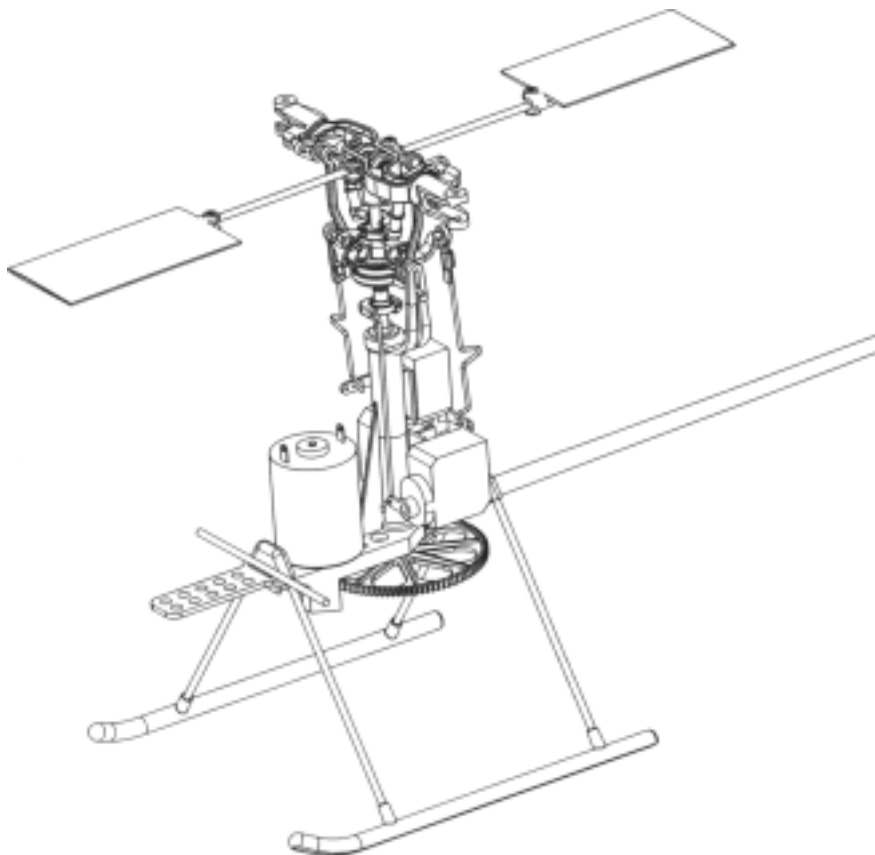


Assembly Notes

Collective Pitch Conversion Kit

Part N° 67460

PE 0 7 01 04



Collective Pitch Conversion Kit

Congratulations ... on purchasing the collective pitch upgrade kit for your piccolo!

With this kit, your indoor helicopter is transformed into a highly manoeuvrable & agile helicopter, whose flight characteristics will astonish you. Fast flights, in a hall or outdoors, leading to aerobatics are now a reality! With a simple 4-channel remote control, flying is easy and satisfying for even the new recruit to R/C helicopter flying. Using a helicopter transmitter, with its separate collective pitch channel and throttle control, your piccolo performs like a larger helicopter and is capable of not only hovering and circuit flight but advanced aerobatics and 3D manoeuvres! Use the features of the your helicopter transmitter to fine tune for your flying style, even set-up your Piccolo for autorotation.

We guarantee:

For the first 6 months after purchase, that this kit is free from any production or material defects.

Damage caused by misuse or assembly mistakes are not covered by this warranty. As soon as the helicopter is put into operation, the user assumes full responsibility.

Other Items...

you will need the following items to finish your pitch conversion (not supplied with this kit):

Item:	Part N°:	Description
Servo	171100	Micro 100
or	171200	Micro 200

items we also recommend for optimal performance:

Item:	Part N°:	Description
Electronic Board	720535	IKARUS Piccoboard Plus
	720540	
	720572	
	720573	
Gyro	720624	IKARUS Heading-Lock Module
Battery	67491	8 cell NiCd Battery 250mAh
Motor	106559	Tuning Motor G310
Cable	68227	Y-lead (for 4ch remote control)
Auto-rotation Unit	67459	Optional

The basics of helicopter flight...

We've already described the details in the Piccolo manual, therefore below you will find only the necessary supplements. With the Pitch Conversion kit you can control the ascent and descent of the helicopter by the angle of attack of the main rotor blades, rather than through the speed of the blades. There are two control system possibilities; to which we refer in this instruction manual.

Using a 4 channel Radio Control System

1) Combined control of pitch and throttle with one function. For this a 4 channel remote control and a Piccboard with 4 channels, in conjunction with a Y-lead is all that is required. The drive motor and the pitch servo are connected to a single channel using a Y-lead. This is marked in this manual as **V1** (version 1).

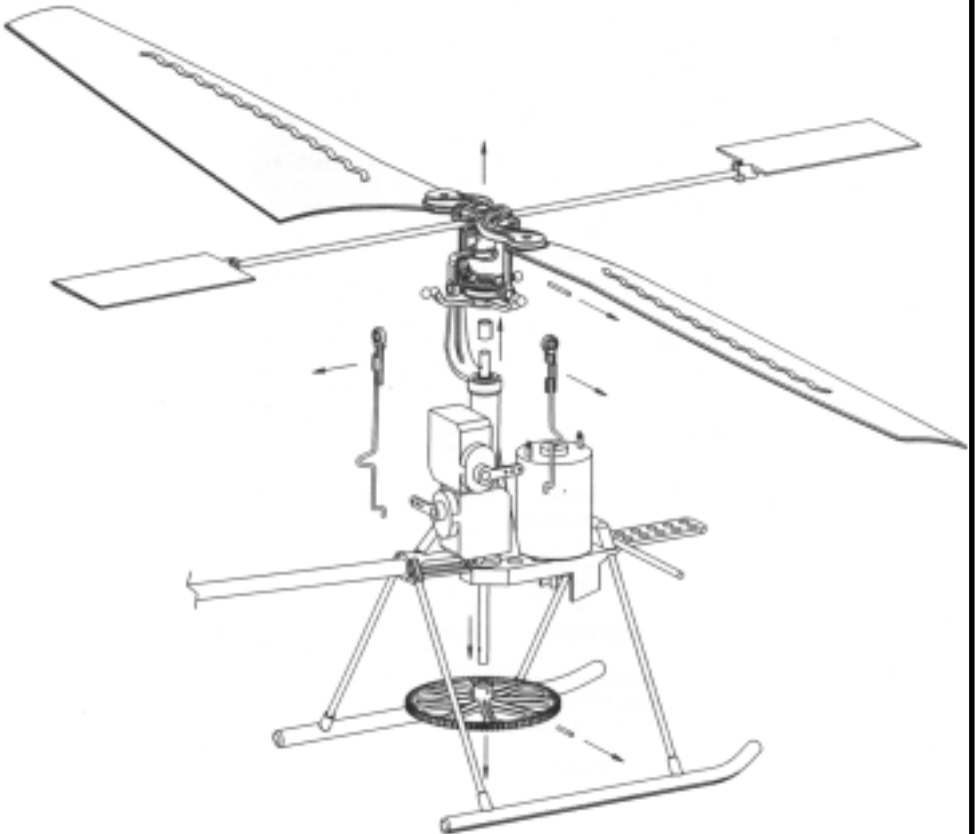
Using a 5 / 6 channel Radio Control System

2) Separate control of RPM and pitch. For this you need the Piccboard Plus, a remote control with at least 5 channels and the possibility of mixing both the functions. Please look up the corresponding sections in your transmitter manual for mixing details. Note that tail mixing functions must be set to 0, since the Piccboard takes over this function. With this version you receive an aerobatic helicopter, with which you can perform rolls, loops and even inverted flight. In this version the main rotor speed remains to a large extent constant within the entire pitch range, so that, for example, even steep descents and sharp braking will not cause problems for you. In the manual this version is called **V2**.

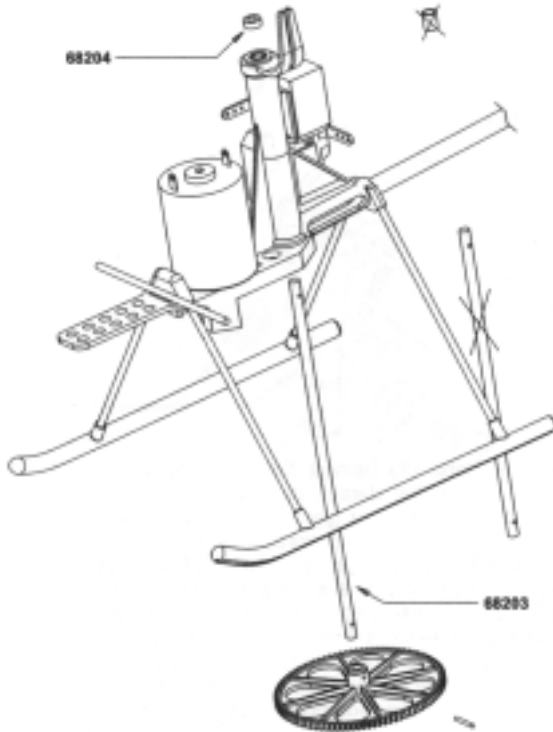
Assembly

Place your Piccolo on your workbench and remove the battery. The Piccoboard and the wires (not shown on the diagram) may be left in the helicopter.

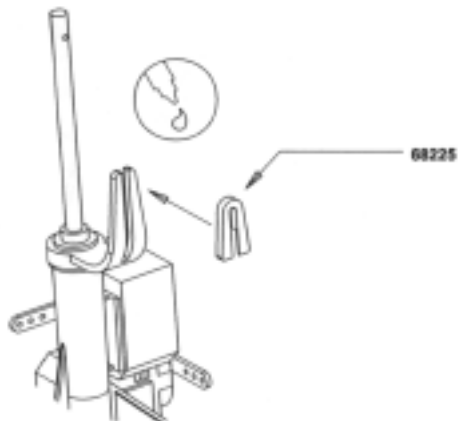
Remove the control links from the swashplate and then at the servos. Pull the pin off the centre hub of the rotor head and remove the rotor head. Remove the silicon sleeve above the upper bearing and pull out the main shaft. Pull the pin from the main gear wheel and separate the gear wheel from the shaft.



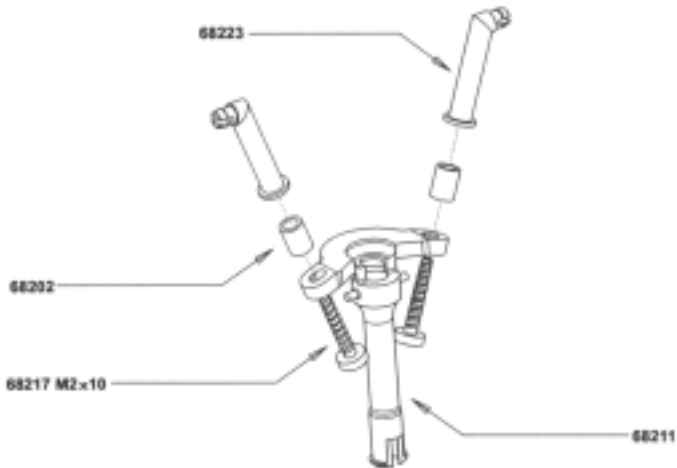
Now take the longer main shaft 68203 and install the gear wheel with the pin. Put the main shaft back through the 2 ball races and fasten in place with the new locking ring 68204. Since, during aerobatics, negative forces occur you should additionally secure the locking ring with a drop of CA-glue.



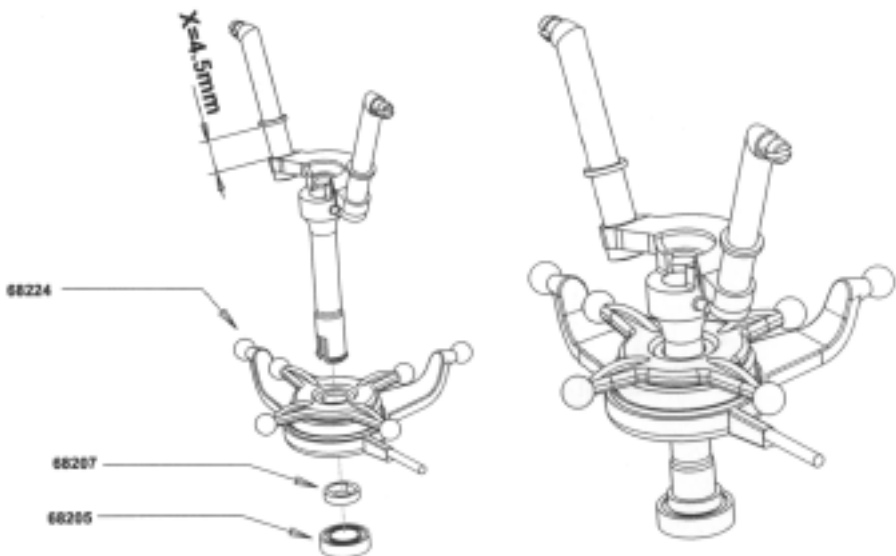
Glue on the extension of the swashplate guide 68225 in place as drawn. Make sure that no adhesive goes into the guide slot!



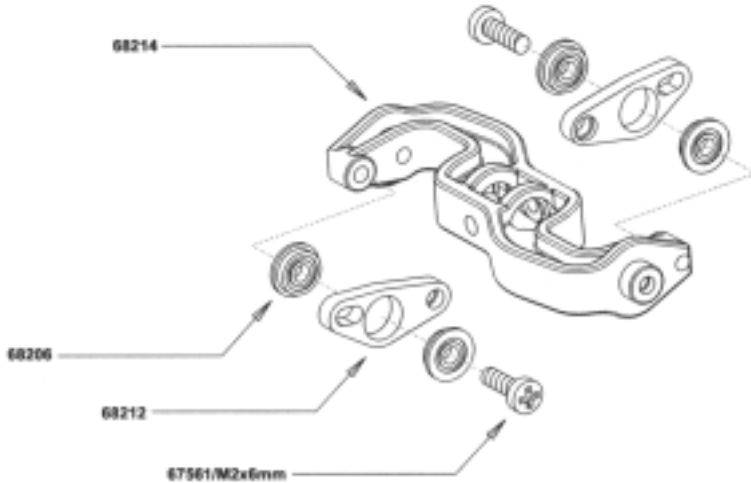
Insert the two M2 x 10 screws 68217 through the arms of the pitch slider case 68211. Push a piece of silicone tube 68202 over each screw and then screw on to the control rods 68223. Check the distance between the pitch slider case and the control rods as



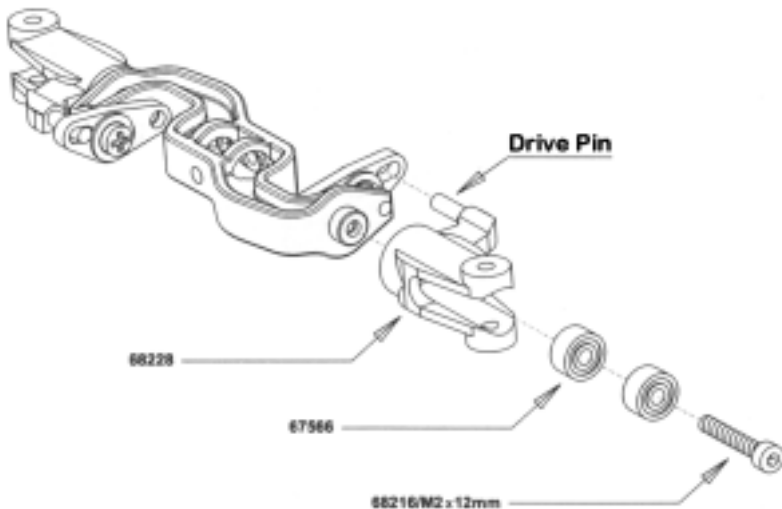
The silicone tube should be compressed so that dimension 'X' is 4.5mm for both versions. Note that the dimension is measured on both sides, and that they should be as equal as possible. Slide the swashplate 68224 onto the pitch case, then likewise fit the new bearing retainer 68207 and push on the bearing 68205 until it locks



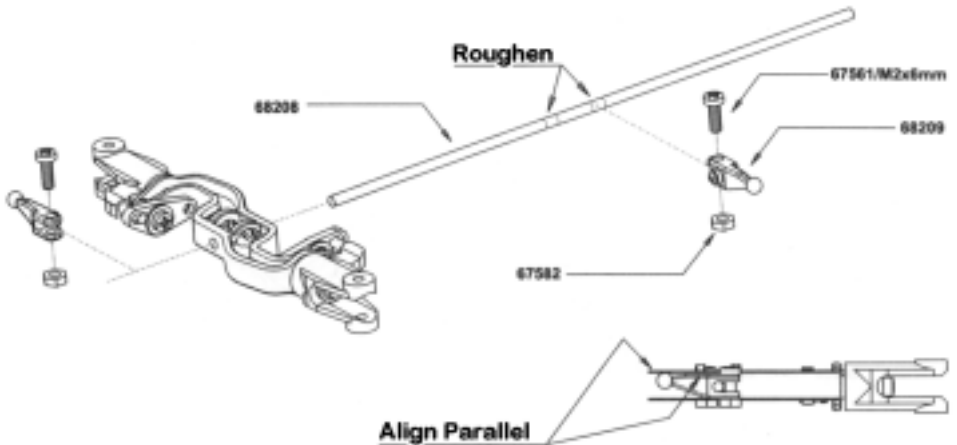
Next put two flanged bearings 68206, as shown, into the hole of a pitch control bellcrank 68212. Insert the screw and bolt the assembly to the rotor head 68214. Repeat for the other side. **Note:** you are tightening metal screws into a plastic part. Please be careful not to over tighten the screws as you can damage the rotor head and make it unusable.



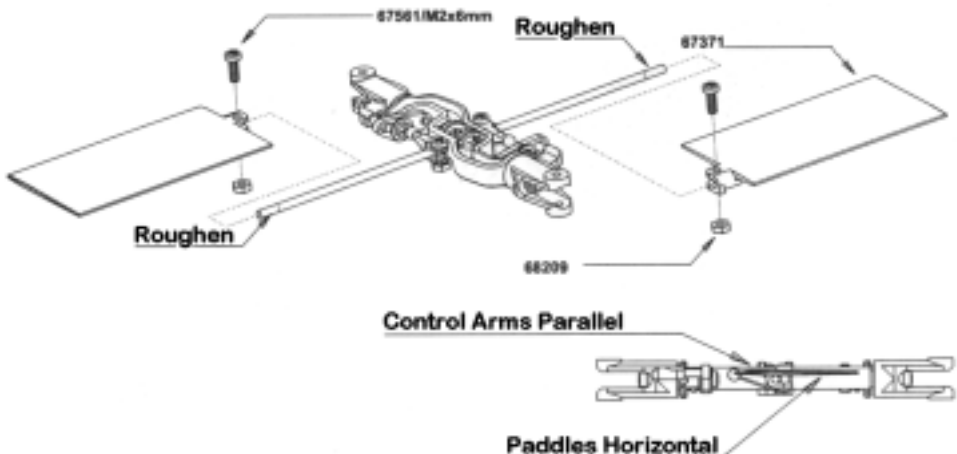
Put the two 2x6x3 ball races 67566 into the blade holder 68228. Insert the M2 x 12 hexagon socket screws and bolt these to the rotor head. The drive pin of the blade holder must locate in the slotted hole of the pitch bell crank. Please tighten these screws



Insert the fly-bar 68208 through the rotor head and roughen up within the area of the control levers. Screw the control levers 68209 on either side of the head. The fly-bar must sit accurately in the middle to ensure smooth, vibration free, running. Align the control levers, when screwing them on, so that the top edge (on both sides) is parallel to the upper edge of the rotor head.



Note: Since the new fly-bar is more rigid, the ends must be roughened with emery cloth where the paddles are fitted. Now bolt the paddles 67371 to the fly-bar. Again, the paddles must be mounted evenly, and be horizontal on both sides when the control levers are parallel to the upper edge of the rotor head.



Glue the servo mount plate 68218 to the chassis in the position shown.

Slide the completed washplate assembly over the main shaft.

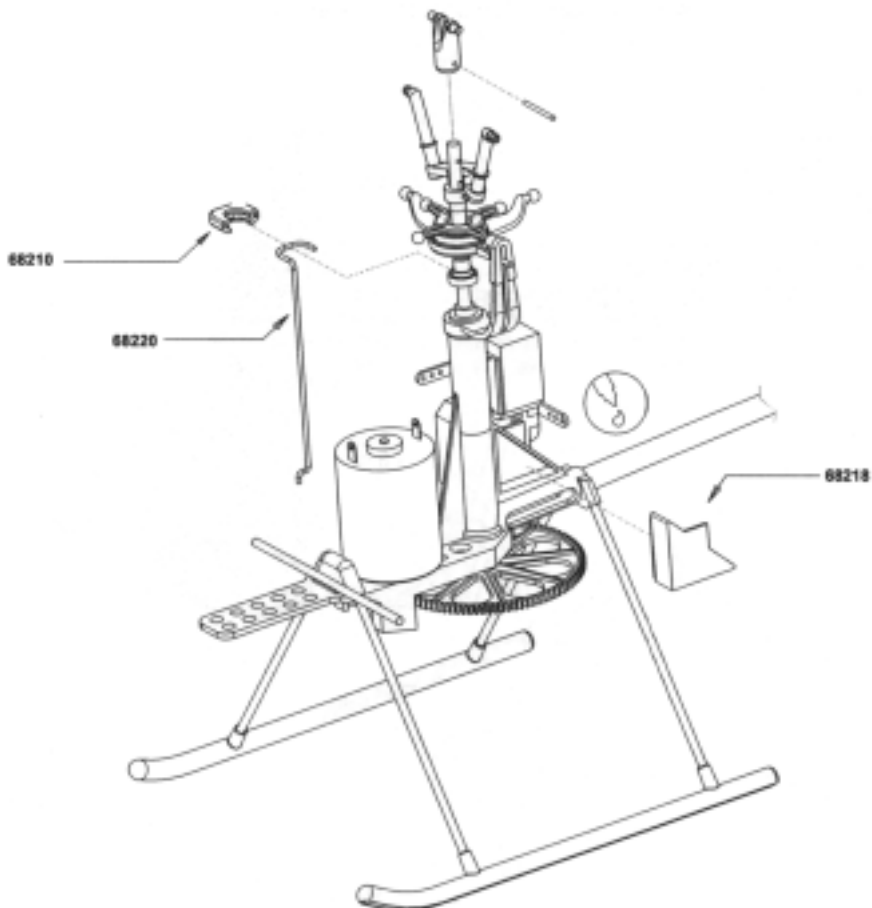
Put the Pitch drive ring 68210 over the pitch control linkage 68220 and press both onto the ball race of the pitch case.

Now put the centre hub of the rotor head onto the main shaft and fasten it with the pin.

Connect the Pitch Servo to the Piccoboard as follows:

V1 Disconnect the plug of the main rotor controller from the receiver. Connect the Y-lead to the receiver and then connect the pitch servo and main speed controller to the Y-lead.

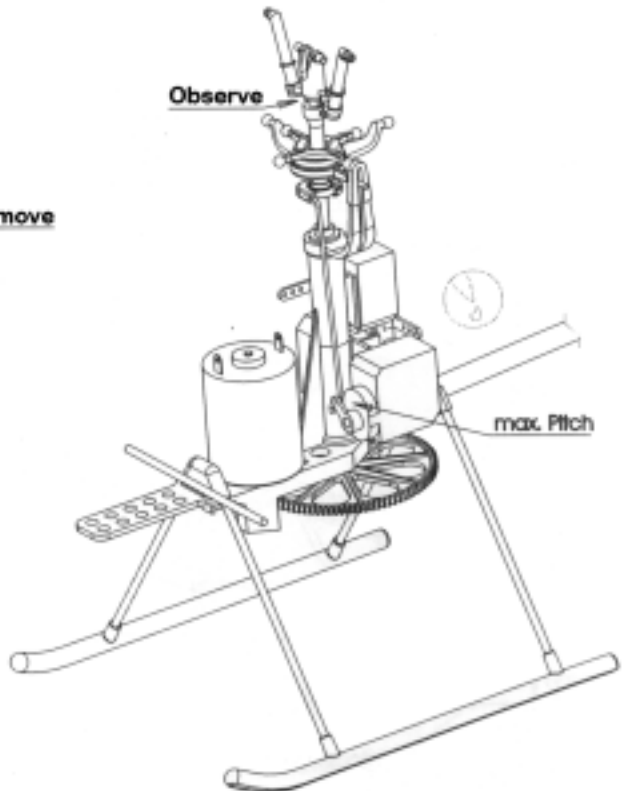
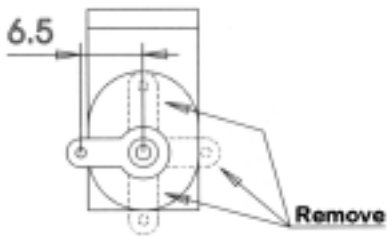
V2 Connect the pitch servo and main motor controller to the



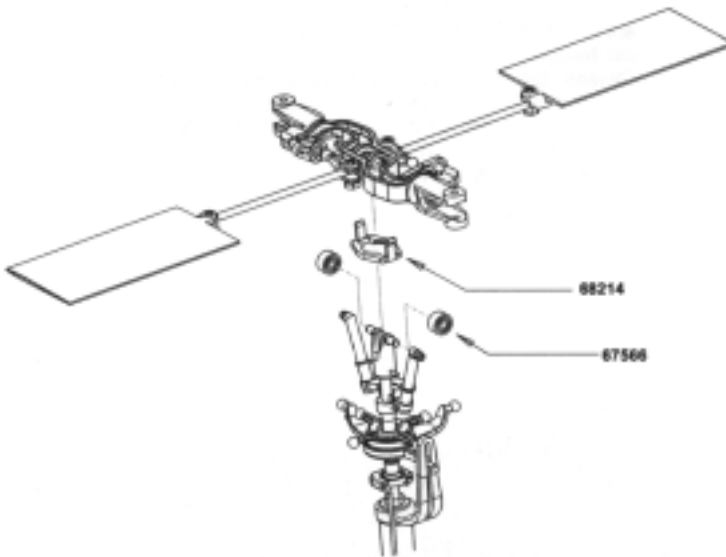
Disconnect the leads of both Motors from your Piccoboard.

Switch on your transmitter and connect the battery to the Piccoboard. Move the throttle / collective pitch stick to the central position. Make sure you have the right length arm on your servo (see diagram).

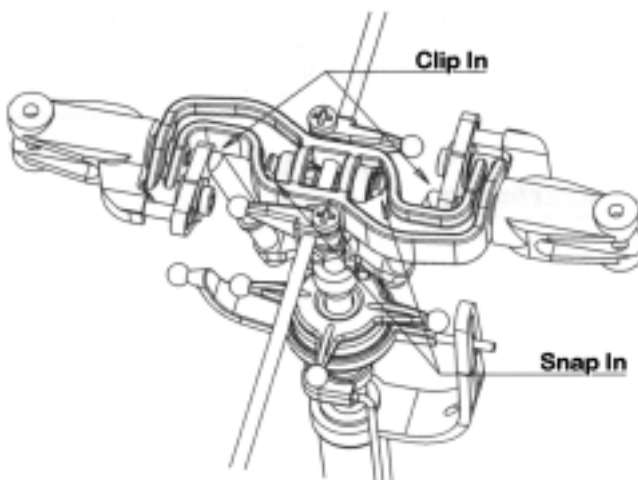
Move the transmitter throttle stick to the full power position. Connect the collective pitch linkage to the collective pitch servo arm. You can now move the pitch mechanism vertically by moving the servo. Move the servo carefully (without force) as high as possible, until the pitch case rests against the centre hub of the rotor head. In this position, glue the servo onto it's mount. When the glue has dried, bring the throttle / collective pitch stick on the transmitter into the central position. Move the transmitter trims for the pitch and roll function to the centre position. Disconnect the battery from the



The higher acceleration forces, which occur with the Pitch-Piccolo, require additional protection for the rotor head. Place the locking clip 68214 over the central hub. Put the two 2x6x3 ball races onto the central hub. Clip on the pre-assembled rotor head onto the ball races as before.

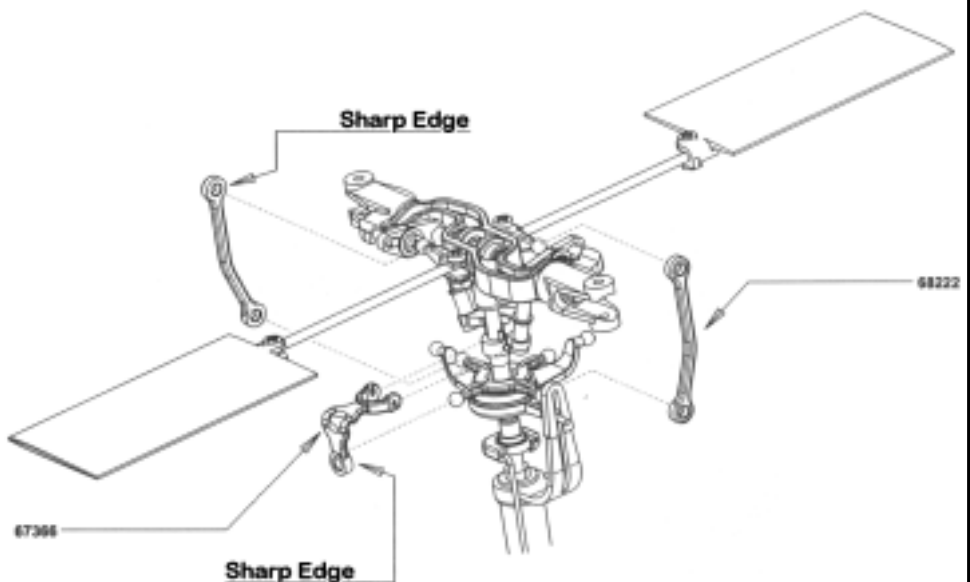


Shift the locking clip upward, until both locking hooks locate into position in the rotor head and catch. Afterwards clip both of the pitch control rods, from the inside, into the pitch bell cranks until you hear the snap locks click into position.



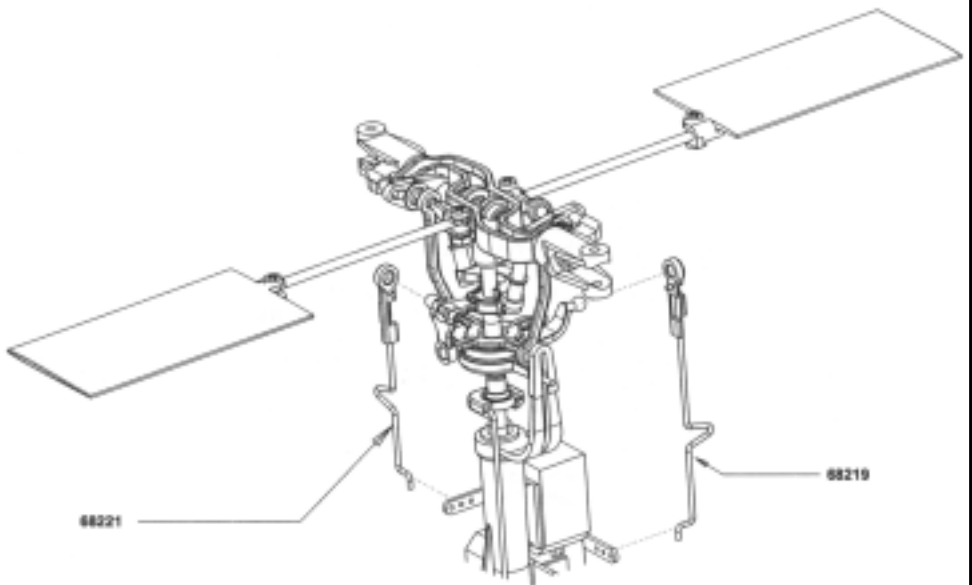
Mount the swashplate anti-rotation link 67366 into position so that the sharp edge around the ball housing is inside as illustrated. Attach the U-shaped end to the two pins at the top of the pitch slider, and then press the ball housing onto one of the balls with a short arm on the swashplate inner ring. **Note:** the swashplate anti-rotation link is no longer fastened the central head piece. Also make sure it is mounted the correct way around

Attach now the fly-bar control arms 68222, first on to the balls at the long arms of the swashplate inner ring, then on the fly-bar arms. The sharp edge of the control arms should be inside.



Remove the ball links from your old linkages and put these on the new, longer linkages 68219 and 68221. Put the swashplate into a horizontal position and insert the linkages into the middle holes of the servo levers.

Now modify the linkages, if necessary, by bending the V of the linkages to alter their length, until the swash plate with the linkages installed is horizontally.

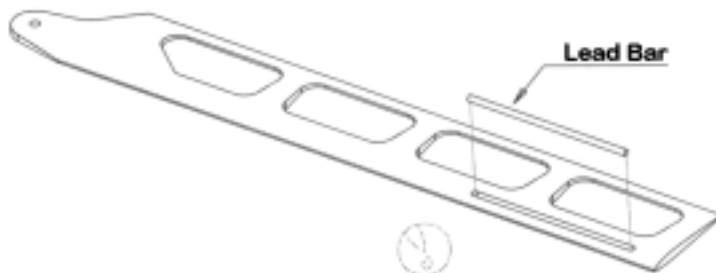


The rotor blades 68213 of the pitch-Piccolo are optimized in profile and centre of gravity and are still to be completed. Please take time and care with this process!

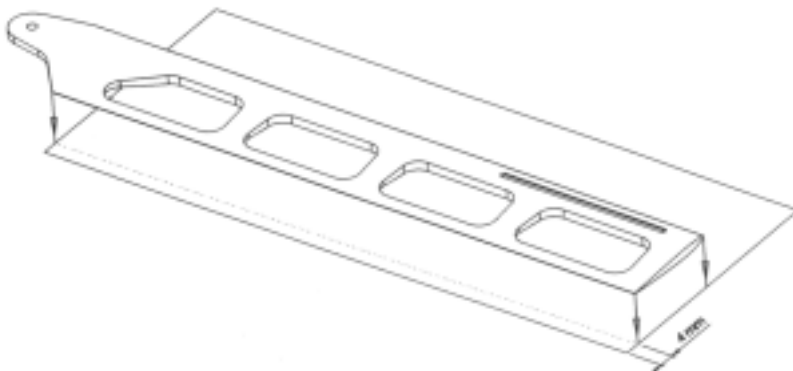
The following steps must execute for both rotor blades. Straighten, if necessary, the lead bars by rolling them on a flat surface. The lead provides for an optimized position of the blade centre of gravity.

Then insert each lead bar into the prefabricated slot.

Position the bar in such a way that it does not protrude over the outline of the profile at any point, and stick it carefully in place from both sides. **Caution: the lead must not be able to work loose under any circumstances during the flying operation!**

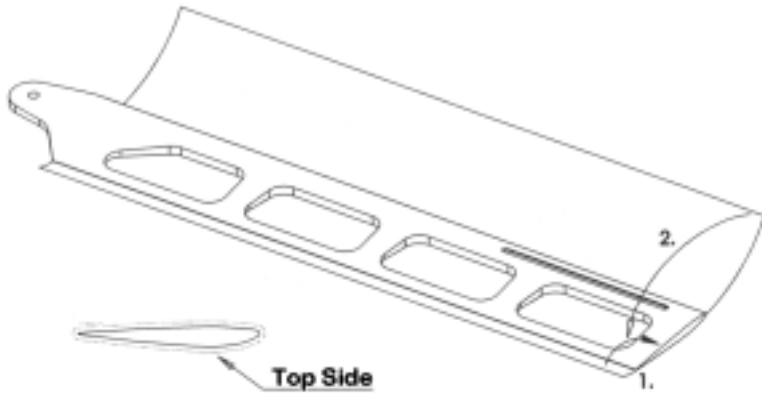


You will find self-adhesive film included on the kit for covering of the main rotor blades. For optimal blade attitude recognition a piece of yellow adhesive film on one blade is recommended. You can also use a different colour films on each blade. We also recommend Orastick (ProTrim) adhesive film which is available from the modelling trade in many colours. Take the self-adhesive film and remove the protective plastic film. Put then the film, adhesive upward, on a smooth flat surface. Hold the rotor blade into the position shown, approximately 2cm over the film and carefully lower the blade, rear edge first. When positioned correctly on the film, press it in lightly and carefully forward from the rear edge, until the foil on this side of the blade (the later profile top side) is stuck on.

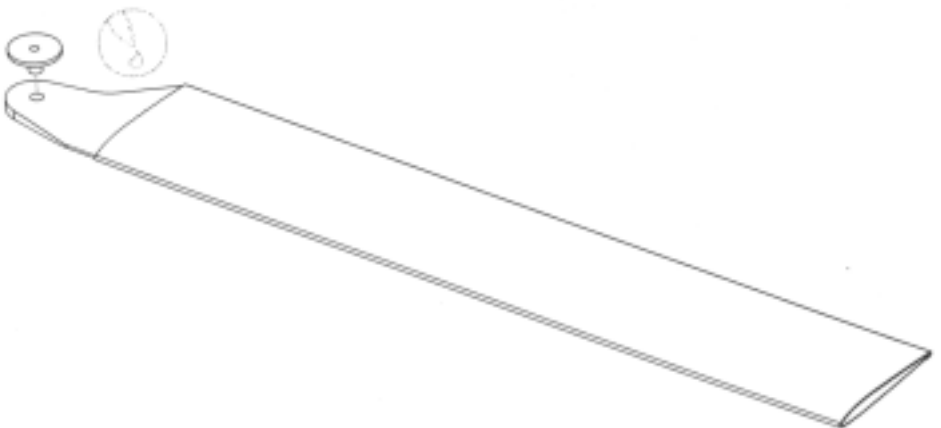


Wrap the short edge of film all the way over the onto the other side of the blade and press the film down. To do this, it is helpful to lift the blade and carefully press in down on the surface, then slowly tip the blade over until the rear edge rests flat on the surface so the film is completely attached. Then return the blade to its previous position.

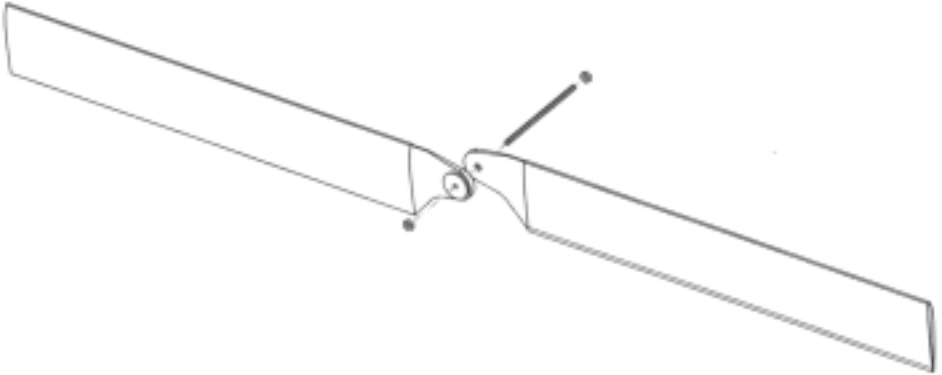
Neatly bring the long edge of the film all the way over from the front of the blade to the rear. When you are happy, press to stick it down. The adhesive strength of the film can be increased by heating



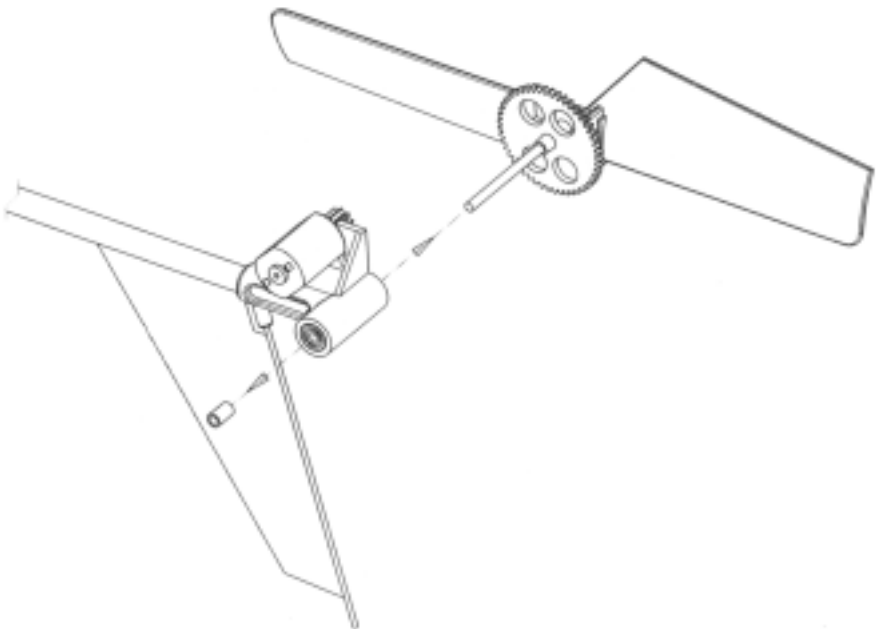
Place the blade back on the surface with the top of the blade uppermost. Glue the blade ferrule into the hole in the blade root, as shown, using CA-adhesive.



The rotor blades must be still be balanced. Hold the blades together as illustrated and put the M2 threaded rod through the hubs. Bolt the bar asymmetrically with two M2 nuts, so that one nut sits at the beginning of the threaded rod. Tighten the nuts evenly in such a way that the blades do not swivel under their own weight.



Take your Piccolo and dismantle the tail rotor. Do this by removing the piece of silicon on the rear (engine) side of the tail and then pull the tail rotor blade and gear wheel from the bearings. The bearings remain in the tail rotor housing.



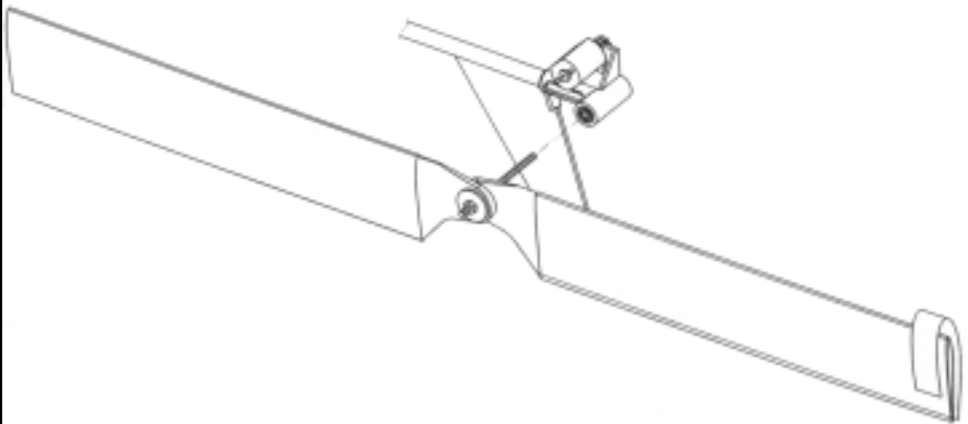
First, put the threaded rod fitted to the main rotor blades into the ball bearings into the tail rotor housing. Make sure that the threaded rod goes through both bearings and can freely turn.

Now observe whether one blade lifts itself. Repeat this several times, until you are sure which blade lifts. Stick around the end of this blade the black adhesive strip, so that you can detect the tracking later. Repeat the balancing and stick to the lighter blade, if necessary, a strip of Tesa film. Take time doing this exercise, and only stick the tape to the rear of the blade to start. Then shorten the adhesive strip until the blades remain in horizontal position. Then stick the tape as shown around the blade end.

If the rotor blades are correctly balanced from the beginning, please stick one short (1 cm) adhesive tape strip to each leading edge of the blade profile. Use more black tape on the blade with the black adhesive film, and on the other use Tesa film. This facilitates observing and adjusting the tracking later.

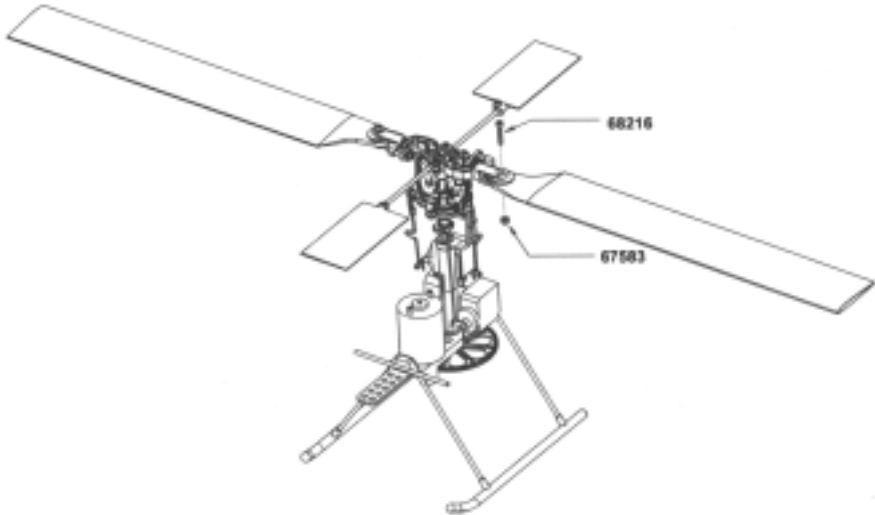
If you can now pull the threaded rod out of the tail rotor again, unscrew the nuts and remove the threaded rod.

Please now reassemble your tail rotor again.



Now fasten the rotor blades using the M2x12 socket-head cap screws and Nyloc nuts. Tighten these carefully until the rotor blades do not swivel even if you put the helicopter on it's side.

Now you have finished it, your pitch Piccolo is rigged before you! Before the next steps, adjusting the model, please first ensure that your batteries are charged and check all connections



Adjusting and flying

The new rotor head handles in a more agile manner than before. It is therefore advisable to connect the pitch and roll linkages in the middle hole of the servo levers, or to reduce the servo travel from the transmitter to approximately 70%.

As previously described, there are two possible versions:

V1 (combined control of pitch and RPM)

Two points must be given particularly consideration here:

1. The measurement X of the pitch linkages must be adjusted as described.
2. The pitch servo must, as described, be installed so that the pitch case rests against the central piece with pitch max (full power).

Thus a basic adjustment is made.

V2 (separate control of RPM and pitch)

For this a 5 channel transmitter with appropriate programming

Adjust the main rotor speed, in the hover, to approximately 1700RPM. By programming a gas pre-selection your pitch Piccolo becomes, without reservation, aerobatics suited.

So that you can use and adjust the system to an optimal condition, we recommend version 2!

The following components and adjustments have proven to be particularly successful.

- Tuning motor G310 (160559)
- 9 tooth pinion
- 8 cell NiCd pack 250mAh (67491)
- Piccboard Plus (720535 or 720540)
- Heading Lock module (720624)
- Free-wheel (67459)
- Measure of pitch linkages 'X': 4.5mm
- Number of revolutions: 1650 RPM, aerobatics: 1750 RPM

Now check the following are still correct
Function of throttle and pitch servos.

Motor off = Pitch housing down

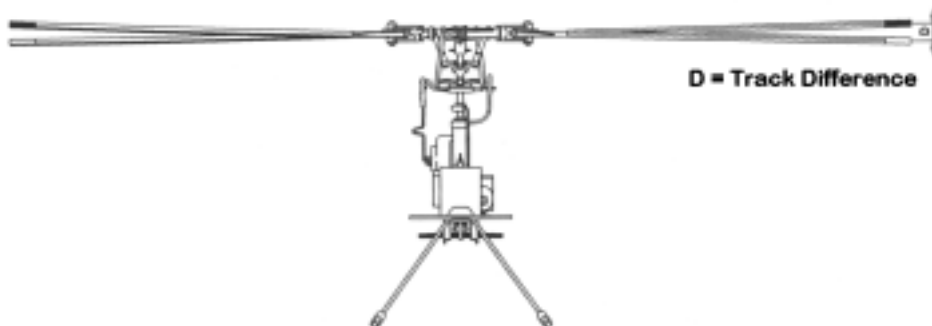
Motor Full throttle – Pitch housing up

Before you first fly, you must check the tracking of the main rotor blades, and if necessary adjust.

Slowly open the throttle and increase the RPM, to the point where the Piccolo is just before take off.

Observe the right side the of the blade disc. If you (as drawn) detect a difference between the two blades, determine which blade runs at the higher level. In the example darkly marked page runs higher.

Stop the main rotor again and remove the Battery.

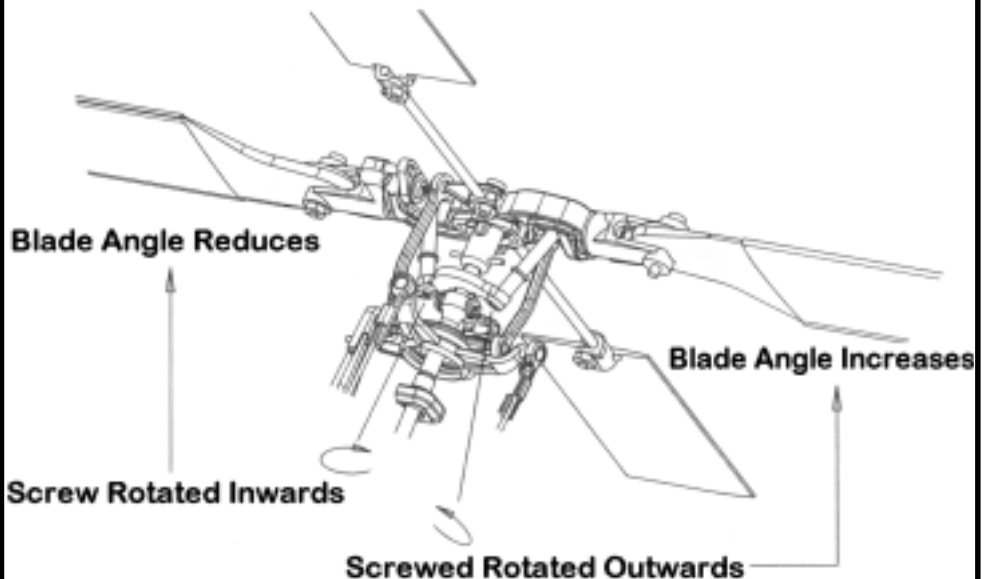


Now adjust the angle of incidence of the blade that is running higher. The blade angle is controlled by the mixer bellcrank 68212 and the mixer arms 68223. Tighten the mixer arm screw 68217 of the higher running blade. Proceed carefully, one revolution of the screw corresponds to approximately 1 cm of track run change.

If the track run difference was larger than 1 cm, we recommend, to not only adjust the higher running blade, but also raise the lower running blade. To raise the lower blade, unscrew the mixer arm screw.

Re-check the tracking and continue to make the adjustments, as described above, until both rotor blades run in the same plane.

Next you check the tracking in hovering flight, which is easiest with an assistant. This allows them to concentrate on the rotor blade



Once the tracking is adjusted, you are ready for your first flight. Please note that with Version 1 the negative pitch travel cannot be reduced. Therefore it is to be noted that using negative pitch in flight should be undertaken carefully. Make yourselves first familiar with the changed flight characteristics. In time you will be able to control ever more daring manoeuvres, and you alone will be able to determine the boundaries that are feasible.

Overview

Qty	Order No.	Description	Dimensions (mm)
2	68202	Silicon Tube	1 x 6
1	68203	Main Shaft CFK	114.5 x 3
1	68204	Locking Ring	2 x 5
1	68205	Bearing	4 x 7 x 2
4	68206	Flanged Bearing	2 x 5 x 1.5
1	68207	Bearing Retainer	1 x 5
1	68208	Fly-bar	2 x 150
2	68209	Control Arms	2 x 3 x 15
1	68210	Pitch Drive Ring	11 x 7 x 3
1	68211	Pitch Slider	28 x 22 x 10
2	68212	Pitch Bellcrank	2 x 7 x 15
2	68213	Main Rotor Blade	23.1 x 3.4
1	68214	Rotor Head	17 x 45 x 9
1	68215	Rotor Head Clip	16 x 6.5 x 11
4	68216	Screw	M2 x 12, black
2	68217	Screw	1.6 x 10
1	68218	Servo Mounting	19 x 19 x 8
1	68219	Control Rod, Pitch	1 x 55
1	68220	Control Rod, Collective	1 x 59
1	68221	Control Rod, Roll	1 x 45
2	68222	Fly-bar Control Rods	36 x 2
2	68223	Mixer Arms	14 x 3
1	68224	Collective Pitch Swashplate	
1	68225	Swashplate Guide Extension	2 x 6 x 12
2	68226	Lead Weights	2 x 50
2	68228	Blade Holder	10 x 16 x 26
4	67566	Bearing	2 x 6 x 3
6	67582	Nut	M2
2	67371	Paddle	24.3 x 5 x 2, 13
6	67561	Screw	2 x 6
2	67583	Nyloc Nut	M2
1	67366	Swashplate Anti-Rotation Link	25.5 x 8.5 x 2.5

Troubleshooting

Problem	A possible cause	Consequence	Elimination of errors
Model does not Take-Off.	Direction of travel of the pitch servo is wrong Pitch servo incorrectly positioned Pitch linkage poorly adjusted Throttle travel is reduced at the transmitter	Blades produce no lift Too low an angle of incidence (pitch) Too low an angle of incidence (pitch) Motor does not reach full power.	Reverse direction of travel of the servo Position correctly Check Pitch values (setting dimension of pitch linkage) Adjust servo travel to 100%
RPM reduces with maximum pitch	Pitch linkage incorrectly adjusted	Too high an angle of incidence (pitch)	Check Pitch values (setting dimension of pitch linkage)
Poor Flying Time	Too low an RPM Optimal flying times are achieved using the recommended components (Tuning Battery and Tuning Motor)	Poor efficiency	Check Pitch values (setting dimension of pitch linkage)
Model Vibrates	Tracking adjustment Blades poorly balanced Blade holder screw bent Paddle fly-bar rotates	Vibration	Re-adjust Re-balance Replace screws Re-adjust

