engine flange, place a washers behind of engine flange, screw and tighten up the Nylock nuts by fingers.

Installation with Kievprop spacer 40-80 mm: Install spacer by means of short mounting bolts. Place the washers behind of engine flange over bolts, screw and clamp the Nylock nuts with torque of 2.5 kg/m (220 inch/pounds; 18 ft-lbs). Joint spinner's backing plate (if required) with assembled propeller, align holes, insert a long mounting bolts with washers, place all assembly on spacer using 8 mm holes for bolts, screw and tighten up the Nylock nuts by fingers behind of spacer flange. **NOTE: in no event the bolts must penetrate the spacer flange through big holes!**

Installation with Kievprop spacer 30 mm: joint a spacer with spinner's backing plate (if required) and assembled propeller, insert mounting bolts with washers through 8 mm holes of spacer, place all assembly on engine flange, place the washers over bolts behind of engine flange, screw and tighten up the Nylock nuts by fingers. **NOTE: in no event the bolts must penetrate the spacer through big holes!**

c) Turn the propeller with gearbox shaft to a convenient position for pitch adjustment. Pull each blade outward to seat the blade collar in the hub socket.

Place the pointer of *pitch measurement tool* to a blade so that its stopper rested on leading edge for tractor props, on trailing edge for pusher props. Insert other end of *pitch tool* into central hole of the hub. Slightly press *the pitch tool* in the middle of tubular rod to the blade by one hand, turn adjustable blade in a hub by second hand to necessary value on a *pitch tool scale*. Clamp two nuts to a light torque only to hold the adjusted blade in place, other blades must be able to rotate freely by hand. If you can't turn remaining blades, little bit weaken clamped bolts.

Adjust other blades in the same way.

d) Check the pitch of all blades again. **Difference as little as 1/4 of scale graduation can cause a prop to run rough and vibrate.**

e) Clamp all nuts and bolts in criss-cross pattern with torque of 2.5 kg/m (220 inch/pounds; 18 ft-lbs).

Note: the gap between both hub halves must be equal all the way around. You may also check propeller tracking.

IMPORTANT!!! Respect the recommended torque values. Use a properly calibrated torque wrench. Never exceed or decrease a recommended torque (stretch) of bolts!

f) Refer to your engine manufacturer for a recommended static RPM test. Secure your aircraft, chock wheels and set parking brake before conducting the static rpm test (run-up). Start and warm up the engine. Slowly advance throttle to maximum static RPM's.

RPM reads Low:

Too much pitch. Reduce the pitch by one or half increment and test again.

RPM reads High:

Not enough pitch. Advance the pitch by one half of increment or more and test again.

Important: Never exceed the limitation of RPM stated by engine manufacturer.

g) Once satisfied with final pitch adjustment, check again torque on all bolts and secure them with safety wire (if locking holes are available) or with Nylock nuts for bolts that thread into smooth holes of the propeller flange.

h) Check up a pitch adjustment of blades and the torque of all bolts after 5 first hours of running time or each time at occurrence of vibration.

The table of pitch values, recommended for initial adjustment
(measuring by pitch tool).

Propeller types	Engine types / gear ratio														
	Rotax582				Rotax618				Rotax 912UL		Rotax 912ULS		Rotax 914		
	2.62	3.00	3.47	4.00	2.62	3.00	3.47	4.00	2.273	2.43	2.273	2.43	2.273	2.43	2.43
163/263	1.0	1.2	1.4	-	1.1	1.3	1.5	-	1.2	1.3	1.3	1.4	1.4	1.5	
173/273	1.1	1.3	-	-	1.2	1.4	-	-	1.3	1.4	1.4	1.5	1.5	-	
183/283	0.9	1.1	1.3	-	1.0	1.2	1.4	-	1.1	1.2	1.2	1.3	1.3	1.4	
164/264	-	0.9	1.3	1.5	-	1.0	1.4	-	-	1.2	1.2	1.3	1.3	1.4	
174/274	-	1.0	1.4	-	-	1.1	1.5	-	-	1.3	1.3	1.4	1.2	1.5	
184/284	-	-	1.2	1.4	-	0.9	1.1	-	-	1.1	1.0	1.2	1.1	1.3	
165/265	-	-	1.2	1.4	-	1.1	1.3	1.5	-	1.1	1.1	1.2	1.2	1.3	
175/275	-	1.0	1.3	1.5	-	1.2	1.4	-	1.1	1.2	1.2	1.3	1.3	1.4	
185/285	-	-	1.1	1.3	-	-	1.2	1.4	-	1.0	1.0	1.1	1.1	1.2	
166/266	-	-	-	1.1	-	-	1.0	1.2	-	-	-	-	-	1.0	
176/276	-	-	1.1	1.2	-	-	1.1	1.3	-	-	-	1.0	1.0	1.1	
186/286	-	-	-	1.0	-	-	-	1.1	-	-	-	-	-	1.0	
243	1.1	1.3	-	-	1.2	1.4	-	-	1.3	1.4	1.4	1.5	1.5	-	
293	-	1.0	1.2	1.4	-	1.1	1.3	1.5	1.0	1.1	1.1	1.2	1.2	1.3	
244	1.0	1.2	1.4	-	1.1	1.3	-	-	1.2	1.3	1.3	1.4	1.4	1.5	
294	-	-	1.1	1.3	-	1.0	1.2	1.4	-	1.0	1.0	1.1	1.1	1.2	
245	-	1.1	1.4	-	1.1	1.3	1.5	-	-	1.3	1.3	1.4	1.4	1.5	
295	-	-	-	1.1	-	-	1.0	1.2	-	-	-	-	-	1.0	
246	-	-	1.2	1.4	-	1.1	1.3	1.5	-	1.1	1.1	1.2	1.2	1.3	

Note: - the values of blade pitch in the table show meters of geometrical pitch.

Pitch values necessary for your flight tasks can differ from values shown in the table.

These values are inapplicable for customers buying propellers from North American distributor. Please, request this information from your seller.

Some recommendations for pitch adjustment:

To adjust your propeller the first time, use the values of a pitch given in the table. **It can save you from exceeding of any rpm limitations.**

Faster aircrafts require higher pitch adjustment that will not allow exceeding of rpm limitation, established by engine manufacturer at *completely open throttle*, at maximal speed.

Increase of pitch adjustment on the one hand lead to: decrease of frequency of rotation, to lowered rate of climb, and to lengthening of take-off distance; on the other hand leads to increase

of fuel efficiency at cruiser speed and to increase of maximal speed without the exceeding of rpm limitation.

Decrease of pitch adjustment on the one hand lead: to increase of rpm and rate of climb during take-off and to a shortening of take-off distance; on the other hand leads to lower fuel efficiency at cruise speed and to reducing of speed range.

Normal pitch adjustment allows the engine in static test to reach 95 % of rpm of its maximum power regime *at completely open throttle*.

Dismantling of assembled propeller can be performed in reversed sequence.

Storage of propeller.

Dismantled propeller should be stored in dry space. Before storage, remove, properly dry a protective covers and return them back.

Properly wash a blades and a hub of disassembled propeller using a detergent not containing abrasives; the use of degreaser is admissible at working in the open air. Use of solvents for paints is not admissible.

At propeller storage on airdrome, installed on aircraft, we recommend to store the blades in protective covers from influence of ultraviolet rays and other atmospheric factors.

Remove and dry protective covers after rain.

It is forbidden to store or transport assembled propeller vertically standing on blade tips or in horizontal position, under weight of foreign objects.

Store the dismantled assembled propeller in vertical position, hanging on a central hub hole.

If you store the propeller installed on aircraft, keep it away from aisles and places with high probability of damage by other objects.

Blades of disassembled prop must be stored in horizontal position on a flat and soft surface or in covers.

Dismantled propeller must be transported in disassembled condition.

4. Periodicity of visual inspections and maintenance.

Carry out visual inspection of the propeller in beginning and the end of each flying day for timely detection of external damages.

Clean the propeller when it is necessary.

Adjust the blades pitch when it is necessary, depending on weather conditions and flight tasks and also when you have found a difference in pitch of blades.

Perform inspection with disassembling of the propeller with periodicity of 1 year with obligatory recording about this in propeller log book.

Annual inspection with disassembling includes:

- Visual inspection of a blades feathers and blades shanks;
- Checking of drainage holes in tips of blades by means of blowing of air into them (this item is significant only for blades produced before August, 2014). De facto all blades without drainage holes not require this procedure;
- Visual inspection of a hub for detection of visible cracks, deformations and seats of corrosive damage;
- Visual inspection of bolts for detection of thread deformations, wear, a bends and corrosive damages.

- Visual inspection of spinner dome and backing plate for detection of cracks.
- Inspection of spinner screws and replacing if they are damaged.

The list of admissible damages

- a) Small scratches, nicks and dents on metal blade protection, which are not causing the flaking of its edge from the blade structure, which are not deforming the border line between the metal and blade structure and not leading to local thickening (swellings) on this border line;
- b) Scratches and dents on painted surface of blade without disheveled edges;
- c) Grid of small cracks on paint visible on both sides of a blade along trailing edge, being formed because of difference of rigidity of paint and composite material under it owing to elastic deformations because of oscillations;
- d) Small scratches, dents and nicks on spinner dome;
- e) Longitudinal cracks in length less than 30 mm, that are visible on paint and are located near blade shank along trailing edge, and along all leading edge up to metal protection;
- f) Any dents on surface of a hub if the depth not exceeds 0.5 mm.

5. Fault Detection

The most suitable method of fault detection of Kievprop blades is visual inspection.

At fault detection for metal parts the base method is visual inspection. At detection of suspicious defects or damages on metal parts where danger level cannot be defined visually, any other standard method of nondestructive test (*ultrasound, x-ray etc*) may be applied.

Distinctive feature of Kievprop blades is next: any damages that can endanger, which has not been caused by external action, are not progressing quickly, they informs about themselves in advance in a change of usual behavior of propeller and can be detectable during daily visual inspection.

The list of inadmissible damages

- Dents and ruptures or cracks on metal protection which provoke a flaking its edges from composite structure;
- Dents and ruptures or cracks, on blade surface, which have provoked a thickening in the field of blow, or border line deformation between metal protection and blade;
- Scratches, dents and cracks with disheveled edges, which are testifying about damage of a reinforce layers.
- Transverse cracks on paint in length over 10 mm;
- Delamination of trailing edge of the blade in length more than 40 mm;
- Any longitudinal cracks on paint, in length over 30 mm;
- Flaking and crumbling of paint and undercoat across a blade feather with delamination of composite material which are a sign of excessive deformations;
- Any cracks on spinner dome body and backing plate;
- Any damage of spinner dome screws;
- Any penetrant cracks on a hub which are visible on mechanically processed surfaces inside and outside;
- Corrosion damage of a hub with depth more than 0.5 mm;
- Stretching or any other deformation of bolt body or thread and/or corrosion damage.

6. Repair and replacement of parts and components.

Manufacturer does not establish any periods of obligatory overhauls and replacements of components and details of props. All components can be used "on condition" while they are able to meet the Continued Airworthiness Requirements. Any local repair described below can be made at will of the owner, when any damage from a list of "admissible" has worsened exterior of a prop.

Repair of damages described in section 4, item (a):

- straighten all protrusive edges around a nick or a dent which are raised above metal protection using easy hammer and dolly. You can perform this procedure for both sides;
- scrape off pollutions in cavities by a knife and moisten them by gumboil for tin solder;
- fill the cavities with a solder by short touchings of a soldering tool tip in order to avoid an excessive heating of epoxy under metal;
- remove excess of solder by flat file and grind metal surface by fine-grained abrasive paper.

Repair of damages described in section 4, item (b):

- grind the damaged place by sand paper and degrease this place;
- fill scratches and cavities with high strength repair epoxy;
- remove superfluous epoxy after hardening by water-resistant abrasive paper 600 grit with water and align it to old level using a flat wood bar and depolish the paint around damage with overlapping 3 - 5 cm (1 - 2");
- cover undamaged surface, using adhesive tape;
- repaint the damaged place by thin three layers of automobile acrylic paint from aerosol container, extend the painting area sequentially and remove adhesive tape at once after painting. The surface can be polished after paint drying.

To not exceed the balance moment the repainting of all blade surface is forbidden.

At detection of damages described in section 4, items (a, b): operation of propeller without repair is admissible.

For damages described in section 4, items (c, d): repair is not assigned. Operation of propeller without repair is admissible.

At detection of damage described in section 4, item (f): mark the ends of crack and observe its development during operation. If it will grow or expand the propeller operation must be stopped. In this case consultation with manufacturer is obligatory with detailed description and the photos of damaged place.

At detection of seats of corrosion on a hub, make a deepening in this place with the ratio 1/10 of the depth to the width up to full removal of corrosion signs with radius of deepening not less than 4 mm. Then cover this place by anticorrosive primer. If depth of deepening will exceed 0.5 mm, inform the manufacturer about this, giving the description and a photo of damaged place.

All details and components of propeller having damages, described in section 5, in "*the list of inadmissible damages*" must be replaced unconditionally, repair is inadmissible.

To replace any damaged components: remove and disassemble propeller in accordance to section 3 of this manual.

Blockage of the drainage hole located in a blade tip can provoke delamination of a trailing edge near a tip because of pressure of condensate in the blade. If the drainage hole is not impermeable for air, it must be cleared by means of steel elastic wire in diameter of 1 mm.

The blades with serial numbers which follow after numbers: 163378; 173207; 183439; 243256; 2631352; 2731030; 2831376; 293289; are filled inside with foam compound and deprived of drainage holes and necessity in this procedure.

7. Instructions for Continued Airworthiness.

The operation history and any performed service on propeller should be properly documented on Propeller Logbook.

Never install the propeller on aircraft, if this type is not approved for these types of aircraft and engine.

Properly inspect and be certain in compliance of your propeller with requirements of this manual before propeller operation start.

Preflight and Postflight visual inspection is the base preventive measure against failure of your propeller.

Preflight inspection includes:

- Properly check the propeller assembly for looseness, any signs of damages, excessive wear or any other conditions that may pose a threat to your safety (see section 5, *the list of inadmissible damages*).
- Visually inspect a spinner and backing plate for missing fasteners, damages and cracks.
- Check backing plate for free play that can testify about looseness of all propeller assembly, if this take place, check and torque all propeller bolts.

Do not tow an aircraft, taking the blades by hands.

Do not exceed the limitation of rpm at propeller operation. If your propeller has accidentally exceeded rpm limitation, do not operate your aircraft without proper inspection for fault detection (section 5). In this case this is the necessary measure for airworthiness maintenance. All propeller parts should be properly inspected in disassembled condition to avoid possible faults in future.

Avoid a taxiing on places containing rubble, sand and gravel to reduce excessive wear and/or damage of blades leading edges. Excessive fast wear is objective result of regular operation at such conditions and in a rain.

If you feel vibration increase, check the pitch adjustment of blades and torque of all bolts.

Bolts with signs of stretching and deformation of any kind should be replaced immediately.

8. Limitations of Airworthiness.

Manufacturer states the limitation of calendar service life «*on condition*» - 8 years from date of sale including storage time for all new blades which have numbers above than listed below including.

Manufacturer states limitation of calendar service life «*on condition*» - 6 years from date of sale for all blades Kievprop which have serial numbers lower than: 163378; 173207; 183439; 243256; 2631352; 2731030; 2831376; 293289.

Manufacturer establishes limitation of suitability of the hub and the bolts «*on condition*» without any other limitations.

The condition of metal parts can be determined during any necessary disassembling or during obligatory annual inspection (see the list of inadmissible damages in section 6).

After expiring of *calendar service life* manufacturer can make decision about its prolongation after receiving from owner of description and photos that testify about serviceability of all parts of propeller. Manufacturer establishes terms of prolongations of service life on own discretion in each separate case, in accordance to information about condition of each concrete propeller.

Period between inspections with full disassembling of the propeller is 1 year. Any use of propellers manufactured by Kievprop with engine types unlisted in “*The table of pitch values, recommended for initial adjustment*” in section 3 but which meet the requirements of *section 1*, should be agreed with manufacturer or official representative.

Warning:

Manufacturer forbids use of Kievprop propellers with any direct drive engines and with engines which are not meeting the requirements described in section 1 of this manual.

Manufacturer does not bear responsibility for unauthorised use of "Kievprop" propellers with engine types not approved or not coordinated with manufacturer.

9. Limited warranty.

We offer a one year limited warranty on any defect in materials and workmanship.

In the case if any part or propeller does not conform to this warranty, Kievprop will repair or replace defective parts. Kievprop reserves the right to independently choose a way of compensation: repair or replacement. Any part replacement during warranty will not extend warranty period originally established for propeller. Compensation by means of repair or replacement does not include cost of shipment, removal and installation which are responsibility of the client.

Conditions, exceptions and disclaimers.

This warranty applies only to propellers which have been installed, used, maintained and stored properly in strict accordance with instructions and recommendations of this manual. This warranty does not cover the units having obvious signs of abuse, alterations, improper installation, negligent service, incompetent repair or improper packing for transportation. Also it does not cover damages from strike or owing to excessive wear due to operation in extreme conditions. Operation with exceeding of limitations of any sort or use with engines or equipment not approved or not agreed with Kievprop, automatically voids this warranty.

Any questions for obtaining of warranty service should be decided in contact with representative or manufacturer.

This limited warranty is the only warranty provided with respect to covered units, **and there are no other warranties, representations, conditions or guarantees, express or**

limited, with respect to the covered units or the manufacture thereof, including, without limitation, any implied warranties of merchantability or fitness for particular purpose.

Repair or replacement of a nonconforming unit is the exclusive remedy for breach of this limited warranty, and shall constitute fulfillment of all liabilities of Kievprop to a customer or user, whether based on contract, negligence or otherwise.

In no event shall Kievprop be liable for any other expenses, claims or damages of any kind howsoever caused, including (without limitation) any other product replacement or installation costs and/or any direct, indirect, consequential, incidental or special damages.

The purchaser of the covered units has read, understood and, by purchasing the units, agrees to be bound by the above terms and conditions.