Hurricane

Manual for the models

Hurricane-F3B, Hurricane-F3F und Hurricane-E

in the variations „cross tail“ and „V-tail”

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1. Introduction

1.1. Aerodynamic Concept

Only models with a wide speed range stand the test in tough F3B and F3F competitions. However, this quality is only achieved by models with excellent high lift performance (launch, duration flight, turns) that at the same time can demonstrate the smallest possible profile drag whilst speeding and during the zoom at the end of the launch at a speed of more than 200 km/h.

The airfoil WO-430 - WO-439 was newly developed for the Hurricane and allows for such flight performance in its entire speed range. The broader design aims at avoiding unnecessary resistance. This should still be valid when high load factors cause deformations during dynamic manoeuvres.

Indeed, exactly those qualities make flying gliders for non-competition pilots enjoyable: Good performance at high C_L-values that allow for more successful thermal flying, longer flight hours, good chances for return when facing a downdraft, secure landings at slow speed and so on. Maximum fun is guaranteed when the climb-rate can successfully be converted into high speed and extreme manoeuvres.

Genuine F3B- and F3F-competition-models are the best glider models for all-round use. Unfortunately, only very few models that are advertised as belonging to the F3B/F3F class are successfully used in such competitions. Logo-Team’s Hurricane for sure is one of them.

1.2. Construction

A versatile glider model has to possess a high degree of robustness. The wings of the Hurricane are in its simplest variation already built in double-carbon (with additional reinforcement). The right (!) choice of carbon fibre for the spar ensures a high degree of stiffness and (!) strength. The light fuselage, stabilisers and wing tips attain a high mass concentration. This guarantees high dynamic stability and sensitive reactions to thermal influences.

The robustness of the models is founded on yet another fact: nowadays F3B models are no longer designed according to strength (resistance to breaking), but according to stiffness (little deformation under load). That is how control behaviour is achieved that remains constant at all speeds. Whilst other models deform at a load of 80kg tow load during launch or at speed turns with 40g, genuine F3B models do this as little as possible.

Following the current trend to heavier F3F models, the F3F version of the Hurricane is supplied with a fourfold carbon wing (useful adjustment!). Accordingly, the fuselage is equipped with additional layers of tissue in order to better handle landings in rougher terrains.

1.3. RC components and equipment

Certain RC articles are recommended because of the good experiences we had with them over the years. This however does not mean that other components cannot be used, as long as they meet the requirements.

1.3.1. Wings

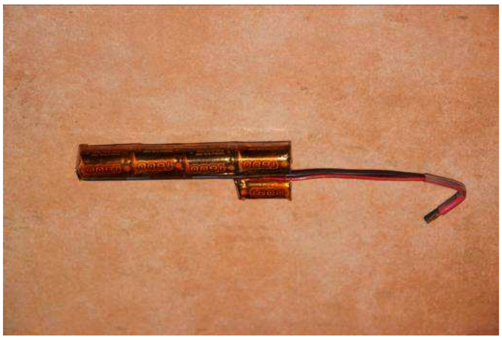
We recommend Futaba S3150 digital servos for all four flap-servos. For those servos, the servo mounts can already be installed in the mould when the wings are built. Likewise, the RDS-installation can already be set up - if so wished by the customer. It is recommended to order both.

1.3.2. Fuselage

We recommend the low profile servo Futaba S9551 for the elevator, the Futaba S3156 for the rudder and the Graupner DS3781 or the Futaba S3155 for the V-tail. Servo boards are held for these combinations. Please mention when ordering.
As receiver battery the types AA (14.5 x 50 mm) or 2/3A (17 x 30mm) are recommended. Both types can be put in as 4 cells or 5 cell constructions. Placing lead weights in the fuselage nose can be tight for the 5-celled type of the AA battery, but with a bit of patience it is possible.

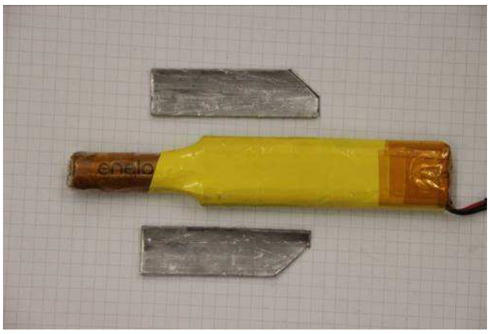
2. Construction of the fuselage

2.1. RC-installation, nose-lead



Four-celled batteries of the type 2/3A are to be soldered in the form - - - -
Five-celled batteries of the type 2/3A are to be soldered in the form - - - =

Four-celled batteries of the type AA are to be soldered in the form - - =
Five-celled batteries of the type AA are to be soldered in the form - = =



Provisionally install the battery. Check the assembly of the servo board with the servos and the space required for the receiver. Ensure sufficient space for the cable routing, especially for the Hurricane-K’s large S9551.

Balance the model for the first time. Depending on the desired location of the centre of gravity (see below), 20-100g of lead is required in the nose. The weight is positioned in front of or beside the battery. Weigh the required amount of lead.

Seal the front end of the inner fuselage with tape. Determine and mark the leading edge of the battery. Fill the space between the leading edge of the inner fuselage and the marking with lead balls and the space between the lead balls with liquid epoxy resin. Position the fuselage upright. Make sure not to glue in too many lead balls. If necessary, part of the mass can be drilled out from the front at a later stage.

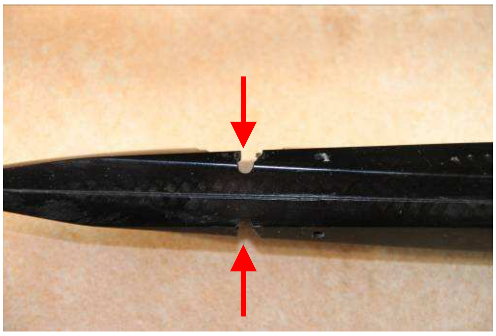
2.2. Variation V-Tail

Complete the V-tail: for this purpose glue the 4 carbon rods into the designated holes in the tail. Use only a small amount of superglue so that the rods can be removed again if necessary.

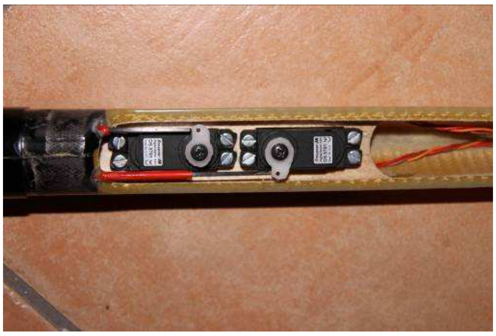
Now fix the push rod mounting plates. To this end, plug them into the V-tails and fit them onto the fuselage. Attach ball clevis joints at the cut-out space at the bottom. Check for ease of movement. Then glue the push rod mounting plates with UHU endfest to the V-tail. Assemble the tail right away and align the rudder installation: the push rod mounting plates point down. Mount the clevis joints. Align the clevis joints symmetrically from right to left and put as a precaution a 1mm thick plate between the clevis joints during the curing time. This will prevent subsequent collisions of the rods.

Control closely whether the remaining space is big enough so that the push rods of the V-tail never touch the fuselage.

After the final mounting, secure the V-tail to the fuselage with a thin, circumferential strip of tape. The V-tail can be permanently mounted to the fuselage in subsequent operation.



Next, the DS3781 (or S3155) as well as the servo board are installed: The servos are inserted together with the servo board on a trial basis. Already at this stage prepare for the subsequent cable placement: the cables of the V-tail are going to be fitted below the servos, both 6 wire cables to the wings are going to be laid on the sides of the servos in the corner of the servo board and the fuselage frame.



The length of the servo horn is 8mm. Position the servos in longitudinal direction so that both rods have sufficient space to move up to their entry point into the fuselage. Imagine that the clevis joint is screwed on to the carbon rods (see below). Apart from this, the servo board shall of course be as far up front as receiver and battery permit.

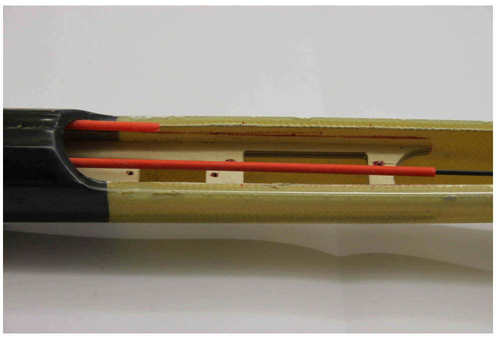
When everything has been tested, fit the servo board in, using UHU endfest. Roughen up the surface by sanding the fuselage as the bonding of servo board and fuselage contributes considerably to the stability of the front part of the fuselage. Also ensure that the servo board is securely fitted in the back part between the wings.

It is also important that the niche between servo board and fuselage frame is not filled with too much glue, given that otherwise there would not be sufficient space left for the wing cables. It would be best to run along the edge of the niche with a spatula to clear it of the glue. A triangle measuring approximately 3mm edge length should remain as adhesive beading.

Now mount the entire construction. Mill cut-outs in the metal clevis joints so that a servo angle of 45°in both directions is possible. Trim the carbon push rod so that it extends 5mm over the thread of the clevis joint. Unscrew the clevis joints and secure them with UHU endfest – also 3mm in front and behind the thread - so that nothing can loosen at a later stage.

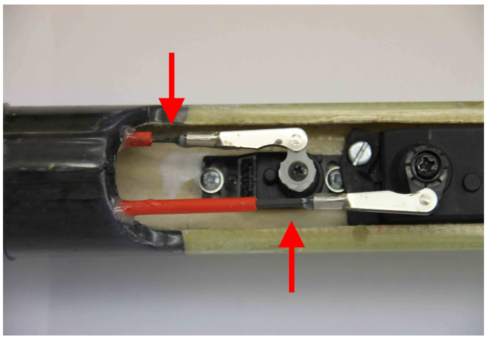
2.3. Variation cross-tail

First fit the S9551 (length of servo-horn is 7.6mm) by obliquely sanding down its lower edge parallel to the fuselage's side surface until its surface extends 2.5mm over the level of the fuselage cut-out. Insert the servo together with the servo board on a trial basis and mount the rudder servo S3156 (arm length of drive-rod is 6.6mm). Already at this stage prepare for the subsequent cable placement: the cables of rudder and elevator servos are going to be fitted below the S9551, both 6 wire cables to the wings are going to be laid on the sides of the servos in the corner of the servo board and the fuselage frame.

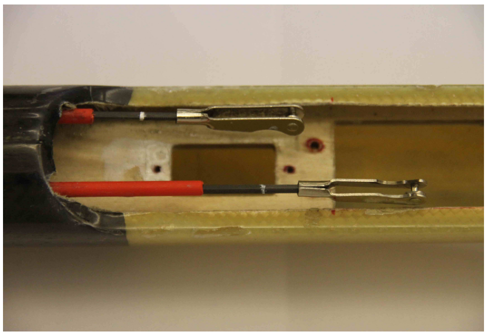


Position the servo in a longitudinal direction so that the rudder rods have sufficient space to move up to their entry point into the fuselage. Imagine that the clevis joint is mounted on to the carbon rods (see below). Apart from this the servo board shall be as far at the front as receiver and battery permit.

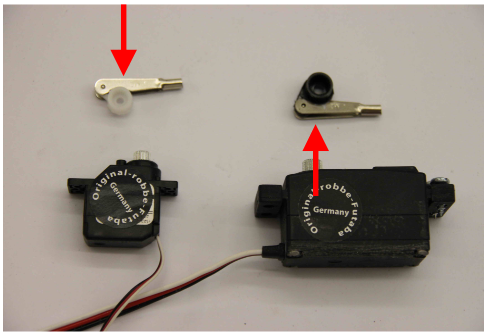
When everything has been tested, fit the servo board in, using UHU endfest. Roughen up the surface well by sanding the fuselage as the bonding of servo board and fuselage contributes considerably to the stability of the front part of the fuselage. Also ensure that the servo board is securely fitted in the back part between the wings.



It is also important that the niche between servo board and fuselage frame is not filled with too much glue, given that otherwise there would not be sufficient space left for the wing cables. It would be best to run along the edge of the niche with a spatula to clear it of the glue. A triangle measuring approximately 3mm edge length should remain as adhesive beading.

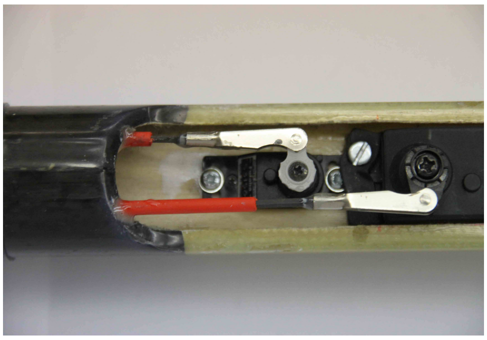


Now mount the entire construction. Mill cut-outs in the metal clevis joints so that a deflection of 45° in both directions is possible. Trim the carbon push rod so that it extends 5mm over the thread of the clevis joint. Unscrew the clevis joints and secure them with UHU endfest – also 3mm in front and behind the thread - so that nothing can loosen at a later stage.



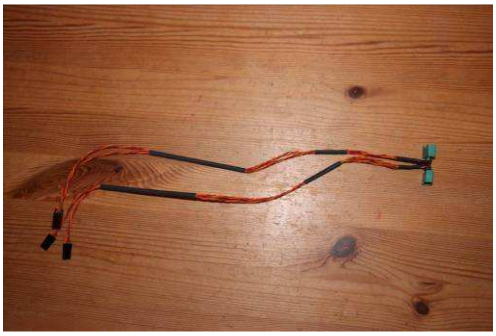
There is no more work necessary on the tail unit of the K-fuselage as the installations are already mounted.

2.4. Cable harnesses



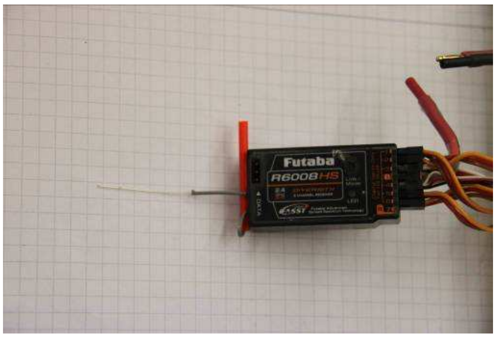
Solder the cable harnesses for fuselage and wings. The green plugs and sockets can be permanently glued to the wings and fuselage. That is how you get the “automatic rudder connections”. Coated shrink tubing help to maintain order as they can be glued to the sidewalls of the fuselage.

2.5. RC-installation 35MHz



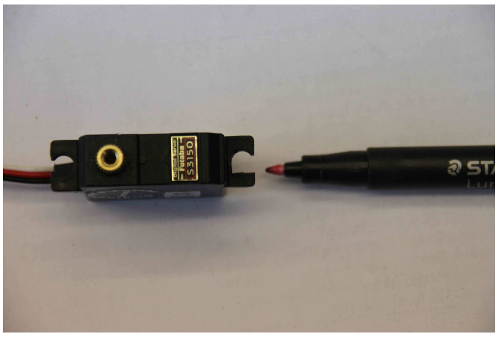
Run the antenna wire to the rear of the fuselage and direct it through the rudder gap or the V-tail (using the already prepared drill holes at the roots) to the end of the respective rudder. Solder a 450 mm steel wire to it and make sure that from the wing tip of the respective tail the wire extends backwards.

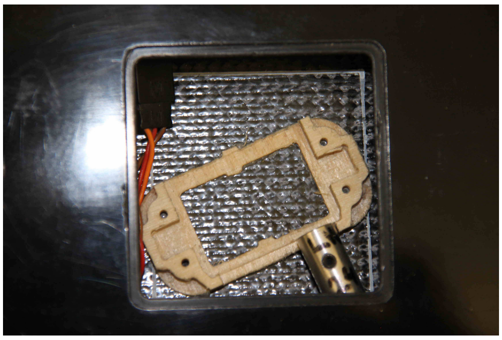
2.6. RC-installation 2.4 GHz

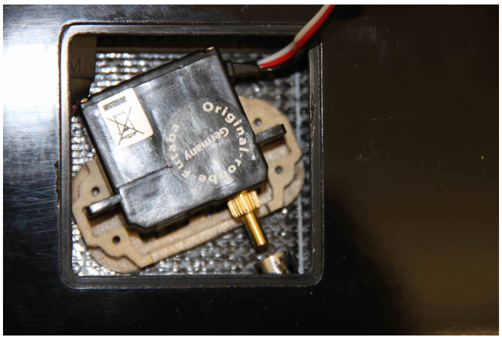


In general the antennas of 2.4 GHz receivers have to be shortened. Make sure to keep the exact length of the free inner piece. Then run one antenna in flight direction (e.g. parallel to a servo) and the other vertically in the fuselage. To this end it can be induced in a Bowden cable sleeve which itself is stuck to the receiver.

3. Wing variation RDS

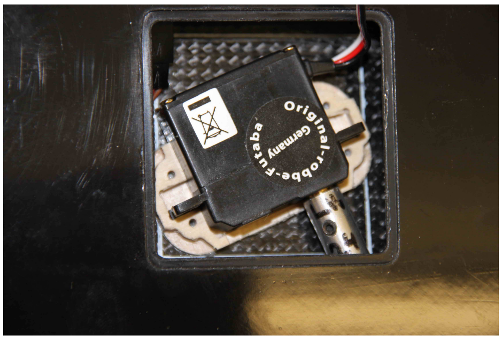


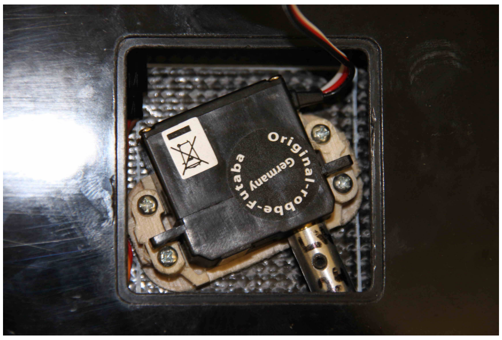




If you have chosen the RDS installation then you only have to mount the servos, solder the cabling and establish the connection to the RDS.

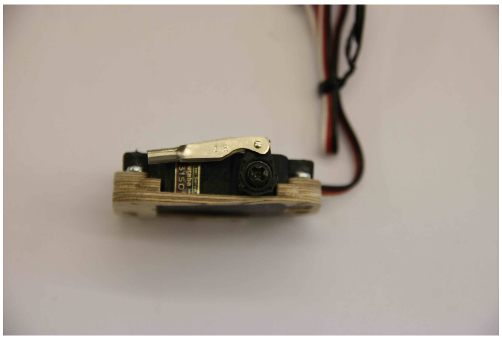
- Bolt the brass axle to the final servo gear wheel.
- Widen the cut-outs in the fixing lugs parallel to the longitudinal axis of the servo
- In order to utilise the full deflection, the servos have to be fitted with a centre offset: Therefore put all middle settings of the wing servos to zero.
- As regards the outer rudder, push the servo into the fitting and shift the bell of the RDS-linkage onto the servo so that the rudder extends approximately 5mm above the zero position.
- Repeat the same for the inner rudders that should point down 15-20 mm if the servo's set to zero. Because of the gratings on the servo head this will not be possible down to the exact millimetre.
- Screw the servos into the fittings.
- Assemble the cable harnesses into fuselage and wing. Test the basic functioning of all servos and check whether the respective full extents of deflection is more or less achieved.
- Mount the servo cover. Position the inscription on the inside in flight direction up front. Glue the servo cover to the frame, e.g. with silicone

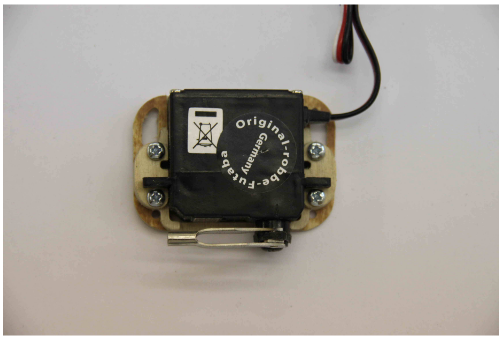


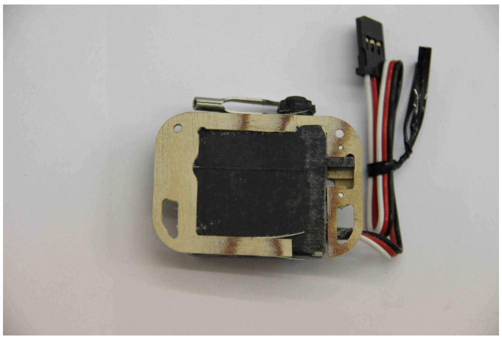


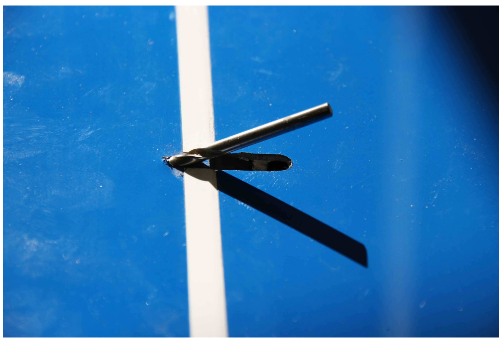
4. Wing variation Rods

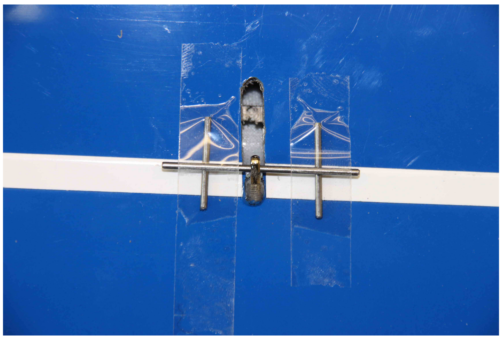
- The lever length of the servo is 6.0mm with the outer servo and 8.5mm with the inner servo.
- Mill cut-outs in the clevis joints so that a deflection of 45° in both directions is possible
- In order to utilise the full deflection, the servos have to be fitted with a centre offset: therefore put all middle settings of the wing servos to zero.
- The corresponding position of the outer flap will deviate 5mm upwards from the Strake. Position the lever arm on the servo so that it forms a right angle with the rods.
- The corresponding position of the inner flap will deviate 20mm downwards from the Strake. Position the drive rod on the servo so that it forms a right angle with the rods.
- Wax the servos with release spray. Then stick the servos and the servo mounts into the wings. It is possible that you will have to lightly sand the servo and the servo mount in the rear part.
- Drill the holes for the eyebolts into the wings pointing diagonally downwards into the fuselage. Adjust the eyebolts so that the drillings of the outer rudder lie exactly above the cut on the surface. Insert 1.5mm steel into the eyebolt and put 0.5mm distance pins under it. (see picture with blue surface)
- Adjust the inner eyebolts so that the holes at the rudder are positioned 2.0mm in front of the cut on the surface

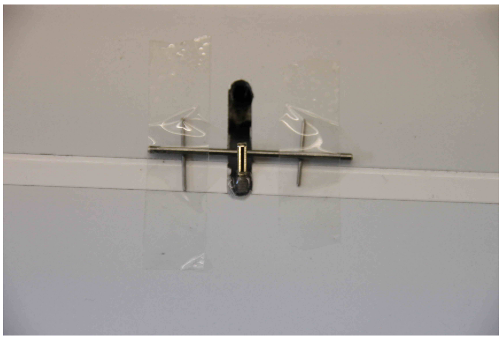












and underlay the tension pin/Achsstift with 1.5mm vis-à-vis the wing contour (see picture with white surface)

- Remove the eyebolts and then fix them with UHU endfest. Adjust the eyebolts exactly as described above.
- Assemble rods in the required length and install them
- Check that the rods do not block. If necessary, re-mill the recess in the wing-surface and in the auxiliary spar.

5. Calibration of the Hurricane-F3B

5.1. Center of gravity

A centre of gravity of 93mm is recommended when flying in the competition class F3B. The (rudder) deflections suggested below for the longitudinal movement only apply for this centre of gravity. The launching hook is then positioned 113mm behind the edge of the canopy.

For the first couple of flights and for a less skilled pilot, one should bring the centre of gravity forward to 91mm. When the centre of gravity lies further towards the front, the stability of the longitudinal movement increases.

Experienced pilots can move the centre of gravity little by little back to max 97mm. The further the centre of gravity is towards the back the more sensitive the Hurricane reacts to elevator deflections. These should therefore be reduced accordingly. As a result, the model becomes more and more difficult to master. Therefore only move the centre of gravity in 1mm steps. This corresponds to 5g lead in the nose.

Please note that because of the wing geometry of the Hurricane the centre of gravity is further towards the front than with many other F3B and F3F models.

5.2. Example for using the tables

The following table shows to what extent which function of the **transmitter** deflects which flap of the **model**. All deflections are listed positively when downwards and negatively when upwards. All data is stated in mm.

The following example fort he flight Phase **launch** illustrates this:

Transmitter →	**→ Model**	**Launch**	Zoom
pull / **push**	**inner = outer flap**	+0 / **-15**	+2 / -0
Offset	**inner flap**	**+13**	-1.5

In the flight condition '**launch'** the **inner flaps** of the wing are lowered **13mm**. To abort a launch – e.g. after the rope breaks – one has to fully push (**transmitter =**

push). This causes the **inner flaps** of the **model** to move **15mm upwards**. Adding up the flaps are then standing at -2mm, which benefits the effectiveness of the elevator. In colloquial terms this function is called “snap-flap”.

5.3. Flight phase launch and zoom

Transmitter →	→ Modell	Launch	Zoom
Offset	Elevator	+0.7	+1.2
Pull / push	Elevator	-11 / +11	-6 / +6
Pull / push	Inner = outer flap	+0 / -15	+2 / -0
Offset	V-tail	+0.8	+1.4
Pull / push	V-tail	-7 / +7	-4 / +6
Offset	Inner flap	+13	-1.5
Offset	Outer flap	+12	-1.5
Rudder	Rudder	+20 / -20	+20 / -20
Aileron	Rudder	+20 / -20	---
Rudder	V-tail	+10 / -10	+10 / -10
Aileron	V-tail	+10 / -10	---
Aileron	Inner flap	-10 / +0	-7 / +6
Aileron	Outer flap	-20 / +0	-14 / -12

For the exact setting of the elevator trim first set the deflection to 3.0mm and determine the corresponding percentage in the transmitter. Do not measure the smaller deflections but calculate them on the basis of the established percentage. Follow the same procedure for small flap deflection angles on the wings.
<u>Example:</u> For +3.0mm you need +20%. Therefore you need exactly -8% for -1.2mm Don’t expect that the deflections during flight are exact to 1/10 of a mm. However, the pre-settings are very good and work in relation.

5.4. Flight phase duration

The Hurricane achieves its minimum sink close to the minimum airspeed at 1mm plain flap trim and -1.2 mm elevator trim. However, this is only possible in very calm air. For the Hurricane to also fly smoothly in windy and gusty weather, the flap and elevator trims have to be reduced. Therefore we recommend a basic trimming of -0.6mm (1) and flap 0mm (2). With the flap slider (3), these two values can be increased to -1.2mm trim (4) and +1.0mm flap (5) respectively. Essentially however, the “right position” has to be set anew for every weather condition.

Transmitter →	→ Model	Duration
Offset	Elevator	-0.6 (1)
Pull / push	Elevator	-11 / +11
Flap positive (3)	Elevator	-0.6 (4)
Offset	V-tail	-0.8
Pull / push	V-tail	-8 / +8
Flap positive	V-tail	-0.8
Pull / push	Inner = outer flap	+0 / -0
Offset	Inner = outer flap	+0.0 (2)
Flap positive (3)	Inner = outer flap	+1.0 (5)
Brake	Inner / outer flap	+50 / -20

Brake	Elevator	+5.0
Brake	V-tail	+3.0
Rudder	Rudder	+20 / -20
Aileron	Rudder	+20 / -20
Rudder	V-tail	+10 / -10
Aileron	V-tail	+10 / -10
Aileron	Inner flap	-8 / +5
Aileron	Outer flap	-16 / +5

5.5. Flight phase distance / cross-country

Transmitter →	→ Model	slow	fast
Offset	Elevator	0	+0.8
Pull / push	Elevator	-11 / +11	-11 / +11
Offset	V-tail	-0.1	+0.9
Pull / push	V-tail	-7 / +7	-7 / +7
Pull / push	Inner = outer flap	+1.5 / -1.5	+1.5 / -1.5
Offset	Inner flap	0	-0.4
Offset	Outer flap	0	-0.4
Brake	Inner / outer flap	+50 / -20	+50 / -20
Brake	Elevator	+5.0	+5.0
Brake	V-tail	+3.0	+3.0
Rudder	Rudder	+20 / -20	+20 / -20
Aileron	Rudder	+12 / -12	+4 / -4
Rudder	V-tail	+10 / -10	+10 / -10
Aileron	V-tail	+6 / -6	+2 / -2
Aileron	Inner flap	-8 / +4	-8 / +6
Aileron	Outer flap	-16 / +8	-16 / +12

5.6. Flight phase speed

Transmitter →	→ Model	speed
Offset	Elevator	+0.8
Pull / push	Elevator	-8 / +8
Offset	V-tail	+0.9
Pull / push	V-tail	-5 / +5
Pull / push	Inner = outer flap	+1.0 / -1.0
Offset	Inner flap	-0.8
Offset	Outer flap	-0.8
Rudder	Rudder	+20 / -20
Aileron	Rudder	+0 / -0
Rudder	V-tail	+10 / -10
Aileron	V-tail	+0 / -0
Aileron	Inner flap	-8 / +7
Aileron	Outer flap	-16 / +14

5.7. Ballasting

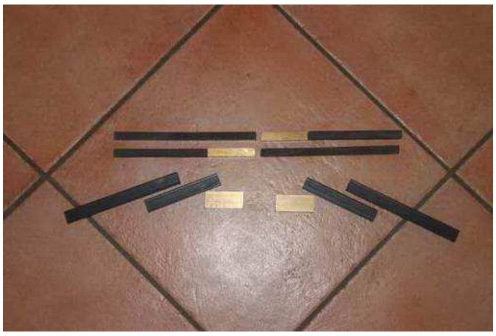
The set of ballasts is composed of 6 units: the shortest element for each compartment corresponds to one unit. The middle element is double the length – that is the weight of 2 units – and the long element is three times the length – that is the weight of 3 units.

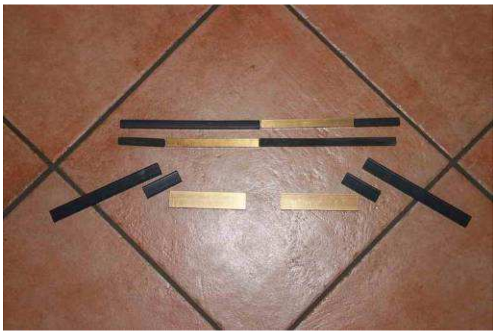
It is therefore possible to load without too many spare parts all combinations from 1 to 6 units: 1 = 1; 2 = 2; 3 = 3; 4 = 1 + 3; 5 = 2 + 3; 6 = 1 + 2 + 3.

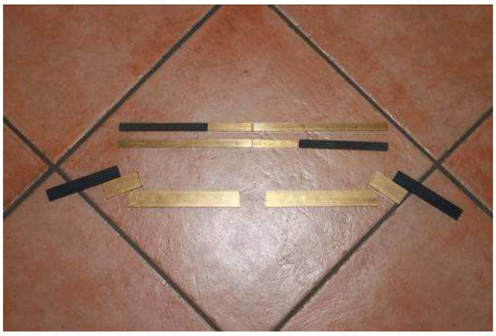
The following basic principles are applicable:

- The same amounts of units are loaded into the joiner and ballast compartments. Thus the centre of gravity remains on the same spot.
- Inside the joiner the ballast is loaded symmetrically: front/back and left/right
- Inside each compartment the ballast is loaded symmetrically: left/right
- All cavities are completely filled with PVC or balsa

The adjoining pictures show all the options of symmetrical loading of 1 to 6 units.







A slightly unsymmetrical distribution of the ballasts is also possible and unproblematic. If 2 to 3 units are to be loaded, the ballast compartment on the right should get 3 units and the compartment on the left 2 units. This should be reversed in the joiner.

5.7.1. Two-compartments system

As a standard, the Hurricane F3B is delivered with a two-compartment system with a maximum of 1650g additional load. One third of the ballast weight is loaded into the joiner and two thirds of the weight into the rear ballast compartment. By default the rear compartment is positioned so that the additional load does not move or only insignificantly shifts the centre of gravity, if this lies at 93mm or further in the front. In this case “ballast upfront” is to be indicated on the order form.

For experienced pilots, who prefer their centre of gravity at 94mm or further at the back, there is an optional positioning of the rear ballast compartment so that also in this case the centre of gravity does not shift with additional load. In this case, “ballast at the back” is to be indicated on the order form.

The adjoining table indicates the different possibilities of ballasting a typical F3B with an empty weight of 2000g. Thereby e.g. 5 units right and left result in 10 units of brass and 2 units PVC in the rear compartment and to as many units of brass and PVC in the joiner.

Units Brass	Units PVC	Weight In g	Wingload In g/dm^2
0	0	2000	35
0	12	2195	38
1	11	2316	41
2	10	2438	43
3	9	2559	45
4	8	2680	47
5	7	2801	49
6	6	2923	51
7	5	3044	53
8	4	3165	55
9	3	3286	58
10	2	3408	60
11	1	3529	62
12	0	3650	64

5.7.2. Three-compartments FAI System

With this particular set of ballasts an additional weight of up to 2.2kg is possible. Please indicate when ordering, whether the centre of gravity is desired to be at 93mm or further at the front (indicate “FAI upfront”) OR at 94mm or further at the back (indicate “FAI at the back”). With that the total weight of approximately 4.2 kg comes close to the maximum FAI-wingload of 75 g/dm^2.

The adjoining table indicates the different possibilities of ballasting a typical F3B with an empty weight of 2000g. Thereby e.g. 5 units right and left result in 10 units of brass and 2 units PVC in the rear compartment and to as many units of brass and PVC in the joiner.

Units Brass	Units PVC	Weight In g	Wingload In g/dm^2
0	0	2000	35
0	12	2260	40
1	11	2422	42
2	10	2583	45
3	9	2745	48
4	8	2907	51
5	7	3068	54
6	6	3230	57
7	5	3392	59
8	4	3553	62
9	3	3715	65
10	2	3877	68
11	1	4038	71
12	0	4200	74

5.7.3. Ballast and stall – a little flight mechanics can save your glider!

It is specifically repeated here that the stall behaviour shifts with the wing load when turning. For flight mechanical reasons, the efficiency of the decalage considerably decreases because of the rotation when turning or in a looping. This decrease is becoming respectively smaller with increasing wing load. This can have fatal consequences that have caused many crashes: If the settings for the flaps and the maximal elevator for a certain ballasting have been found, for which (without gusts) no stall happens, one generally feels on the save side.

HOWEVER: if the wing load is increased but the settings remain the same, the next turn or aerobatic manoeuvre can lead to a stall. The more the wing load is increased compared with the one already tested, the more the risk increases. The topic becomes even more important considering the higher ballasting that is now possible with the Hurricane.

5.8. Summary center of gravity – ballast

The above-mentioned recommendations can be summarised as follows:

	First flight / beginners	High performance	Experienced pilots
F3B / plain	91	93	95 – 97
F3F / slope	89	91	93 - 95

Schwerpunkt	89 - 93	94-97
Ballast 1650g	“ballast upfront”	“ballast at the back”
Ballast 2200g	“FAI upfront”	“FAI at the back”

6. Calibration of the Hurricane-F3F

The subsequent chapter <u>only</u> describes the changes of settings compared with the settings of the F3B version. It is therefore necessary to read the previous chapters.

6.1. Center of gravity

A centre of gravity of 91mm is recommended for flying on slopes and in F3F competitions. The (rudder) deflections suggested below for the longitudinal movement only apply for this centre of gravity.

For the first couple of flights and for a less skilled pilot, one should bring the centre of gravity forward to 89mm. When the centre of gravity lies further towards the front, the stability of the longitudinal movement increases.

Experienced pilots can move the centre of gravity little by little back to max 95mm. The further the centre of gravity is towards the back the more sensitive the Hurricane reacts to elevator deflections. These should therefore be reduced accordingly. As a result, the model becomes more and more difficult to master. Therefore only move the centre of gravity in 1mm steps. This corresponds to 5g lead in the nose.

Please note that because of the wing geometry of the Hurricane the centre of gravity is further towards the front than with many other F3B and F3F models.

6.2. Flight phase thermal lift

The data of ‘flight phase F3B duration’ can directly be transferred to thermal flying at a slope. If the centre of gravity is further upfront the deflections for the longitudinal movement have to be slightly increased. Only data that differs from ‘flight phase F3B duration’ is stated:

Transmitter →	→ Model	Duration
Offset	Elevator	-0.7
Pull / push	Elevator	-12 / +12
Offset	V-tail	-0.9
Pull / push	V-tail	-9 / +9
Brake	Elevator	+5.5
Brake	V-tail	+3.3

6.3. Flight phase edge of the slope

These correspond largely with the settings for the F3B cross-country flight. The differences are:

Transmitter →	→ Model	Langsam	schnell
Offset	Elevator	0	+0.8
Pull / push	Elevator	-11 / +11	-11 / +11
Offset	V-tail	-0.1	+0.9
Pull / push	V-tail	-7 / +7	-7 / +7
Pull / push	Inner = outer flap	+5 / -1.5	+5 / -1.5
Brake	Elevator	+5.5	+5.5
Brake	V-tail	+3.3	+3.3

6.4. Flight phase speed

For particularly fast conditions, nosedives from a great height and subsequent aerobatic manoeuvres, a flight condition similar to F3B speed flight is recommended:

Transmitter →	→ Model	Speed
Offset	Elevator	+1.0
Pull / push	Elevator	-11 / +11
Offset	V-tail	+1.1
Pull / push	V-tail	-7 / +7
Pull / push	Inner = outer flap	+1.5 / -1.0
Offset	Inner flap	-1.2
Offset	Outer flap	-1.2

6.5. Ballasting

The ballast systems are the same for the F3B and F3F models. Therefore, carefully read chapters 5.7 and 5.8. When ordering F3F models, please also state “ballast upfront” or “FAI upfront” if you want the position of the ballast compartments to be further in the front for centre of gravities up until 93mm. State “ballast at the back” or ”FAI at the back” if you desire a centre of gravity of 94mm or further back.

6.5.1. Two-compartments System

The adjoining table indicates the different possibilities of ballasting a typical F3F with an empty weight of 2400g.

Units Brass	Units PVC	Weight In g	Wingload In g/dm^2
0	0	2400	42
0	12	2595	45
1	11	2716	48
2	10	2838	50
3	9	2959	52
4	8	3080	54
5	7	3201	56
6	6	3323	58
7	5	3444	60
8	4	3565	62
9	3	3686	65
10	2	3808	67
11	1	3929	69
12	0	4050	71

6.5.2. Three-compartments FAI System

With this particular set of ballasts, a takeoff weight of 4.6kg is possible for the Hurricane F3F. This corresponds to a FAI-wing load of 75 g/dm^2. This however includes the total surface of the model (wings + elevator). The Hurricane can therefore fly at a total weight of 4.637 kg.

Units Brass	Units PVC	Weight In g	Wingload In g/dm^2
0	0	2400	42
0	12	2660	47
1	11	2822	49
2	10	2983	52
3	9	3145	55
4	8	3307	58
5	7	3468	61
6	6	3630	64
7	5	3792	66
8	4	3953	69
9	3	4115	72
10	2	4277	75
11	1	4438	78
12	0	4600	81

7. Calibration of the Hurricane-E

Adopt the settings of the F3B or F3F, depending on whether you are flying your Hurricane-E in the plain or on the slope.

The Hurricane-E was consciously designed as analogue as possible to the F3B and F3F models. It is thus an ideal training device.

8. Warranty and liability

Logo-Team has always strived to find a “better F3B model”. In more than 20 years we have been able to acquire following key competencies in all relevant branches:

- Profile design
- Aerodynamic Concept
- Handling
- Highly rigid lightweight constructions
- Validation in competitions: Eurotour competitions and world championships

The company StratAir GmbH has a long experience of realising commercial high-end aircrafts – also for competitions – producing high quality and taking all appropriate measures for quality assurance.

The Hurricane F3B is the sum of all our experiences.

However, it is impossible for StratAir and Logo-Team to control the correct assembly and correct use of your Hurricane. Therefore, StratAir GmbH and Logo-Team UG are denying any warranty and liability. Fly at all times within the boundaries of the system. Plan your flight path so that it maintains a safety distance from groups of people. Finally, always fly with adequate liability insurance.

The Hurricane is an aircraft that will transform flying gliders into a unique experience.