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2021

MIRAI V

Instruction Manual/Návod ke stavbě/Bauanleitung

F3RES/F5RES High Performance Thermal Glider / Electric Glider
Vysokovýkonný termický větroň/motorový větroň F3RES/F5RES
Der leistungsstarke Thermik-Segler / Motorsegler F3RES/F5RES

Rev. 1: 11/2021

PRECAUTIONS:

This R/C model is not a toy. Use it with care and stricktly following the instructions in this manual.
Assemble this model following stricktly these instructions. DO NOT modify or alter the model. Failure to do so, the warranty will lapse automatically. Follow the instructions in order to obtain a safe and solid model at the end of the assembly.
Children under the age of 14 must operate the model under the supervision of an adult.
Assure that the model is in perfect conditions before every flight, taking care that all the equipment works correctly and that the model is undamaged in its structure.
Fly only in days with light breeze and in a safe place away from any obstacles.

UPOZORNĚNÍ:

Tento RC model není hračka. Je určen k provozování osobami staršími 15 let.
Model dokončete a připravte k letu PŘESNĚ podle návodu. Model NEUPRAVUJTE, v opačném případě automaticky ztrácí záruka svoji platnost.
Model provozujte opatrně a ohleduplně, důsledně se řiďte pokyny v tomto návodu.
Před každým letem se ujistěte, že model je v prvotřídním stavu, dbejte, aby všechny části pracovaly správně, a model nebyl poškozený.
S modelem létejte na vhodné ploše bez překážek, stromů, elektrických vedení apod. Vyhledejte bezpečné místo, mimo cesty a veřejné komunikace, dbejte na bezpečnost přihlížejících diváků.

VORSICHTSMAßNAHMEN:

Dieses R/C Modell ist kein Spielzeug. Benutzen Sie es mit Vorsicht und halten
Sie sich an die Anweisungen in dieser Anleitung. Bauen Sie das Modell gemäß der Anleitung zusammen. Modifizieren und verändern Sie das Modell nicht. Bei Nichteinhaltung erlischt die Garantie. Folgen Sie der Anleitung um ein sicheres und haltbares Modell nach dem Zusammenbau zu erhalten.
Kinder unter 14 Jahren müssen das Modell unter Aufsicht eines Erwachsenen betreiben.
Versichern Sie sich vor jedem Flug, dass das Modell in einwandfreiem Zustand ist, dass alles einwandfrei funktioniert und das Modell unbeschädigt ist.
Fliegen Sie nur an Tagen mit leichtem Wind und an einem sicheren Platz ohne Hindernisse.

MIRAI V Kit

F3-RES/F5-RES High Performance Thermal Glider / Electric Glider

Designed and manufactured in the Czech Republic

Specification

Wingspan:	1995 mm
Length:	1210 mm
All-up Weight:	420g plus

Wing Section:	Special RES HB
CG Position:	80 mm
Controls:	Rudder, elevator, airbrake, (motor)

Recommended RC Equipment

◊ Rudder and Elevator Servo: Hitec HS-53 2x
◊ Spoiler Servo: Hitec HS-65MG, Dymond D47
◊ Receiver Battery: Panasonic Eneloop AAA 800mAh 4.8 V pack

Recommended Glues

Unless stated otherwise, use medium cyanoacrylate (CA) glue (KAV9952 KAVAN CA Medium). D-box sheeting and wing ribs are better to be glued using a water resistant white aliphatic resin, like our KAV9960 KAVAN White Glue (alternatively, you can use this sort of glue for most of wood-to-wood joints). The highly loaded parts (wing roots, wing main spars, firewall etc.) should be glued together using 30 minute (or slower) epoxy (like KAV9967 Epoxy 30min) offering high strength and enough time for the correct positioning.

Tools and Accessories

◊ Very sharp modeller's knife (e.g. Excel 16001 with No. 11 blades)
◊ Scissors
◊ Electric drill with drill bits
◊ Wire cutter
◊ Long nose pliers
◊ Screwdrivers
◊ Razor saw
◊ Sandpaper No. 80, 100, 180, 360-400
◊ Needle files
◊ Soldering iron and solder
◊ Clothing pegs
◊ Modeller's pins
◊ Epoxy mixing stick and vessel
◊ Masking tape, clear sticky tape
◊ Rubbing alcohol (for cleaning up excessive epoxy)
◊ Paper tissue or soft cloth (for cleaning up excessive epoxy)
◊ Straightedge with scale
◊ Square edge
◊ Thin clear plastic film (for protecting the building plan)
◊ Permanent marker
◊ Modeller's sealing iron, heat gun (for covering)
◊ Lightweight balsa filler

Warning!

This RC model you will build and fly is not a toy! Although it may seem to be light and slow in flight it is capable of serious bodily harm and property damage. It is your responsibility and yours alone - to build this model correctly, properly install RC equipment and motor and to test the model and fly in accordance with all safety standards (and common sense) as set down in Safety Codes valid in your country.
If you are just starting RC modelling, consult your local hobby shop or an experienced modeller in your local RC club to find a good instructor.

Precautions

You must build the model according to the instructions. Do not alter or modify the model, as doing so may result in an unsafe of unflyable model. Take time to build straight, true and strong. Use proper radio and other equipment that is in first class condition, properly install all the components and test their correct operation before first and any further flight. Fly the model only with competent help from a well experienced modeller if you are not already an experienced RC pilot.

Note: We, as the kit manufacturer, can provide you with a top quality kit and instructions, but ultimately the quality and flyability of your finished model depends on how you build it; therefore we cannot in any way guarantee the performance of your completed model, and no representations are expressed or implied as to the performance or safety of your completed model.

MODEL ASSEMBLY

Tail Surfaces

Everything has been designed extremely light; yet strong enough. The tail feathers are removable for easy transport/storage.

◊ Trial fit the parts of the stabilizers and control surfaces – no glue yet! Sand as necessary to obtain perfect fit. **(Fig. 1)**
◊ Tack glue the plastic tubes **V14** into the stabilizers with a few drops of CA.
◊ Roughen the surface of the 3x0.5mm **V10** carbon spars using No. 150 sandpaper and glue them with medium CA to the trailing edges of the stabilizers.
◊ Glue together all the balsa parts using medium CA or aliphatic resin.
◊ Glue the stabilizer root ribs **V4L/V4R** (1.2 mm plywood). Use the **V16** carbon rods inserted into the **V14** tubes as alignment pins for the **V4L/V4R** root ribs. Double check the root ribs were straight and square to the stabilizers. Take care the **V16** rods were not glued in to the fin in this step.

(Fig. 2)

◊ Put the tail surfaces aside for now; they will be finished after the tailplane seats are installed to the tail boom.

Fuselage (Glider Version)

◊ Trial fit the parts of the fuselage– no glue yet! Sand as necessary to obtain perfect fit **(Fig. 3)**

◊ Glue the liteply reinforcement plates **F3** and **F5L** to the inner side of the **F17L** fuselage side (with the large opening for the **F16** hatch); glue the plates **F3** and **F5R** to the inner side of the **F17R** fuselage side (without the hatch opening). **(Fig. 4)**

◊ Glue the **F6** locking plate to the front of the **F16** hatch; the locking plate has to match the position of a notch in the **F5L** reinforcement plate and the hatch matched the opening in the **F17L** fuselage side. The pair of **F21** magnets will be epoxied into the **F16** hatch and **F5L** plate only after the fuselage is covered – otherwise the high temperature of your sealing iron might de-magnetize the magnets. **(Fig. 14)**

◊ Epoxy together the tail boom holder consisting of the liteply part **F13** and plywood parts **F10** and **F14**. Attach the **F9** wing bolt plate with the M5 aluminium captive nut epoxied in place. Insert the entire assembly of the tail boom holder between the fuselage sides. Now you can start gluing the fuselage from the rear to the nose. **(Fig. 6)**

◊ Glue together the nose part of the fuselage; do not forget bevelling the edges of the fuselage formers and **F18** and **F19** liteply braces as required. **(Fig. 9)**

◊ Epoxy the **F9** wing bolt plate and the tail boom holder assembly in place.

◊ Bevel the **F1** nose blocks and glue in place.

◊ Partially cut (ca 1 mm deep) and crack the fuselage sides along the front edge of the **F2** fuselage former and glue them to the **F1** blocks (the cut line is to be soaked with thin CA before the final sanding).

◊ Epoxy the tow hook plate **F15** in place. Glue the **F20** carbon ballast tube into the holes in **F7** and **F8** formers. **(Fig. 10)**

◊ Glue the upper and lower 2.5 mm balsa sheeting to the fuselage. Slide the tail boom tube **F22** onto the tail boom holder – do not glue yet. Fit and glue the balsa fairing plates **F11** and **F12** in place. Carefully match all the parts so the tail boom had a tight fit but remained still easily detachable. **(Fig. 11) (Fig. 12)**

◊ Sand the entire front part of fuselage; take care all the parts including the **F11/F12** fairing created a smooth transition between the fuselage and the tail boom. **(Fig. 14)**

◊ Insert the **V16** carbon rods into the pre-drilled holes in the tail boom; glue them in place. The bottom ends or the rods should stick out by ca 0.5 mm from the tail boom (there is an opening in the bottom side of the tail boom in order to accommodate the tail skid **V12**) – refer to **Det. D**. **(Fig. 2)**

Fuselage (Electric Version)

◊ The building sequence of the electric version fuselage is basically the same as with the glider version except for the firewall, nose and servo tray; also the **F20** ballast tube is not to be used.

◊ Instead of liteply **F3** reinforcement plates, glue the balsa triangular sticks E4 along the edges of fuselage sides **F17L** and **F17R**. **(Fig. 5) (Fig 7)**

◊ Epoxy the **E3** servo tray behind the **F7** fuselage former.

◊ Epoxy the firewall **E2** in place. Before you epoxy the firewall in, make sure the openings and holes in the firewall match your motor – make any changes as necessary or cut a new firewall to match your motor perfectly.

◊ Once the bottom and upper sheeting is in place cut the fuselage sides flush with the front edge of the **E2** firewall. Temporarily install your motor and use the spinner as a jig to align the **E1** plywood ring; once satisfied, epoxy it in place. Sand the nose to the desired shape matching your spinner. **(Fig. 9) (Fig. 10)**

Tail Surfaces - continued

◊ Glue the **V9** pins into the tailplane seats **V8L** and **V8R**. **(Fig. 15)**

◊ Slide tailplane seats **V8L** and **V8R** onto the **V16** carbon rods.

◊ Insert the **V13** tailplane locks into the notches in the stabilizers (do not glue yet). **(Fig. 16)**

◊ Slide the stabilizers onto the **V16** carbon rods and push against the **V8R/V8L** seats until you hear the click announcing the **V13** lock has engaged the **V9** pin of the stabilizer seat. Tack glue the locks into the stabilizers with a few drops of CA. **(Fig. 17)**

◊ Push the stabilizers together with the tailplane seats to the tail boom and tack glue the seats to the tail boom (apply the cyano sparsely; keep away from the locks and **V16** carbon rods).

◊ Remove the stabilizers and epoxy the **V8R/V8L** seats to the tail boom. Work thoroughly, but apply the epoxy sparsely; prevent the glue from running into the openings for the stabilizer locks.

◊ The ruddervator horns **V11** as well as the **V12** tail skid will be glued in later, after the tail surfaces are covered.

Wing

Wing Centre Section

◊ Epoxy together the wing central ribs **W3** and **W4**; insert 3 mm beech dowels into the holes in order to obtain correct match. Note: Make a left and right pair of ribs. **(Fig. 20)**

◊ Epoxy the **W10** wing fixing bolt plate between the central ribs. **(Fig. 21)**

◊ Epoxy together the parts of the **W13** main spar shear webbing; the short 0.8 mm ply **W11** joiner (with a hole in the centre) to the front side, the **W12** long joiner to the rear side. **(Fig. 22) (Fig. 23)**

◊ Make bays for **P32** wing carbon joiners; epoxy together the **W14** front (shorter) 0.8 mm ply plate, 5 mm ply central plate **W15** and rear 0.8 mm ply (longer, slanted edge) **W16** plate. Prevent the epoxy hardening inside the bays – put the parts together with the **P32** carbon joiner inserted, then immediately remove the joiner (do not forget cleaning the joiner using a paper tissue and rubbing alcohol before the glue sets). **(Fig. 24)**

◊ Slide all ribs onto the mains spar shear webbing (no glue yet!). Bind the joiner bays with the provided Kevlar thread and soak with medium CA. **(Fig. 25) (Fig. 26)**

◊ Insert the **W27** rear spar, trial fit the **W30** leading and **W17** trailing edges. Sand to fit if necessary. Once satisfied with the fit, glue all the parts of the wing centre section with medium cyano over the building plan protected with a sheet of thin clear plastic film (you might find better gluing ribs to the **W13** main spar shear webbing with an aliphatic resin).

◊ Edge glue together the **W24** upper D-box sheeting (1.5 mm balsa) and the **W26** upper 8x2 mm spruce stick main spar; once cured glue it to the wing using aliphatic resin. Use a hardwood stick positioned along the leading edge to push the balsa sheeting straight and even to the **W30** leading edge.

◊ Glue the **W26** lower 8x2 mm spruce stick main spar in place.

◊ Bevel both two **R5** end ribs of the wing centre section using the supplied 7° dihedral jig. Then glue the **W6** 3 mm liteply end ribs. You might find easier doing it later; with the **P32** joiners inserted and finished wing outer panels attached.

◊ Glue the **W21** airbrake frame to the upper side of the wing; insert and glue the airbrake bay reinforcement plate **W20** (balsa 1.5 mm) into **W5**, **W7** and **W8** ribs. Cyano the **W34** fibreglass bushings for the airbrake tor-

sion bar onto **W3/W4** and **W7** ribs. Insert the 3 mm carbon torsion bar **W37** into the bushings. Do not forget to slide the **W36** control horn in the centre. Do not glue yet! The control horn and airbrake levers are to be glued in place once the wing is covered and the servo and airbrakes fitter (refer to **Det. C**).

◊ Glue the **W29** magnet holders to the bottom side of **W21** airbrake frames. The pairs of **W33** magnets will be epoxied into the holders **W29** and airbrakes **W22** and **W23** only after the wing is covered.

◊ Glue the 1.5 mm balsa **W28** upper centre sheeting (supplied in 2 pieces) and the bottom **W19** sheeting in place over the **W3** ribs.

◊ Do not glue the **W25** airbrake servo hatch; it will remain removable for easy access to the servo. You can secure it using e.g. small wood screw (not supplied in the kit) to the 5 mm plywood holders **W32**. Do not forget to cut the opening for the wing fixing bolt into the balsa sheeting.

◊ Epoxy the **W1** central riblet with the wing alignment pin sandwiched between two **W2** riblets in place. Glue the 1.5 mm front bottom sheeting **W18** between the **W3/W4** ribs.

◊ Sand to fit and glue the 2.5 mm balsa gussets **W38** in place. **(Fig. 27-31)**

◊ Fine sand the entire wing centre section (incl. the airbrake).

Wing Outer Panels (Fig. 32-36)

◊ The wing outer panels are to be constructed in the same manner as the wing centre section; the main difference is that the inner part and the outer winglet are built as one part on a flat surface. Once the structure is finished, you will cut it between the end/root ribs; then bevel to obtain the correct dihedral and glue together.

◊ Glue together both two wing outer panels over the building plan protected with a sheet of thin clear plastic film (remember – you are building left and right wing panels!). Please note the inner spars are made of spruce sticks **P33** resp. **P23**, whilst the winglet spars are made of balsa sticks (**P34** and **P31**).

◊ Glue the top D-box sheeting **P27** and **P28** in the same manner as the wing centre sheeting **W24**.

◊ Sand the wing tip flat, glue the **P17** winglet fairing in place and bevel it to the required 35°angle. Insert the **P29** plywood joiner and sand the **P18** wing tip to fit. Once satisfied glue the joiner and wing tip in place.

◊ Sand to fit and glue the 2.5 mm balsa gussets **P33** and the **P34** diagonal braces made of 5x3 mm spruce stick in place.

◊ Cut off the outer winglets between the end ribs **P10** and **P11**; bevel the **P11** ribs using the supplied 7° dihedral jig. Epoxy the wing panels and winglets together.

◊ Bevel the **P2** root ribs of the wing outer panels using the supplied 7° dihedral jig. Trial fit the **P32** carbon wing joiner into the respective bays; there should be a tight fit, no play. If there is a significant play, put some epoxy to appropriate area of the joiner and sand as necessary once the glue hardens.

◊ Glue the 3 mm liteply **P1** root ribs with 3 mm beech alignment pins **P30** in place.

◊ Fine sand the entire wing outer panels.

Covering

◊ Thoroughly sand the surface of all parts with No. 360-400 sandpaper and carefully vacuum all the dust (the iron-on film does not stick well to a dusty surface; the dust also contains hard grains released off the sandpaper capable to ruin the smooth coating of your sealing iron quickly).

◊ Use as light iron-on film as you can get (transparent Oracover, Oralite etc. – not supplied in the kit). Follow the instruction manual supplied with the covering film of your choice please.

Hinging the Control Surfaces

◊ Use strips of a high quality hinging tape (available in hobby shops) or strips of the same iron-on film you used for the covering. Remember to apply the tape with the control surface deflected to the limit in order to get free movement of the particular control surface.

Pushrod Installation

◊ Tack glue the pushrod tubes to the 1.5 mm balsa pushrod tube holder with three plywood formers supplied in the kit. Do not shorten the tubes yet – they will have to go all the way into the front part of the fuselage. The push rod tubes go all the way through the tail boom tube. **(Fig. 37)**

◊ Insert the balsa holder with push rod tubes into the tail boom; align with the front part of the fuselage. Once satisfied tack glue the holder to the tail boom tube.

Tail Boom Installation

◊ Attach the wing centre section to the fuselage and secure with the M5 nylon bolt. Attach and secure the tail surfaces to the tail boom with the push rod tubes installed in their holder (the holder prevents the tubes from getting loose and keeps any unwanted play in the elevator and rudder linkage next to zero). Slide the tail boom onto the holder on the fuselage front part. Thread the push rod tubes through the holes in **F10**, **F8** and **F7** formers.

◊ Check that the fuselage is straight looking from above; align the V-tail symmetrically to the trailing edge of the wing when looking from behind. Once satisfied use 30min epoxy to secure the tail boom in place. Double check the correct alignment of the wing, fuselage and tailplane before the glue hardens.

Servo Installation

Rudder and Elevator Servos Installation

◊ The ruddervator servos are to be installed into their servo tray **F23** under the **F16** hatch (glider) or into the E3 servo tray under the wing (electric version). Cyano the push rod tubes into the fuselage formers.

◊ Solder the M2 brass threaded couplers to one end of the piano wire pushrods, attach the M2 ball links and fasten them to the ruddervator horns. **(Fig. 1) (Fig. 2)**

◊ Fit the V-tail to the fuselage; insert the control horns into the ruddervators – do not glue yet. Set the servos in neutral position with your radio on and mark the correct length of the push rod wires. Make a "Z" bend on the end of the pushrod and fit it to the servo arms. Check once again and only then cyano the control horns in place. Do not forget to glue the end of the push rod tubes to the fuselage.

Spoiler Servo Installation

◊ The spoiler servo is to be installed using a strip of double sided foam tape (not supplied in the kit) to the **W28** balsa sheeting. First, apply thinned epoxy or thin cyano to the inner surface of the W28 sheeting in order to be sure the double sided foam tape will stick. Reinforce the inner surface of the **W22** and **W23** airbrakes in the same manner.

◊ Epoxy the **W33** magnets into the holes in **W22** and **W23** airbrakes and **W29** holders on the airbrake frames. Please check the polarity of magnets first – they must attract each other. **(Fig. 30) (Fig. 31)**

◊ Refer to the **Det. C** on the building plan during the final airbrake servo installation. Link the servo horn and the **W36** torsion bar lever with two ball links joined together with an M2 threaded rod (saw off the head of the supplied M2x10 mm screw).

◊ Once you check the servo can move freely within the required range, cyano the **W36** lever to the **W37** carbon torsion bar. **(Fig. 39)**

◊ With your radio on, set the airbrake servo to the "airbrake fully extended"

position. One at a time, set the **W22** and **W23** airbrakes in the fully extended position (-24 mm), push the corresponding lever **W35** to the airbrake and secure with a small drop of cyano to the **W37** torsion bar. Take care the position of both two airbrakes was exactly the same! Once satisfied, secure the joints of **W35** and **W36** levers with the **W37** torsion bar using a sparse amount of epoxy.

◊ Finally, cut an opening into the **W25** hatch to allow free movement of the airbrake servo arm (if necessary) and secure it to the **W32** holders. **(Fig. 40)**

Wing Root Ribs

◊ Glue the pairs of **W31** magnets using 5min epoxy into the openings in **W6** and **P1** ribs. Please check the polarity of magnets first – they must attract each other.

Towhook (Glider)

◊ Install the towhook to the pre-drilled holes in the **F15** plate.
◊ Keep the recommender CG position 78 – 82 mm behind the wing leading edge.
◊ Set the towhook 10 mm in front the CG for the first flight.
◊ You have to loose the front screw in order to move the towhook.

Power System Installation (Electric Version)

◊ Fit your motor using appropriate screws to the firewall; secure the ESC and power pack using Velcro tape into the cockpit. With your RC set on test whether the motor rotates in the correct direction (counter clockwise when looking from the front) If it not the case, change the setting of your ESC or swap any two of the three cables between the motor and ESC. Fit 30 mm spinner with blades corresponding to your motor and battery set-up.

Recommended Control Surface Throw, CG Position

◊ CG Position: 78-82 mm
◊ Rudder: ±13 mm
◊ Elevator: ±13 mm
◊ Spoiler: -24 mm
◊ Brake->Elevator mix: -2 mm elevator at full airbrake

FLYING

Be sure you are using fully charged batteries. Now (and before any further flight again) check correct function of whole radio equipment, motor and moving of control surfaces. Be sure any part of flight equipment cannot move during flight. We strongly recommend making a range check (see your radio instruction manual for details).

The first flight: Wait for a calm day. Fly only on a safe site as a RC club flying field. Glider will be very happy on your favourite slope on a calm day. The very light lift will allow perfect fine trimming out.

Glider: Switch your transmitter and then the receiver on and check all the working systems one more. Facing INTO the wind hold your transmitter in one hand; grip the model in the other hand near the centre of gravity. Hold it at head level and give the model a fairly powerful push exactly into wind; wings level, nose slightly down. Your model should now glide in a long, flat and straight path without needing any help from you. Use the controls gently if necessary, and adjust the trim tabs until your MIRAI glides above described way. Now check the position of control surfaces; set length of pushrods to bring back trim tabs on your transmitter to central position if necessary (we strongly recommend doing it in any way). Check again gliding of your MIRAI.

Now you are ready to make your first bungee launch. Always use a bungee set appropriate to the size (100-150 m) and weight of your model!

Electric version: Switch your transmitter and then the receiver on and check all the working systems once again. Launch your MIRAI with throttle fully open INTO the wind. During climbing be gentle on the controls; try to keep the model flying into the wind until you have about 100-150 metres of altitude. Climb slowly - too steep climbing may cause the model will stall and fall to the ground. You are at 150 metres - this is time to trim out your MIRAI at full power. After everything is OK - it means the model at approx. 50-60% of full throttle flies straight without turning, descending or ascending (if your MIRAI already tends to ascend you will have to increase motor down thrust), turn the motor off and test MIRAI's gliding characteristics.

Keep your MIRAI into the wind and observe its flight. If turns without power right (although under power it kept the straight direction) it will be necessary to increase motor right side thrust and vice versa. If descends too much without power (although under power it kept the level flight) you will have to increase motor down thrust (assuming the centre of gravity is correct! - check it after landing).

Final Fine Tuning: During next flights trim out your MIRAI to find optimal setting - safe climbing and good gliding - it is a compromise, of course. You might find useful programming a spoiler->elevator mix (if your radio allows) that will eliminate the nose pitching when the spoiler is deployed. In general the CG position should be located between 78-82 mm behind the wing leading edge. By moving the CG back you get better gliding performance whilst reducing the stability. It makes your model more sensitive on controls and increases the model reaction on thermal. The back CG position makes the model more difficult to fly and requires more attention from you, while a nose heavy model is easier to fly but you will lack the performance. We recommend starting with the CG at 78 mm behind the leading edge. Beyond 82 mm the increasing lack of stability prevails over the gain of gliding performance.

On windy days, you can improve the penetration of the glider version putting additional ballast into the **F20** ballast tube.

Enjoy your new MIRAI, have a ball!

Parts List

Parts list	Qty	Building Plan No.	Material
Building Plan 1:1	1		
Instruction Manual	1		
Sheet of Stickers	1		
Pushrod Set	2		plastic tube+0.8 mm piano wire
Tail Boom	1	F22	carbon tube Ø18x10 mm
Pushrod Holder + Formers	1+1		balsa 1.5 mm + 0.8 mm plywood
Bag No. 1 – small parts			
Adjustable Towhook w. M3 Socket Screw	1		fibreglass + metal
Neodymium Magnet 3x3 mm	6	F21, W33	
Neodymium Magnet 10x3 mm	4	W31	
Wing Bolt M5	1		M5 nylon
Captive Nut M5	1		M5 aluminium
Rudder Horn	2	V11	fibreglass1,5 mm
Wing Outer Panel Alignment Pin	4	P30	beech dowel Ø 3 mm
Fuselage Corner Radius Template	1		liteply 3 mm
Nose Shape Template	1		liteply 3 mm
Dihedral Jig 7 deg	1		liteply 3 mm
Airbrake Magnet Holder	2	W29	liteply 3 mm
Fuselage Hatch Lock	1	F6	
Kevlar Thread	1		
Carbon Rod	4	V11	carbon rod Ø2 mm
Ruddervator Servo Tray	1	F23	
Airbrake Lever Set	1	W34+W35+W36	fibreglass plate 1.5 mm
V-tai Seat w. Pin	1+1	W8L/R, W9	liteply 3 mm, steel Ø1.5 mm
Ball Link Short M2	4		
Threaded Coupler M2	2		brass M2/0,8 mm
Airbrake Link Bolt M2	1		M2x10 mm machine screw
Tail Skid	1	V12	balsa 3 mm
Bag No. 2			
Nose Block	2	F1	balsa 10 mm
Towhook Plate	1	F15	plywood 1.5 mm
Wing Bolt Plate	1	F9	plywood 3 mm
Fuselage Former	1	F7	plywood 3 mm
Fuselage Former	1+1+1	F2, F8, F9	liteply 3 mm
Horizontal Tail Boom Holder	1	F13	liteply 3 mm
Vertical Tail Boom Holder	1	F14	plywood 3 mm
Fuselage Cross-brace	3	F18, F19	liteply 3 mm
Bag No. 3			
Wing Rib	2	W3	liteply 3 mm
Wing Rib	4	W6, P1	liteply 3 mm
Wing Rib	2	W4	plywood 0.8 mm
Main Spar Shear Webbing Joiner Short	1	W11	plywood 0.8 mm
Main Spar Shear Webbing Joiner Long	1	W12	plywood 0.8 mm
Wing Joiner Bay Plate	2+2+2+2	W14, W16, P25, P26	plywood 0.8 mm
Riblet w. Wing Alignment Pin	1	W1	plywood 3 mm
Riblet	2	W2	plywood 0.8 mm
Wing Bolt Plate	1	W10	plywood 2 mm
Wing Joiner Bay	2+2	W15, P22	plywood 5 mm
Wing Centre Sheeting	1+1+1+1	W18, W19, W28a, W28b,	balsa 1.5 mm
Airbrake Bay Reinforcement plate	2	W20	balsa 1.5 mm
Airbrake Servo Hatch	1	W25	plywood 1.2 mm
Winglet Joiner	2	P29	plywood 1.5 mm
Airbrake Servo Hatch Holder	2	W32	plywood 5 mm
Wing Joiner 2ks	2	P32	carbon

Bag No. 4 – V-tail			
Stabilizer	2	V1L/R	balsa 3 mm
Ruddervator	2	V2	balsa 3 mm
Stabilizer Tip	2	V3	balsa 3 mm
Stabilizer Ribs	2+2+2	V5, V6, V7	balsa 3 mm
Carbon Stabilizer Reinforcement	2	V10	carbon 0.5x3 mm
Plastic Tube	4	V14	plastic tube Ø3 mm
Stabilizer Root Rib	1+1	V4L/R	plywood 1,2 mm
Stabilizer Lock	2	V13	fibreglass 1.5 mm
Bag No. 5 (electric version)			
Firewall	1	E2	plywood 3 mm
Balsa Triangle Stock	4	E4	balsa 8x8 mm
Spinner Ring	1	E1	plywood 1.2 mm
Servo Tray Electric	1	E3	liteply 3 mm
Battery Tray	1	E5	balsa 5 mm
Fuselage Cross-brace	3	F18, F19	liteply 3 mm
Bag No. 6			
Wing Centre Section Rib	6	W7	balsa 1.5 mm
Wing Centre Section Rib	2	W8	balsa 1.5 mm
Wing Centre Section Rib	4	W9	balsa 1.5 mm
Wing Outer Panel Rib Set	2 each	P3-P9, P12-P15	balsa 1.5 mm
Wing Outer Panel Root Rib	2	P2	balsa 5 mm
Wing Outer Panel End/Winglet Root Rib	2+2	P10, P11	balsa 5 mm
Winglet End Rib	2	P16	balsa 5 mm
Wing Centre Section Trailing Edge	1	W17	balsa 5 x 20 mm
Wing Outer Panel Trailing Edge	1+1	P24R/L	balsa 5 x 20 mm
Leading Edge 1+2ks	1+1+1	W30, P20	balsa 5 x5 mm
Wing Centre Section D-box Sheeting	1	W24	balsa 1.5 mm
Wing Outer Panel D-box Sheeting	2	P27+P28	balsa 1.5 mm
Wing Centre Section Main Spar	2	W26	spruce 2x8x690 mm
Wing Centre Section Rear Spar	1	W27	spruce 3x6x690 mm
Wing Centre Section Main Spar Shear Webbing	1+1	W13	balsa 5 mm
Wing Outer Panel Main Spar Shear Webbing	2	P21	balsa 5 mm
Wing Outer Panel Main Spar	4	P33	spruce 2x8x380 mm
Wing Outer Panel Rear Spar	2	P23	spruce 3x5x380 mm
Wing Outer Panel Main Spar (outer)	4	P34	balsa 2x8x260 mm
Wing Outer Panel Rear Spar (outer)	2	P31	balsa 3x5x200 mm
Wing Gusset Set	1	W38, P33	balsa 2,5 mm
Wing Tip	2	P18	balsa 3 mm
Wing Tip Reinforcement	2	P19	balsa 3 mm
Winglet Fairing	2	P17	balsa 10 mm
Airbrake	1+1	W22, W23	balsa 2,5 mm
Airbrake Torsion Bar	1	W37	carbon rod Ø3 mm
Wing Outer Panel Diagonal Brace	1	P34	spruce 3x5x200 mm
Bag No. 7			
Fuselage Side	1+1	F17L/R	balsa 2 mm
Fuselage Bottom Sheeting	1		balsa 2.5 mm
Fuselage Upper Sheeting	3		balsa 2.5 mm
Tail Boom Fairing	1+1	F11, F12	balsa 8 mm
Fuselage Side Reinforcement Plate (Front)	2	F3	liteply 3 mm
Fuselage Side Reinforcement Plate (Rear)	1+1	F5L/R	liteply 3 mm
Servo Hatch	1	F16	balsa 2 mm
Ballast Tube	1	F20	carbon tube Ø10 mm