"Magnus" Instruction Manual

Thank you for purchasing the Magnus.

Before rushing into the build, we know you are keen! ;) Please take these steps: -

- Please carefully unpack the contents of the box making sure you have all the parts, if not please contact your seller.
- Check the model for postal damage.

1. Kit Contents: -

- Left- and Right-hand Wings
- Carbon Wing Joiner
- Tailplane
- Fuselage
- Canopy
- 2x 3mm x 8mm screws (for the tailplane)
- 4x Servo covers
- 2x Carbon Flap Horns
- 2x Carbon Aileron Horns
- 1x Carbon Elevator Horn
- 1x Carbon push rod (Elevator)
- 1x Fuselage Servo Tray
- 10x M2 Clevises
- 4x 2mm x 40mm Threaded rod
- 2x 2mm x 26mm Threaded rod

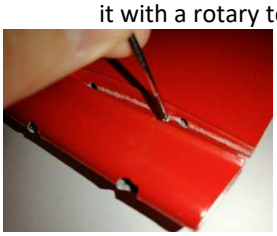
2. Required Ancillaries (NOT Supplied): -

- Epoxy Resin – my preference - Zpoxy 15min
- Thickening agent (for the epoxy) – my preference - West Systems 403, this provides some extra strength to the glue joint.
- Isopropyl Alcohol
- 320grit sandpaper
- Ball cutter
- 1.5mm milling cutter
- Files
- Masking tape

Let's start the Build ;)

3. Fuselage

- Check the seam around the tail plane opening, if there is any excess flashing/material on the top/bottom, then remove it with a rotary tool i.e. Dremel and use a ball cutter.



4. Tail plane

- Up first is the elevator horn...
- I fitted the tail-plane with the supplied 3mm CSK cap heads, marked the required location of the control horn slightly off centre to allow the clevis to fit in the opening without fouling.
- Make sure the horn is perpendicular to the wiper/hinge line.
- Measure 2mm from the wiper and mark!
- Then measure 15mm from the first mark.

- I used a 1.5mm diamond pattern milling cutter to create the slot. I always place my finger directly underneath where i want the slot, this way I know when I am close to the outer glass/carbon layer.

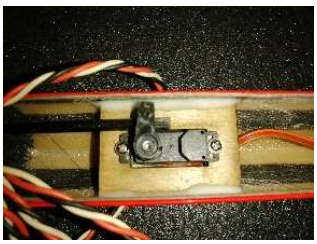
4.1 Gluing the Elevator horn

- Roughen the surface of the horn sides and wipe with isopropyl alcohol. I used 15minute epoxy mixed with West Systems 403. Apply the glue to the horn's holes, bottom and sides. Oh, apply some glue into the slot cut earlier ;). Tape or hold the horn in position and make sure it is vertical.

5. Elevator Pushrod

Insert Picture)

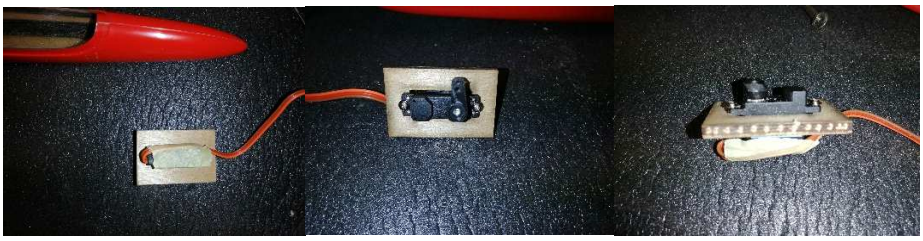
- The 2mm Threaded rod is 26mm long, use a round file to scuff the ID of the carbon tube and clean with Isopropyl alcohol.
- Apply 15min epoxy and thickening agent to the threaded rod and the inside of the carbon tube.
- Insert the threaded rod half its length (13mm) and leave to cure.
- Add the clevis to the prepared end, attach to the elevator control horn and tape the elevator control surface in its neutral position.



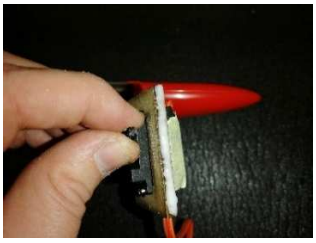
- Now it's time to apply the clevis to the other end…
- With the rod installed and elevator taped into its neutral position and servo in its neutral position 1500us, mark the rod at the chosen servo arm hole. Allow for small amount of adjustment.
- Cut the rod to length and prepare the rod the same as the elevator side.

6. Installing the elevator servo and tray.

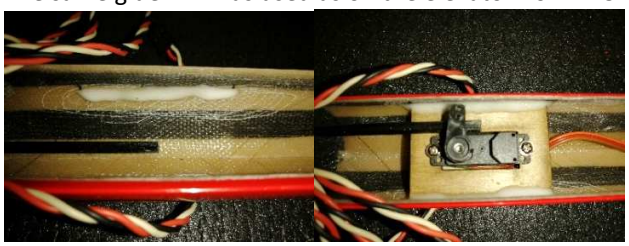
- Test fit the servo tray and sand as required for the best fit. The servo should be almost touching the bottom of the fuselage. I allowed space for a small ballast tube.



- I used 320 grit sandpaper to roughen up the fuse as well as the milling cutter (by hand), I then cleaned with isopropyl alcohol. Note* The servo just touches the fuse bottom.



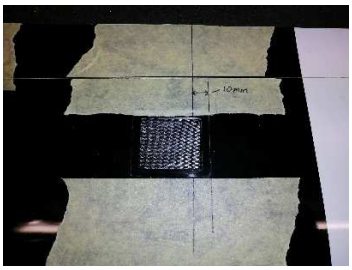
- The same glue mix was used as on the elevator horn. 15min epoxy + West Systems 403.



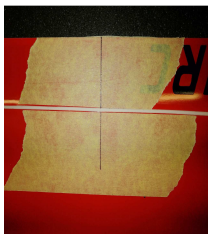
- I added some nice fillets to the top of the tray.

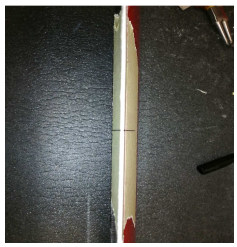
7. Installing the Flap horns and servos

- The servo hatch recess and control surface hinge are perpendicular. Measure 10mm from the outer recess and mark. I draw a line parallel to the hatch recess, the right-hand side of the image is the side of the G10 horn (clevis pin entry).

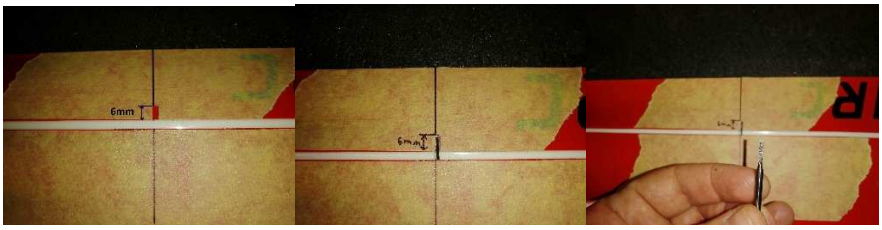


Transfer to wing top >

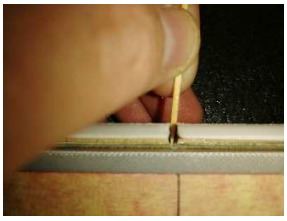




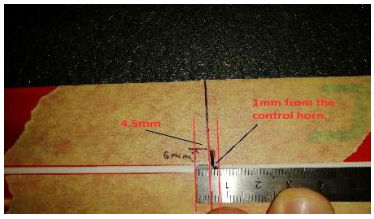
- Measure 6mm from the wiper and mark the slot required for the G10 Flap horn.



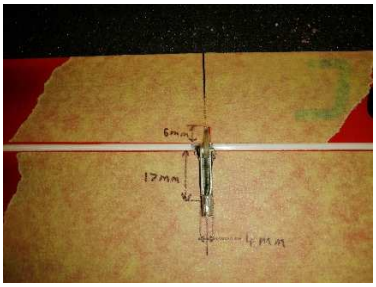
- Cut through the flap stiffener and though the bottom core layer leaving just the outer glass or carbon layer.



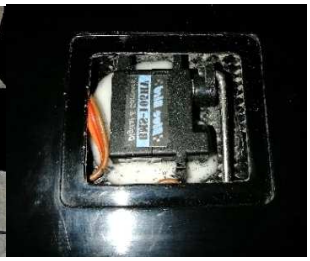
Next mark and cut the wiper >

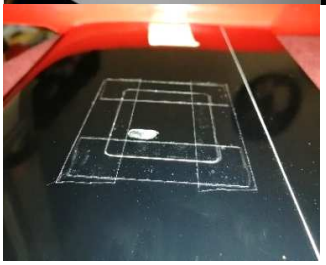


- Next cut the slot in the top wing skin for the crossover linkage. From the gap 17mm long, 4mm wide.
- Now install the horn. Roughen the surface of the horn sides, wipe the horn and slot with isopropyl alcohol. I used 15minute epoxy mixed with West Systems 403. Apply the glue to the horn's holes, bottom, sides and to the slot cut earlier.
- Please make sure the horn is perpendicular, 90 degrees to the hinge line and lines marked out.



- Now install the flap servos……
- For flush servo covers a pushrod with a 90-degree bend and thread is the best way to get everything below the skin. The flap servo output shaft should be positioned close to the wing spar, the servo arm needs to have about a 20-degree offset towards the leading edge, this allows for 60+ degrees down flap. Drill a hole 1.5mm diameter in the flap servo arm as close to the hub as possible and thread 2mm.
- Roughen the servo pocket skin with 320grit sandpaper and/or a milling cutter (by hand) and clean with Isopropyl alcohol.
- Roughen the servo case and clean with Isopropyl alcohol.
- Remember to tape the control surface in its neutral position when gluing the servo in and please make sure the servo is perpendicular to the hinge line and servo pocket.
- Add some weight on top of the servo to keep it from moving.

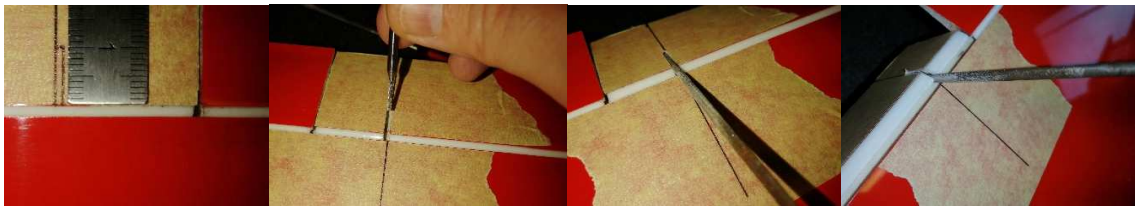




- Repeat this process on the other wing and position the servos to make sure they are all symmetrical (In the same place) in each wing.
- I spend a lot of time making sure the horns, servos and pushrods are perfectly square and true to each other.

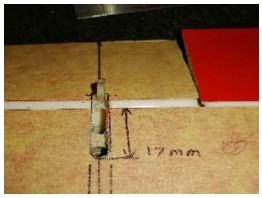
8. ***Installing the Aileron horns and servos***

- The servo hatch recess and control surface hinge are perpendicular. Measure 13mm from the outer recess and mark.
- I draw a line parallel to the hatch recess, the right-hand side of the image is the side of the G10 horn (clevis pin entry).
- Transfer to the top surface for the crossover linkage.
- Cut through the Aileron stiffener and though the bottom core layer leaving just the outer glass or carbon layer.

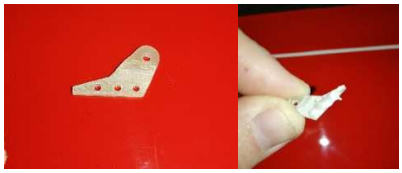


- Mark and cut the wiper for the clevis clearance.

- Next cut the slot in the top wing skin for the crossover linkage. From the gap 17mm long, 4mm wide.

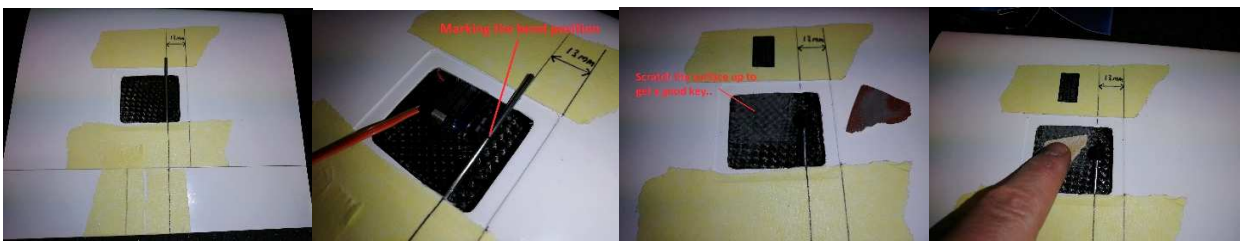


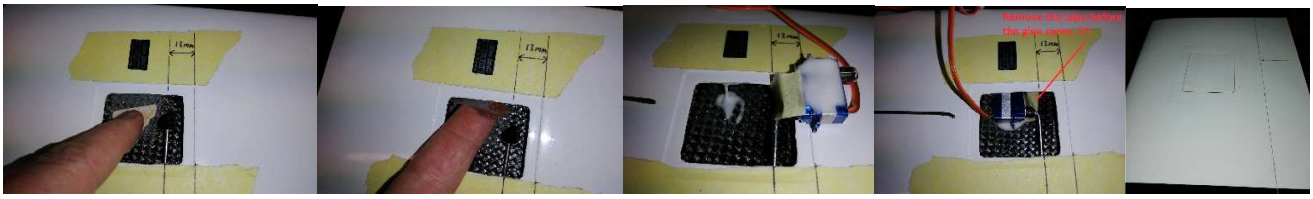
- Now install the horn. Roughen the surface of the horn sides, wipe the horn and slot with isopropyl alcohol. I used 15minute epoxy mixed with West Systems 403. Apply the glue to the horn's holes, bottom, sides and to the slot cut earlier.
- Please make sure the horn is perpendicular, 90 degrees to the hinge line and lines marked out.



Installing the Aileron Servos.

- A pushrod with a 90-degree bend and thread is the best way to get everything below the skin and provide the best geometry. Drill and tap a hole as close as possible to the servo arm's hub.
- The line indicates the outer side of the servo arm.
- Drill a hole 1.5mm diameter and thread 2mm in the Aileron servo arm as close to the hub as possible. Remember to tape the control surface in its neutral position when gluing the servo in and please make sure the servo is perpendicular to the hinge line and servo pocket. Add some weight on top of the servo to keep it from moving.
- The servo arm and pushrod should be 90 degrees to each other.





- Repeat this process on the other wing and position the servos to make sure they are all symmetrical (In the same place) in each wing.

9. Setup

Magnus Setup Sheet 17th July 2020			
Control	**Surface/Measure point:**	**UP**	**Down**
Aileron	Ailerons @Tip	6mm	2.8mm
	Flap @ Fuselage	6mm	3mm
Crow	Ailerons @ Tip	2.5mm	
	Flap @ Fuselage		46mm
	Elevator @ Tip		3mm
Camber (Variable)	Ailerons @ Tip		1mm
	Flap @ Fuselage		3mm
Reflex (Speed)	Ailerons @ Tip	0.5mm	
	Flap @ Fuselage	1mm	
Elevator	Measure @ Tip	2.5mm	2.5mm
Elevator Low Rate	Measure @ Tip	2mm	2mm
Snapflap	Ailerons @ Tip	0.5mm	1.5mm
	Flaps @ Fuselage	1mm	2.5mm

CG 76 - 84mm from wing the LE

Note* For beginners - Start with a CG @76mm
A CG of 79.5mm is recommended but can be moved further back to make the "Magnus" more lively. I have flown @ 90mm excellent for aerobatics but tucks at high speed.

10. Build Threads & groups: -

https://www.rcgroups.com/forums/showthread.php?3615207-%2A%2A%2ANew-Build-TJIRC-Magnus-60%2A%2A%2A

https://www.facebook.com/groups/306848527156158

https://forum.alofthobbies.com/index.php?threads%2Fmagnus-build-thread-tjirc.1245%2F&fbclid=IwAR2WoKuP7k24Au2tjMTPXaqFpHShS3IzBlvWhWQ_PUWMKlhbDf5tu7ZUdks