Q12

The EP glider Q12 is the new version of our very successful Q10 and its newer versions.
The Q10 was designed such, that the model was to be as lightweight as possible.

When we designed the foam successors of the Q10, we took use from our long-years experience with the DLG models. These gliders, made with the foam/skin technology, flew much better, than those stick and film types. The main reason was seemingly the overall improvement of aerodynamic properties.

The foam/skin structure provides much better rigidity. The A/R can be very high. The ailerons and brakes will not warp. The A/R is about same as that of free flight power models.
Each half of the wing is made as single part. The dihedral is built in during the moulding process.

The pod was designed to be used for many different types of models and equipment. It is long such, that folding prop up to 14" diameter could be used. The pod is very slick, yet it provides enough room for RC and power unit parts. The bottom is a bit flattened to get even more room inside the pod.

The rear fuselage part consists of carbon/glass boom. It provides rather long tail arm for excellent flight stability.

The tail feathers are made in similar method as the wings. They are very lightweight. The V-tail is divided into two parts for easy transport.

The CG is in correct position even with the very lightweight components: Motor Dualsky Xmotor 2826CA-10 without gears and LiPo Dualsky Xpower 1200-2S (weight ca. 75 grams).

The on-board RC system is supplied from the ESC BEC. Check if the BEC can supply receiver and 6 servos. When in doubt, use Dualsky VR-3 voltage controller.
It can supplied from the battery balance connector.

Specifications	
Wingspan	2000 mm
Length	1210 mm
Empty weight	from ca. 310 grams
RTF weight, w. recommended equipment	from ca. 530 grams
Wing airfoils	AG 40-43

Recommended equipment for class of small outrunners:

- Motor XM2826EA-10
- Prop Aeronaut 10x6
- Prop spinner 32/3,2 - pin 8/3 – pitch of pins 38 mm
- Accu Dualsky XPower 1200-2S
- ESC Castle Phoenix 35
- Rx and servo supply: ESC BEC or controller VR-3
- Servos GWS PICO BB , ATLAS 09, DYMOND 47 and/or 60 … 6 pcs
- Rx: min. 7 channels
- 4-pin Deans mini red and black or 5 cm servo extensions

Model assembly

Fuselage

Motor mount installation: Cut off the pod tip, so that the opening is of approximately 25 mm diameter. The mount in the kit suits perfectly for the outrunners of 28 diameter o.d. and spinner 32 mm. The sizes of the mount and spinner allow for enough room for the motor cables.
How to adjust correctly the motor mount: Find a longer bolt ca M8 with nut and screw on it into the motor mount central hole. Use the bolt as the indicator of the correct motor axis adjustment: ca. 0-1 deg down, ca. 0-1 deg right. Fix the mount in position with few CA drops. Remove the bolt and secure the motor mount in position with epoxy, around the mount perimeter, from both outside and inside. Be sure to leave the mount surface clean, in area of the contact with the motor face.
Sand the excess pod tip so that the motor mount is ca. 1-1,5 mm deep.

Bend the canopy mount wire (piano wire 0,8 mm), so that the ends are in the middle of the canopy. The wire should be longer than the canopy, ca. 3 mm on both ends are just fine. Drop fix in place with medium CA and activator. Secure with a square layer of glass fibre.

Epoxy in position ply rectangles (touch the FG with sandpaper before), which make for the wing bolt attachment nuts. Using the wing as template drill holes 3,2 mm a run tap M4:
Mark the holes centers, dril holes ca 1,5 mm and check for the correct position. If not satisfied, use rat tail file to "move" the hole center. Only then drill holes 3,2 mm.
Complete the two front holes first, screw the wing in position and then repeat for the rear pair.

Assemble the wing and fuselage pod. Assemble the boom with the tail parts – see below.

Make the cut outs in the servo mount to accept the servos you will use. Install the mount and the servos.

Wing

Caution!!! Even if invisible, the wing surface is slightly porous. Any contact with some organic solver (nitro) will attack the foam core!

Use very sharp and thin blade to cut the notches for the arms in the moving surfaces. Locate the arms so that they protrude through the parts. Glue the arms in place from both surfaces. The epoxy fills the corners what provides for very firm assembly.
The arms of the brakes point rearwards!

Cut off the servo flanges. With servo tester or RC set up neutral servo arm positions. The aileron servos arms point in right angle to the wing bottom surface, the brakes servo arms should point rearwards so that the scope of the motion allows for full brake deflection.

Tail

We have got excellent experience with the 1,5 carbon pins, which secure the tail parts in place. Drill two 1,5 mm holes for the fin securing pins throughout the boom. Mark the positions of the holes on the fin root rib. Drill holes in the fin. Assemble and glue the fin to the boom.
Screw the stab to the stab mount with the plastic bolt, fix its position with 1,5 mm pins but do not glue them yet.
Place the stab/mount assembly onto the boom, take care to keep right angle veritically and horizontally. When correct, drop CA to "pin" the mount in place.
Remove the stab and glue the mount on the boom with medium CA. Check again.
Drill 1,5 mm holes through the mount AND boom, install the 1,5 mm carbon pins and glue with thin CA.
Only NOW push and glue the complete tail and boom assembly on the pod. Rotate the boom on the pod, so that the stab is perfectly perpenticular with the wing.
The centerline of the stab airfoil should be perpenticular with the boom axis.

Servos – moving parts connection

Tailplanes
As the tail arm is rather long, it is most important to keep the servo/horn connection as lightweight as possible. The weight of the conventional full-length wire/tubing would be higher, that the weight of the boom.

Our solution is to use carbon rod 0,8 mm pushrods, which connect the servo arms with the tailplane horns. The rods are guided with pieces of white plastic tubing, mounted on the outer side of the tailboom.
Use one pair of the tubes about 130 mm long in the wing leading edge region and another 3 pairs ca. 20 mm long, located evenly along the boom. For the classical rudder, another piece of tubing in the stab TE region is necessary. You can just tape the tubings to the boom. Easy, secure.

The pushrod is attached to the servo arm with piano wire Z-bend, while the moving surface horn are attached with L-bend. All is made of 0,8 mm piano wire. The rod is connected with the wire with piece of shrinking tape. Use clean soldering iron to shrink the tape. Set up both servo arm and movable surface into neutral positions before. You have few seconds to fine tune the length if necessary, before the tube gets stiff. When satisfied, secure with drop of thin CA.
At worst, cut off the tubing with sharp knife and start again.
This solution is very reliable and lightweight.

The L-bend on the rudder can be secured with ca. 3 mm of plastic tubing, pressed with pliers and secured with CA drop. The L-bend of the stab can not move out, as it is close to the fuselage side. However, if the leg is ca 8 mm long, there is next to impossible to get loose. The L-bend allows for easy detaching the stab, what is very good for the transport reason.

Be very carefull when apply thin CA close to the rod/tubing. A drop inside can totally destroy your effort. We recommend to drop CA on piece of paper and to apply with toothpick.

Ailerons and brakes
The pushrod is made of Z-bent (servo side) 0,8 mm piano wire and metallic tip, plus plastic fork (horn side).
We prefer 2 mm aluminium rod, with threads on both ends, shown on the web. The disadvantage is, that tools to make M2 threads must be used.

Moving surfaces deflections
We suppose to program three flight modes: normal, thermal, speed.

Normal: Flaps (ailerons and brakes) – neutral position, flush with the central part of the wing. It is ca. 2 deg down in respect to the front wing part.
Thermal: Flaps (ailerons and brakes) ca 6 deg
Speed: Flaps (ailerons and brakes) flat bollom
The flaps movement must be compensated with elevator, in the same sense: flaps down, elevator down and vice versa.
Note: Make a cardboard templates with tip angles 178 and 174 deg to adjust the flaps deflection.

Typical movements of the control surfaces:
Ailerons ca +10/-5
V-tail +/- 8 mm
Fin +/- 20 mm
Elevator +/- 5 mm

Butterfly
Brakes + ca 70 deg
Ailerons – ca 10 mm
Elevator compensation: ca 2 mm, adjust as necessary

Transmitter sticks: according to the pilot habit. Usually, the motor is controlled by a switch. For the competition type spot landing the brakes (butterfly) must allow for fluent control.

Centre of gravity
The good starting position is ca 70 mm behind the wing leading edge. Usually, the CG is moved rearwards when you and the model are good friends.

Flying

If the CG is in correct position, the model should fly instantly, without problems.
Lot of fun.

Note
Manual, assembly drawing and pictures of assembly are available from our website www.horejsi.cz

Hořejší model Ltd.
Teslova 7
3011 00 Plzeň
Czech Republic