

Building Instructions

Upside Variable

Pitch Prop System



Thank you for buying our revolutionary UPSIDEDOWN VP-Prop System! Experience a new dimension in 3D performance. Assembly and installation is quite simple, but please read the instruction manual for important safety notes and valuable hints to get the best results from your system. This unit can be used with a variety of motors. We recommend using the German made motor (MAOUSDBLMOT) 33 g 1300KV motor for smaller airplanes around 5 - 8 oz. For larger models we recommend using the E-flite Park 370 1360 KV (EFLM1205) up to 12 oz flying weight.

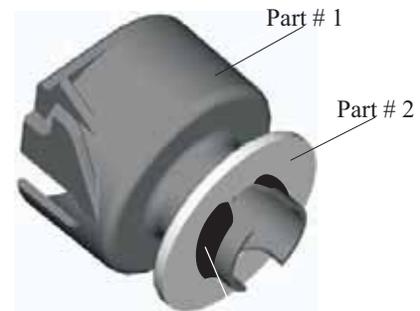
1. Assembly and setup:

Prior to assembly we recommend identifying all individual parts using the parts list. If you find any part to be not acceptable for any reason or missing, please contact us before you start.

1.1

Push the ring (part #2) onto part #1. Ensure that the rounded sides of parts face each other and that the ring is pushed all the way in. Secure the ring with a small amount of 5-min Epoxy. The ring has to be exactly parallel to avoid imbalance.

1.1



use 5min-epoxy glue

1.2

Attach two ball bearings (2x5 mm) to each prop blade using the supplied M2 x 12mm screw.

Attention: Don't over tighten the screws. The ball bearings must spin freely!

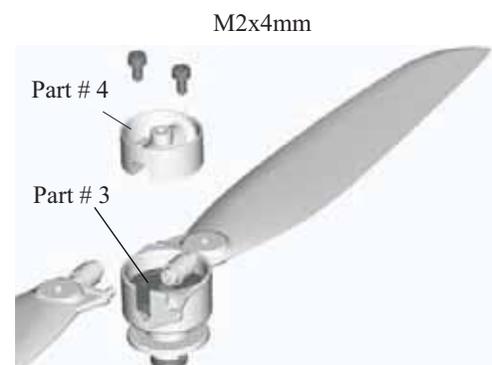
1.2



1.3

Insert the aluminum prop adapter (part #3) into the pitch bridge and attach the blades as shown in the picture. Insert the blade holder (part #4) and secure it with two M2 x 4mm screws. Check for free movement of the mechanism. If necessary, remove any flash and / or glue residues.

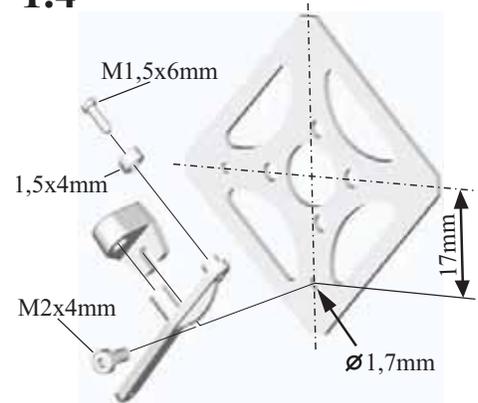
1.3



1.4

1.4

If you want to use an existing motor mount, you need to drill a 1.7 mm hole at a distance of 17mm away from the motor shaft. You can now attach the pitch lever to the motor mount.

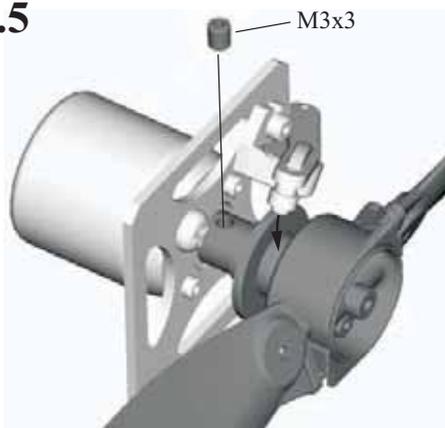


1.5

The variable pitch prop unit is fastened to the motor shaft with one setscrew. The aluminum prop adapter needs to be positioned all the way towards the ball bearing of the motor (to prevent the motor shaft from moving during negative pitch phases).

Loosen the attachment screw of the pitch lever; ensure that the small ball bearing runs between the two discs plates, and tighten the screw again.

1.5



1.5



1.6 Connect the pitch lever with the pitch servo using a rod with a Z-bend. For best performance and to avoid oscillations, try to keep the connecting rod as short as possible.

2. Programming (Computer radio transmitter Set-Up):

There are several possibilities to set up the mix of ESC (Electronic Speed Control) and variable pitch control.

The following set-up describes the usage of a computer radio with a helicopter program:

2.1

Choose a helicopter set-up with a separate pitch servo and deactivate any pre-programmed mixing as "Revomix".

2.2

Use two flight phases (Normal and Acro or Normal and Idle Up) where you can program two independent curves for throttle and pitch.

2.3

In phase 1 (Normal) the throttle should work linear from 0-100%, while the pitch servo stays at +100%, i.e. constant max. pitch forward.

2.4

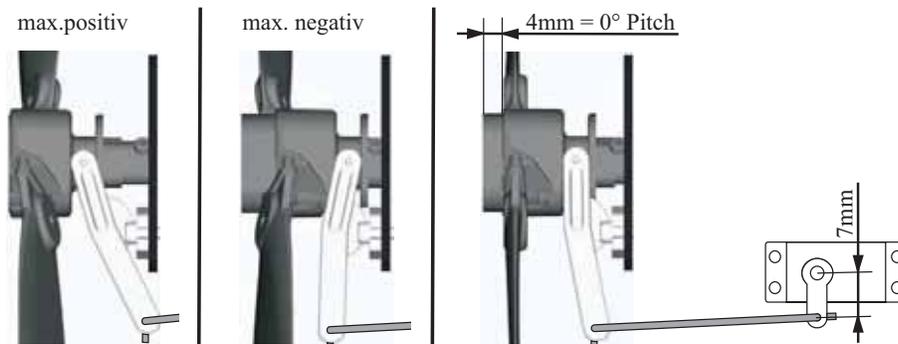
In phase 2 (Acro or Idle-Up), the pitch servo needs to follow the throttle stick from -100% to +100%, while the motor curve needs to be modified into a V-shape, i.e. full throttle at both end positions of the stick and zero power in the middle (-100%).

Ensure that the mechanical set-up provides you zero pitch with the throttle stick in mid-position.

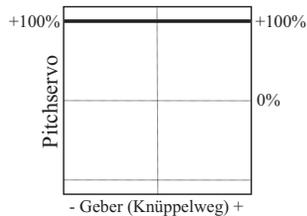
You can check it optically or measure it as shown in the picture (gap = 4mm).

Warning: In order to check the pitch values, it is best to disconnect the motor from the ESC.

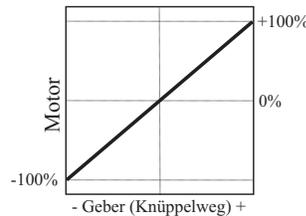
2.1-2.3



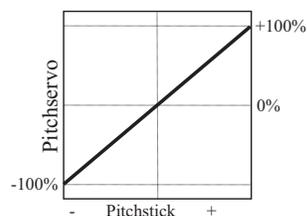
Pitch phase 1



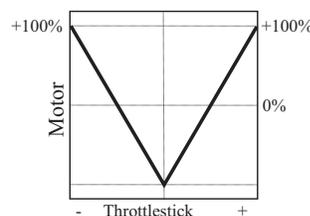
Throttle phase 1



Pitch phase 2

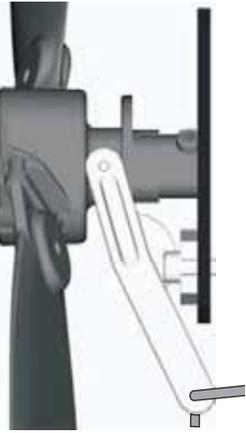


Throttle phase 2

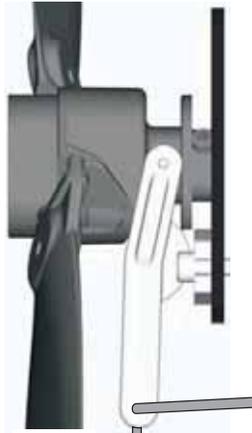


2.1-2.3

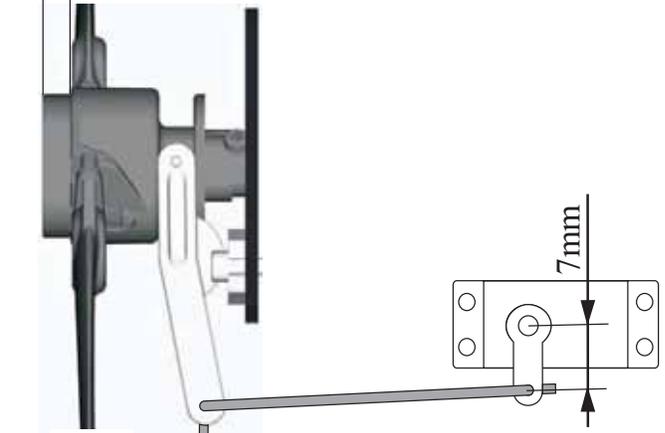
max. positiv



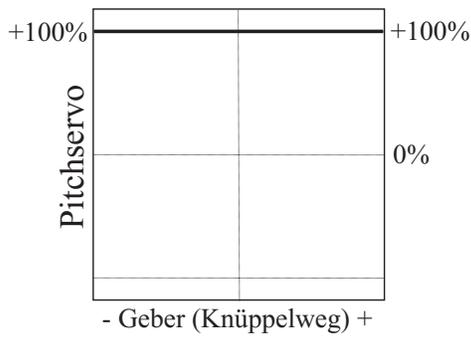
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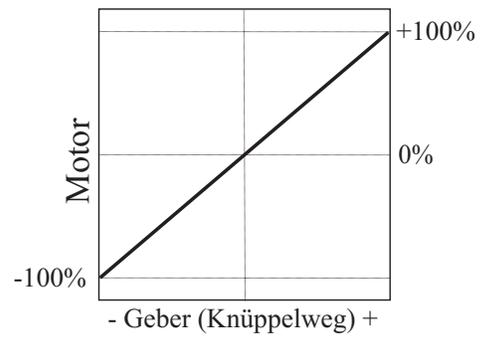
4mm = 0° Pitch



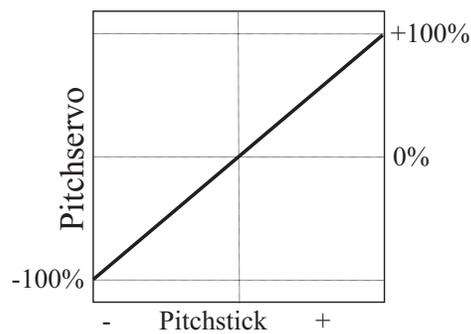
Pitch phase 1



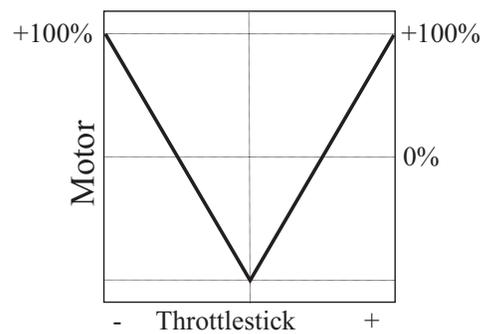
Throttle phase 1



Pitch phase 2



Throttle phase 2



3. System check.

Select phase 1 and carefully open the throttle. The motor should accelerate as usual with a conventional prop set-up and provide positive thrust. Attention: For best performance it is recommended to measure the motor current and to adjust the maximum pitch setting to avoid exceeding battery / motor limits.

To check phase 2, start your system in phase 1 and run it up to full throttle. Switching to phase 2 should not cause any changes. Moving the throttle stick slowly towards the mid position should reduce the prop rpm, reaching the minimum in mid position. Further movement of the stick should cause the motor to spin faster again, but now the prop should start providing negative thrust. Prop rpm should be about the same at positive and negative throttle / pitch settings.

4. Fine Tuning:

After initial flight tests, you may want to re-adjust the maximum pitch values for best performance. Raising the bottom of the V-shaped throttle curve in phase 2 will prevent the motor from stopping completely at zero pitch setting. More kinetic energy will remain stored in the prop system, and initial reaction on pitch changes are more aggressive.

Warning: Never run the motor at high power level and low pitch. Max. prop rpm must never exceed 10.000rpm. Changes to the set-up should be done in small increments and the results monitored carefully.

Keep yourself and others away from the path of rotating blades. Never re-use a damaged, nicked or bent prop.

5. Maintenance:

Some of the design goals for the UPSIDEDOWN VP-Prop System were robustness and low maintenance. In order to reduce the shock loads on the props mechanics and the pitch servo when hitting the ground or walls, the high tensile blade screws (M2 x 12mm) are designed to bent. Even light ground contact can cause extreme loads at high the prop rpm! Always check for vibrations. Vibrations usually indicate that the blade screws are bent. Replacing the screws doesn't take long and should fix x the problem immediately. Vibrations can also be a sign of some mechanical damage and / or a bad set-up. While the prop usually won't fail under these conditions, a weak or damaged fuselage / motor mount often does.

Ensure that your model is up to the job!

We hope that you will have fun exploring the new dimension of flight! (4D)

6. Replacement Parts:

Part Number	Description
MAOUSD8	8" blades with (2) 2.0mm x 12mm screws
MAOUSD9	9" blades with (2) 2.0mm x 12mm screws
MAOUSDSPARE1	Plastic housing, holder and ring
MAOUSDSPARE2	Pitch arm / holder with (1) 1.5 x 4mm bearing and 1.5mm screw
MAOUSDSPARE3	2x5mm blade ball bearings (4)
MAOUSDSPARE4	Carbon mount (1 piece)
MAOUSDBLMOT	BL-Outrunner Motor 1300KV 33g
DUB2114	2.0mm x 12 socket head cap screws (4)

Distributed exclusively in the US by Horizon Hobby, Inc.

Plastic parts:

Part # 1:



Plastic Housing

Part # 2:



Ring

Part # 3



Aluminum Hub

Part # 4:



Blade holder

Part # 5:



Pitch holder

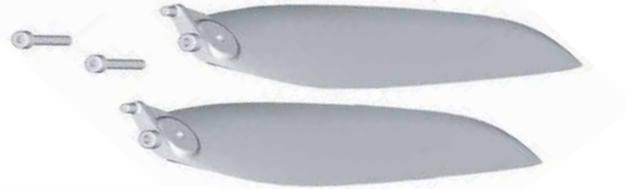
Part # 6:



Pitch arm

Spare parts:

MAOUSD8 + MAOUSD9:



MAOUSDSPARE1:



MAOUSDSPARE2:



MAOUSDSPARE3:



MAOUSDSPARE4:

