

## DG 800 S



## Instruction Manual



Thank you very much for purchasing the CARF Models DG-800S high performance glider. Before you get started building and setting-up your new aircraft, please make sure you have read this instruction manual, and understood it. If you have any questions, please don't hesitate to contact your Rep, or CARF-Models directly. Below are the contact details:

**Email: [techsupport@carf-models.com](mailto:techsupport@carf-models.com)**

**Or call your CARF Rep by phone!!! He will be there for you. Please write down his phone number somewhere on this manual, you'll find it, after you're logged in on our website, on the top right corner of every page.**

## **Liability Exclusion and Damages**

You have acquired a kit, which can be assembled into a fully working R/C model when fitted out with suitable accessories, as described in the instruction manual with the kit.

However, as manufacturers, we at CARF-Models are not in a position to influence the way you build and operate your model, and we have no control over the methods you use to install, operate and maintain the radio control system components. For this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect application and operation of our products, or which are connected with such operation in any way. Unless otherwise prescribed by binding law, the obligation of the CARF-Models company to pay compensation is excluded, regardless of the legal argument employed.

This applies to personal injury, death, damage to buildings, loss of turnover and business, interruption of business or other direct and indirect consequent damages. In all circumstances our total liability is limited to the amount which you actually paid for this model.

**BY OPERATING THIS MODEL YOU ASSUME FULL RESPONSIBILITY FOR YOUR ACTIONS.**

It is important to understand that CARF-Models Ltd, is unable to monitor whether you follow the instructions contained in this instruction manual regarding the construction, operation and maintenance of the aircraft, nor whether you install and use the radio control system correctly. For this reason we at CARF are unable to guarantee, or provide, a contractual agreement with any individual or company that the model you have made will function correctly and safely. You, as operator of the model, must rely upon your own expertise and judgement in acquiring and operating this model.



## Important/General Notes

### Elastic Hinges:

The ailerons, flaps and elevator are all hinged already for you - laminated in the mould and attached with a special nylon hinge-cloth, sandwiched between the outer skin and the foam. This nylon hinge is 100% safe and durable. You will never have to worry about breaking it, or wearing it out. There is no gap at all on the top side of the surface, and there is a narrow slot in the bottom surface, where the control surface slides under the skin during 'down' throw. This means that the hinge axis line is on the *top* surface of the wing and stab, *not* in the centre.

The slot seal needs some explanation, too. The bottom side of every control surface is sealed with the same type of sealing tape the full scale aircraft is sealed with. It is a sandwich of several special tape layers, one being a specially pre-curved mylar sheet. Take care of this tape as it is very important for the proper function and the designed efficiency of all control surfaces.

### Servo Choice:

We strongly advise that you use the recommended high-torque digital metal-g geared servos on all the main flight controls, and the milled plywood mounts are specifically designed for these.

There are plenty of alternative servos available from many manufacturers. However, it is important that you measure the "hight" of the servo from the mounting flanges to the control arm. This dimension is important to know BEFORE you glue any mounting frames in the stab or wing.

### Servo Screws:

Fix the *all* the servos into the milled plywood servo mounts using the 2.9 Ø x13mm or 16mm sheet metal screws provided in the kit, *not* the standard screws normally supplied with servos by the servo manufacturer. This is because all the holes in our milled servo mounts are 2mm diameter, due to our CNC manufacturing process, and this is too big for the normal screws.

### Building Sequence:

The actual building sequence is your choice, but it is definitely most efficient to follow the sequence of this manual.



## Take Care:

Composite sandwich parts are extremely strong, but fragile at the same time. Always keep in mind that these composite airplanes are designed for minimum weight and maximum strength in flight. Please take care of it, especially during transport, to make sure that none of the critical parts and linkages are damaged. Always handle your airplane with great care, especially on the ground and during transport, so you will have many hours of pleasure with it.

To protect the finished surface on the outside of the model from scratches and dents during building, **cover your work table with a piece of soft carpet, cloth or bubble-plastic**. The best way to stop small spots of glue getting stuck to the outside painted surfaces is to give the whole model 2 good coats of clear car wax first, *but* of course you must be sure to remove this 100% properly before adding any additional paint, markings or trim.

## Adhesives and Solvents:

Not all types of glues are suited to working with composite parts. Here is a selection of what we normally use, and what we can truly recommend. Please don't use inferior quality glues - you will end up with an inferior quality plane, that is not so strong or safe.

Composite models require good gluing techniques, due to the higher flying speeds, and hence higher loads on many of the joints.

1. CA glue 'Thin' and 'Thick' types. We recommend ZAP, as this is very high quality.
2. ZAP-O or Plasti-ZAP, odourless, or ZAP canopy glue 560 (for clear canopy)
3. 30 minute epoxy (stressed joints must be glued with at least 30 min & NOT 5 min epoxy).
4. Loctite Hysol 9462 or equivalent (optional, but highly recommended)
5. Epoxy laminating resin (12 - 24 hr cure) with hardener.
6. Milled glass fibre, for adding to slow epoxy for stronger joints.
7. Micro-balloons, for adding to slow epoxy for lightweight filling.
8. Thread-locking compound (Loctite 243, ZAP Z-42, or equivalent)

We take great care during production at the factory to ensure that all joints are properly glued, but of course it is wise to check these yourself and re-glide any that might just have been missed.

When sanding areas on the inside of the composite sandwich parts to prepare the surface for gluing something onto it, do NOT sand through the layer of lightweight glasscloth on the inside foam sandwich. It is only necessary to rough up the surface, with 80/120 grit, and wipe off any dust with acetone or de-natured alcohol (or similar) before gluing to make a perfect joint. Of course, you should always prepare both parts to be joined before gluing for the highest quality joints. Don't use Acetone for cleaning external, painted, surfaces as you will damage the paint.

Tip: For cleaning small (uncured) glue spots or marks off the painted surfaces you can use old-fashioned liquid cigarette-lighter fuel, like 'Ronsonol' or equivalent. This does not damage the paint, as Acetone and many other solvents will, and this is what we use at the factory.

At CARF-Models we try our best to offer you a high quality kit, with outstanding value-for-money, and as complete as possible. However, if you feel that some additional or different hardware should be included, please feel free to let us know. Email us: [feedback@carf-models.com](mailto:feedback@carf-models.com). We know that even good things can be made better !

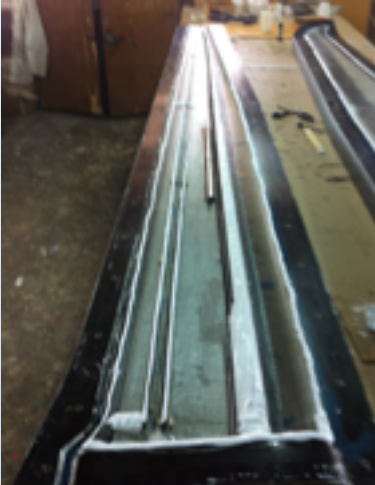
***Did you read the hints and warnings above and the instructions carefully? Did you understand everything in this manual completely? Then, and only then, let's start assembling your CARF-Models DG-800S. If not, please read it again before you continue.***

## Equipment:

This is a list of suggestions for equipment to be installed in your DG-800S:

1. 2 16mm aileron servos like Graupner DES 678 or JR 3711 HV
2. Or: 2 20mm aileron servos like Graupner DES 707 or JR DS 8411 HV
3. 8 20mm standard size servos with at least 15 kg/cm or 120 oz/in like the above
4. Powerbox Sensor oder Evolution or any other high quality power bus
5. Receiver batteries of appropriate size, depending on your planned flying time
6. Receiver with at least 10 outlets

## General information



The wing of your CARF-Models DG-800S is a so called all carbon wing. The skin has several layers of carbon fibre as well as the C-spars. These are laminated in separate molds, all carbon, of course.



The fuselage is made from various glass fibre layers, responsibly and well engineered with Kevlar reinforcements in the canopy and fin area.

This extensive use of high end materials is unique in the industry and responsible for the incredible strength and overall performance of the aircraft.



## Liste Der Enthaltenen Bauteile

| Material Name                         | Piece       | For What                   |
|---------------------------------------|-------------|----------------------------|
| Threaded end M3 with hold for steel c | 2           | Ruder                      |
| PULL PULL WIRE DIA 0.8MM              | 2 x 2 Meter | Ruder                      |
| CRIMP TUBES DIA 2MM                   | 4           | Ruder                      |
| Clevis M3                             | 2           | Ruder                      |
| ALLEN SCREW M 3*12                    | 2           | Ruder                      |
| WASHER M3                             | 6           | Ruder                      |
| SHEET METAL SCREW 2.9*13              | 4           | Ruder                      |
| hinge wire 2mm 400mm                  | 1           | Ruder                      |
|                                       |             |                            |
| Counter sunk M5x 60                   | 2           | Stab                       |
| Clevis M 3                            | 2           | Stab                       |
| ALL THREAD M3 x 20 mm                 | 1           | Stab                       |
| WASHER M3                             | 4           | Stab                       |
| SHEET METAL SCREW 2.9*13              | 4           | Stab                       |
|                                       |             |                            |
| ALLEN SCREW M 3*16                    | 4           | Gear                       |
| ALLEN SCREW M 4*10                    | 2           | Gear                       |
| WASHER M3                             | 8           | Gear                       |
| WASHER M4                             | 2           | Gear                       |
| ALL THREAD M3 x 50 mm                 | 1           | Gear                       |
| Clevis M3                             | 2           | Gear                       |
| Nut M3                                | 2           | Gear                       |
| hinge wire 2mm 400mm                  | 2           | Gear                       |
| SHEET METAL SCREW 2.9*13              | 4           | Gear                       |
|                                       |             |                            |
| SHEET METAL SCREW 2.9*13              | 4           | Towing Clutch              |
| ALLEN SCREW M3*12                     | 2           | Towing Clutch              |
| WASHER M3                             | 6           | Towing Clutch              |
|                                       |             |                            |
| ALL THREAD M3 x 20 mm                 | 2           | Wing                       |
| ALL THREAD M3 x 30 mm                 | 2           | Wing                       |
| THREADED PUSHROD M2*200               | 2           | Wing                       |
| Clevis M2                             | 2           | Wing                       |
| Nut M2                                | 2           | Wing                       |
| Celvis M 3                            | 8           | Wing                       |
| Swasher M3                            | 4           | for 20 mm Aileron Servo    |
| ALLEN SCREW M3*12                     | 4           | for 20 mm Aileron Servo    |
| T Nut M3                              | 4           | for 20 mm Aileron Servo    |
| Nut M 3                               | 8           | Wing                       |
| SHEET METAL SCREW 2.9*13              | 24          | Wing                       |
| SHEET METAL SCREW 2.2*10              | 24          | Wing                       |
| WASHER M3                             | 32          | Wing                       |
| ALLEN SCREW M 6*30                    | 2           | Wing                       |
| Khurled plastic nut M6                | 2           | Wing                       |
|                                       |             |                            |
| Servo mount Ruder                     | 1           | 3 mm Plywood               |
| Servo Mount Retract                   | 1           | 3mm Plywood                |
| Servo mount Towing Clutch             | 1           | 3 mm Plywood               |
| Plywood medium 3 mm                   | 1           | 11 x 7 cm Support Powerbox |
| Plywood medium 3 mm                   | 2           | 3.5 x 100 Support Batterie |
| Retract Look 2 x 6 mm Medium Plywood  | 2           | Rear and Front             |
| Aluminium Bracket for 20 mm Servo     | 2           | Aileron                    |
| Light plywood frame for 20mm Servo    | 2           | Aileron                    |
| Switch Support                        | 1           | Powerbox switch            |
| M 3 x 35 mm                           | 1           | Tail Wheel                 |
| Velcro                                | 1           | 30 cm                      |
| Servo Hatch smal white                | 2           | 16 mm Aileron Servo        |
| Servo support                         | 2           | 16 mm Aileron Servo        |
| Steel wire 1.2 mm 30cm                | 1           | Towing Clutch              |
| Plastic Tube red 30cm                 | 1           | Towing Clutch              |

## milled wood parts and hardware



Rudder servo tray



Retract mounts



Retract Servo tray



milled parts for RC equipment



Cockpit tub and parts



Milled instrument panel



## Milled wood parts and hardware



Horizontal Stab



Rudder



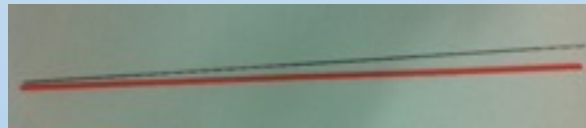
Retract



Wing



Tow release



20mm (standard size)  
servo mount parts



16 mm (mini size) servo  
mount parts

## Horizontal stab installation

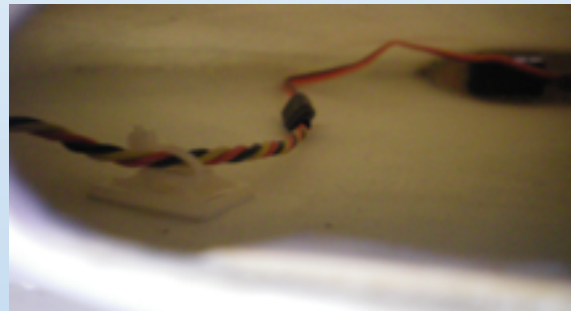
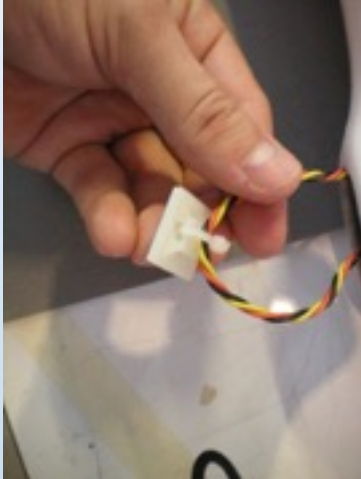


Install a standard size high quality elevator servo with the included 2.9 x 13 mm self tapping screws. Use washers if necessary.

The elevator linkage is assembled from the 20 mm M3 all thread and 2 spring steel clevises.

NOTE: Since space is very tight, these clevises must be secured with LOCTITE after the final elevator setting is adjusted.

## Horizontal stab installation



Extend the servo wire, either by soldering an extension or connecting a pigtail socket. Secure the extension so that it cannot disconnect under any circumstances.

It is helpful to use the tailwheel opening to feed the wire forward. Use cable sockets to secure it to the fuselage wall.

Make sure that it is not rubbing against retract and carbon formers.



The horizontal stab is readily built and can bolted on immediately with the included M5 x 40 mm counter sunk bolts.

## RECENT UPDATE!



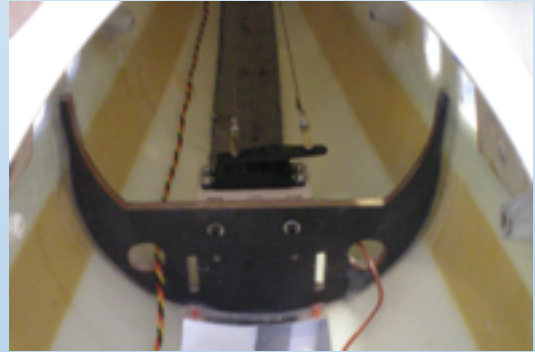
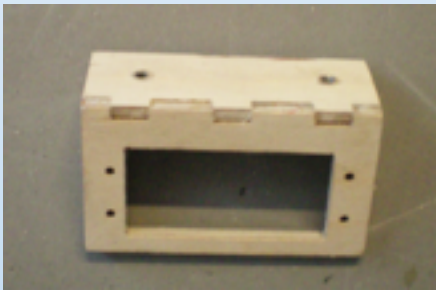
Note: During countless test flights it has been noticed that the stab incidence should be reduced by 0.7 degree in order to maximize the performance of our DG-800. Even though the plane is flying very well with the incidence out of the box in slower thermal flying, the faster you want to fly, the more you feel you need to trim down elevator.

Please sand or grind the spacer highlighted on the photo down to zero thickness at the rear. This will reduce the incidence of the stab just the right amount to allow extremely fast flying at fully neutral elevator.

The result is that you can move the CG approx. 10-15 mm back by removing approx. 400 gram of weight out of the nose.

New kits should have the spacer already sanded down in the factory. Such stabs are marked with a RED DOT on that very spacer to avoid any misunderstandings.

## Rudder servo installation



The rudder servo tray is already assembled and holes for the servo are drilled. Use 2.9 x 13 mm self tapping screws and washers to install your standard size servo (preferably of the same type as the elevator servo)

Then bolt the servo tray from the rear against the landing gear former.

NOTE: Use Loctite to secure the bolts!

## Rudder installation



The spar with the hinge posts is already installed and glued securely. Also the rudder has the hinge pin sleeves and the cut-outs preinstalled. It can be attached to the fin immediately.



Attach the steel wires by looping them through the control horns and crimp them with the included crimp sleeves.

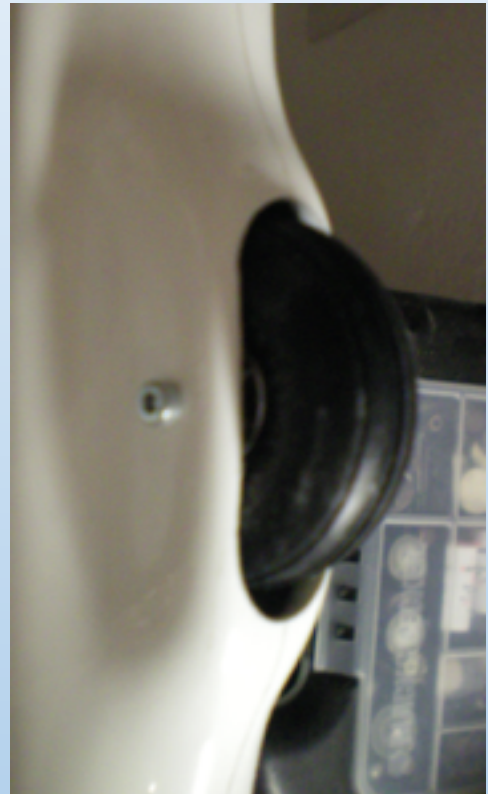
NOTE: Take great care when crimping, use double loops to be sure!

## Rudder installation



Trial fit the hinge pin, either conventionally from the top (where you can always see it) or from the bottom, like shown in the photo. In that case it is important to secure the pin against accidental loss. Bend the end approx. 10-12 mm (1/2")

## Tail Wheel Installation



The tail wheel axle can be made from either M3 or M4 bolt, 35 mm long, depending on the wheel used. The predrilled hole might have to be adjusted slightly to fit.



## Wing Servo Installation



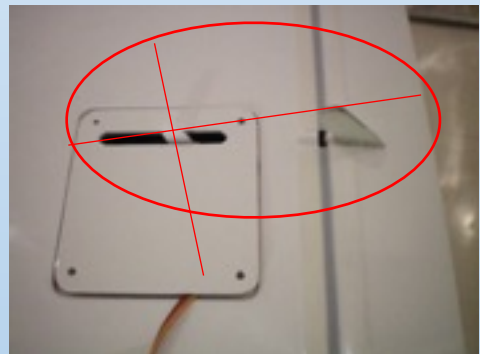
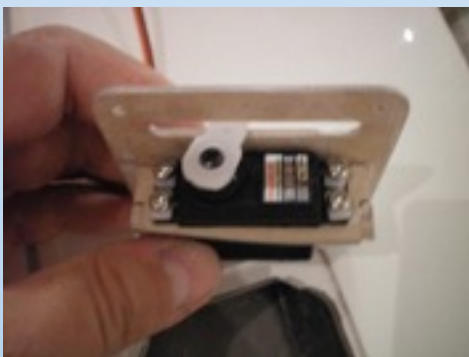
The wings are completely finished. The slot cover tape is attached, control horns are installed and the speed brake cover is precisely attached.

## Installation of 16mm Aileron Servos

### Important Note:

A 16mm Servo can be used if it is one of the newest high end servos with a torque of 10+ kg/cm. This is sufficient if not flown under extreme conditions with oversized jet turbines.

It is recommended, however, to install a standard size servo, if the very top performance and speed is desired. A special servo cover and mount for standard size servos is optionally included in the kit!



For the installation of the aileron servos please use the 2.9 mm sheet metal screws with washer once more. For symmetrical travel please align the servo horn perpendicular to the linkage!



You mount the servo hatches with the 1.9 x 10 mm screws. Create the linkage with a 20 mm long M3 all thread and turn on two spring steel clevises. Use Loctite or CA glue (just like you did with the elevator linkage) because there is no room for counter nuts.

## Installation of 20 mm standard size aileron servos

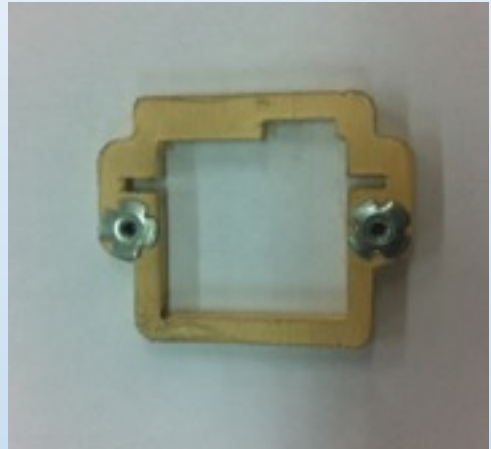
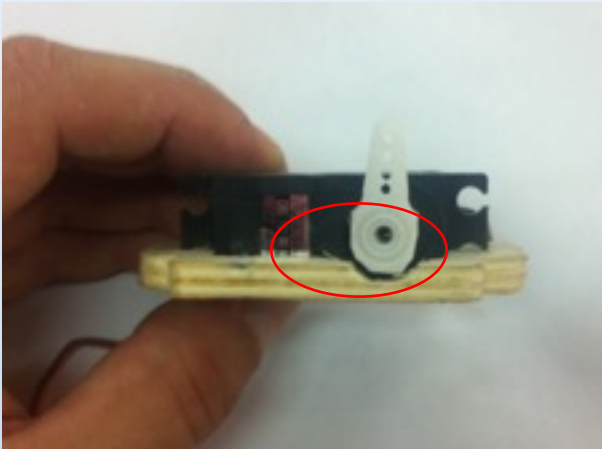
If you decided to use the standard size servos, you will use the flat frame from 6mm plywood. Grind a recess for the servo horn as shown on the photo. Then insert the M3 blind nuts and glue the frame on to the skin.

Note: Sand the skin surface thoroughly with coarse sand paper and use a little playdow (or similar) to fill the threads of the blind nuts. Use a good 30 min epoxy or thickened laminating resin to glue the frame in place. Trial fit with the servo to make sure it fits the recess without binding and the servo horn aligns with the control horn.

Once the frame is glued, fit the servo, use a dot of clear silicone to help secure the servo in the frame (you will always be able to remove the servo with moderate force). Then screw the metal frame on with the M3 x 10 allen screws. Be very careful and use washer if necessary so that the screws do not show through at the outside of the top wing skin.

To mount the servo hatches use the 1.9 x 10 mm sheet metal screws. The linkage is identical to the version with the 16mm servos. Use Loctite or CA glue to secure the clevises on the threaded rod.

## Installation of 20 mm standard size aileron servos



## Spoiler and flap servo installation



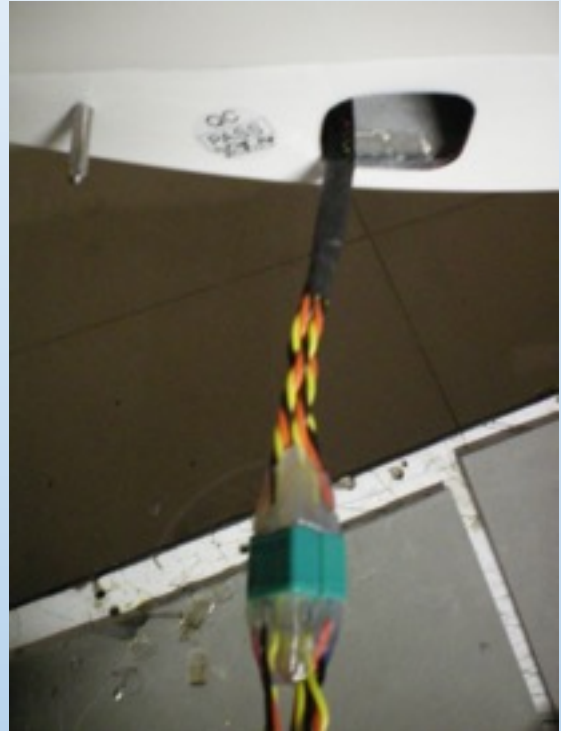
The installation of Flap and Spoiler servos is identical to the method of the 16mm airline servos. Use the 2.9 x 13 mm servo screws included in the kit. Mount the hatches with the 1.9 x 10 mm sheet metal screws.

The flap linkage is built exactly like the aileron and elevator linkage. For the spoiler linkage please use the 2mm threaded end and one M2 spring steel clevis. The limited space requires a Z-bend on the servo side. Do not experiment with this linkage. If this linkage fails in flight it can have fatal consequences. If one spoiler extends itself and the other one stays retracted there is almost no chance to save your plane. That is because you most likely have no idea what happened until you hit the ground...

## Wing attachment



For the wing servo wire connection we recommend to use larger connectors. You can glue 2 against each other. There are many ways and preferences, you might have your own style.



It is important that the wires don't rub against the edges of the cut-outs.

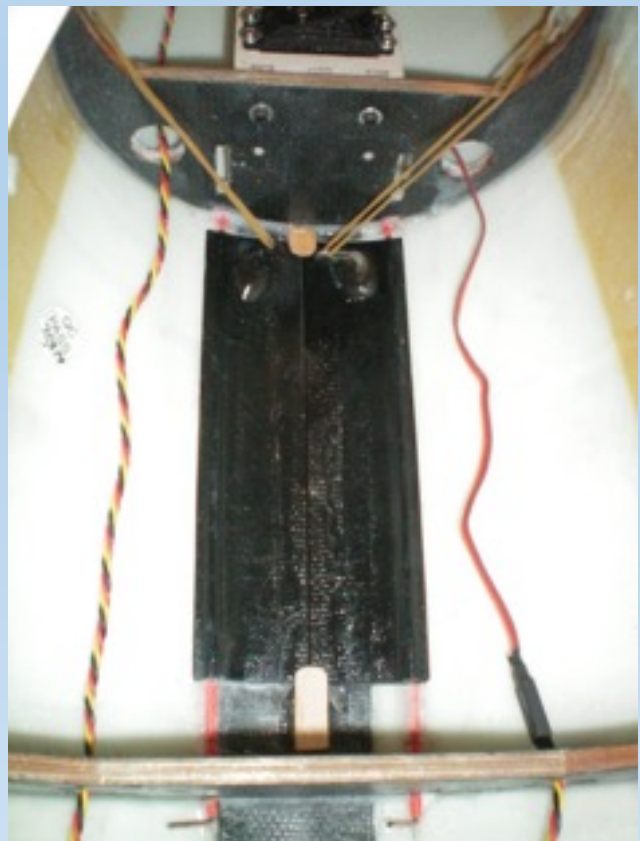


The “floating spar” wing mount is completely finished. Install the massive 30x30 mm carbon connector. Glue the knurled plastic nuts on the M6 bolts and you won't need any allen key to assemble your plane at the field.

## Gear door and retract installation



Create hinge pins from the 2mm welding rod and install the gear doors. Glue stops from scrap plywood and trial fit hooks for two rubber bands. Even though this seems a very simple method to keep the gear doors closed, it is a very efficient one. The retractable gear is designed to open the doors against the spring loading with the steel loop in front of the wheel.



## Gear door and retract installation

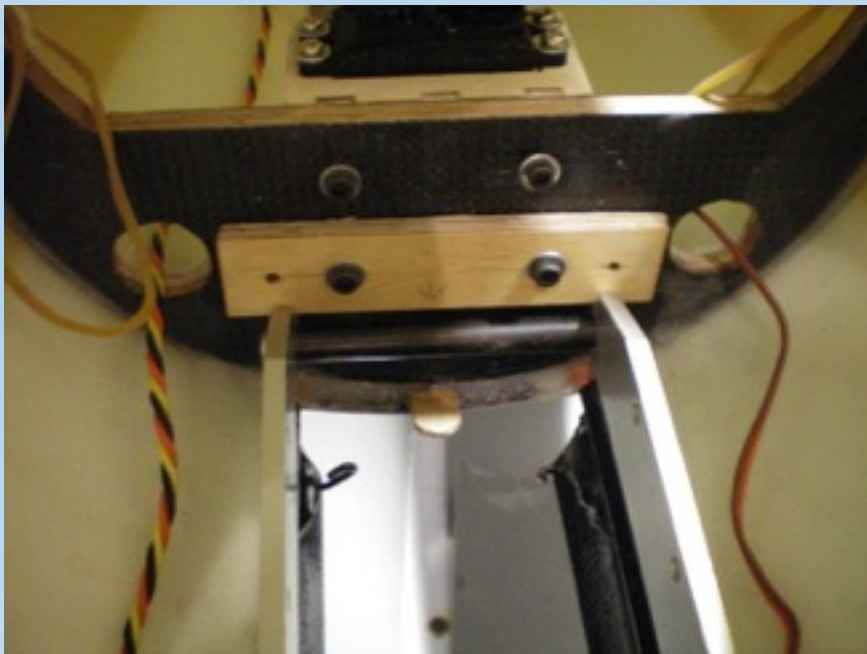


Mount the wooden servo mount with the M4 x 12 allen bolts to the aluminum frame of the retract. As usual, use the 2.9 mm sheet metal screws and washers to mount the servo in the frame. As linkage use the M3 all thread and two spring steel clevises. You might have to adjust the length of the linkage to work properly.

Note: Make sure the linkage is always 100% STRAIGHT!



## Gear door and retract installation



Slide the retract unit into the slots of the two formers and secure it with the two wood boards, bolted on with each two of M3 x 16 allen bolts, as shown on the photos above.

## Remaining equipment installation

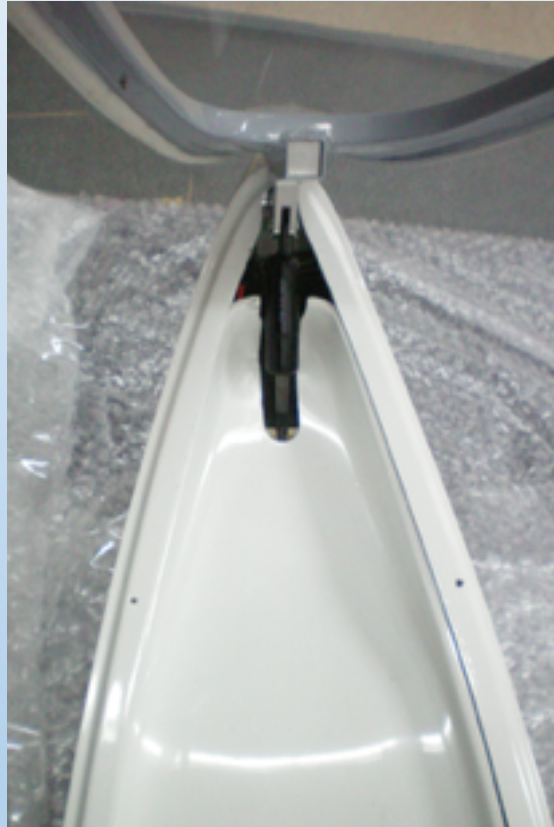


The front part of the fuselage is used as equipment bay. The photos show only a sample installation, since most have their own ideas and methods how to install receiver, powerbox, batteries, switches.... The photos also show an easy way to install the tow release servo.



## Canopy hinge and cockpit tub

The photo shows the gas spring mount of the canopy hinge, which otherwise is already completely installed.



Up to 1.5 kg of lead must be glued into the nose in order to balance the DG-800.

Make sure that the cockpit tub still fits the fuselage after you installed all your equipment and balance weight. Cut a slot in the rear part of the cockpit tub so that you can compress it sideways to insert it under the lip of the fuselage. A scale seat cushion will cover this slot and make it invisible.

The kit contains the base parts for an individual cockpit detailing by yourself. However, we highly recommend to purchase the scale cockpit available as an accessory. It saves you valuable working hours which you better spend flying this magnificent airplane.

On the following page you will find the settings for control travel and CG. Please note that with the reduced stab incidence you can move the CG 10-15 mm back.

## Settings

