

## Building instructions for the Powercat model boat, Order No.: 2125

### The full-size vessel

Class 1 off-shore catamarans are racing boats with a hull length of 12 to 14 m, and are capable of top speeds around 250 km / hr or more. The maximum permissible engine capacity is 8.2 litres, and the power plants are rated at around 750 to 950 BHP. Since the start of the 2003 season all the boats have been powered by Lamborghini V12 petrol engines.

The crew of a Class 1 boat consists of the driver and the 'throttleman'.

The design of our model is based on these famous Class 1 power boats. Every year these vessels take part in a series of races held all round the globe, in a similar style to the Formula 1 car-racing scene.

### The model

This boat is suitable for beginner and advanced modeller alike. At the design stage we paid particular attention to simple construction and good structural strength.

Building the model calls for little in the way of modelling knowledge. All the components are accurately laser-cut, and the vacuum-moulded parts are machine-trimmed, with the result that hardly any trimming or adjustment is required.

The boat is designed for a standard power system consisting of a single central electric motor; at the builder's discretion two motors can be installed in the sponsons.

The model can be fitted with brushed or brushless motors.

### Specification

Hull length approx.	785 mm
Overall length approx.	895 mm
Beam approx.	240 mm
Height excl. rudder approx.	160 mm
All-up weight including RC approx.	2.0 to 2.2 kg, according to motor and battery
Scale approx.	1 : 12

### Manufacturer's declaration from Graupner GmbH & Co KG

#### Contents of the manufacturer's declaration:

If material defects or manufacturing faults should arise in a product distributed by us in the Federal Republic of Germany and purchased by a consumer (§ 13 BGB), we, Graupner GmbH & Co. KG, D-73230 Kirchheim/Teck, Germany, acknowledge the obligation to correct those defects within the limitations described below.

The consumer is not entitled to exploit this manufacturer's declaration if the failure in the usability of the product is due to natural wear, use under competition conditions, incompetent or improper use (including incorrect installation) or external influences.

This manufacturer's declaration does not affect the consumer's legal or contractual rights regarding defects arising from the purchase contract between the consumer and the vendor (dealer).

#### Extent of the guarantee

If a claim is made under guarantee, we undertake at our discretion to repair or replace the defective goods. We will not consider supplementary claims, especially for reimbursement of costs relating to the defect (e.g. installation / removal costs) and compensation for consequent damages unless they are allowed by statute. This does not affect claims based on legal regulations, especially according to product liability law.

#### Guarantee requirements

The purchaser is required to make the guarantee claim in writing, and must enclose original proof of purchase (e.g. invoice, receipt, delivery note) and this guarantee card. He must send the defective goods to us at his own cost, using the following address:

**Graupner GmbH & Co. KG, Service Department,  
Henriettenstr. 94 - 96, D-73230 Kirchheim/Teck, Germany**

The purchaser should state the material defect or manufacturing fault, or the symptoms of the fault, in as accurate a manner as possible, so that we can check if our guarantee obligation is applicable. The goods are transported from the consumer to us and from us to the consumer at the risk of the consumer.

### **Duration of validity**

This declaration only applies to claims made to us during the claim period as stated in this declaration. The claim period is 24 months from the date of purchase of the product by the consumer from a dealer in the Federal Republic of Germany (date of purchase). If a defect arises after the end of the claim period, or if the evidence or documents required according to this declaration in order to make the claim valid are not presented until after this period, then the consumer forfeits any rights or claims from this declaration.

### **Limitation by lapse of time**

If we do not acknowledge the validity of a claim based on this declaration within the claim period, all claims based on this declaration are barred by the statute of limitations after six months from the time of implementation; however, this cannot occur before the end of the claim period.

### **Applicable law**

This declaration, and the claims, rights and obligations arising from it, are based exclusively on the pertinent German Law, without the norms of international private law, and excluding UN retail law.

### **Important safety notes**

You have acquired a kit which can be assembled into a fully working RC model when fitted out with suitable accessories. However, we as manufacturers have no control over the way you build and operate your RC model boat, nor how you install, operate and maintain the associated components, and for this reason we are obliged to deny all liability for loss, damage or costs which are incurred due to the incompetent or incorrect use 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 GRAUPNER company to pay compensation, regardless of the legal argument employed, is excluded. This includes personal injury, death, damage to buildings, damage due to loss of business or turnover, interruption of business or other direct or indirect consequent damage whose root cause was the operation of the model.

The total liability in all cases is limited to the amount of money which you actually paid for this model.

**This model boat is built and operated at the sole and express responsibility of the operator. The only way to avoid injury to persons and damage to property is to handle and operate the model with the greatest care and consideration at all times.**

Before you run the model for the first time please check that your private third-party insurance covers the operation of model boats of this kind. If in doubt, take out a special insurance policy designed to cover modelling risks.

These safety notes should be kept in a safe place. If you ever dispose of the model, be sure to pass them on to the new owner.

### **The following points are important and must be observed at all times:**

- This model is not suitable for young persons under 14 years of age.
- The projecting parts of the model may be sharp, and the aerials could cause eye injuries.
- Bear in mind that tools can be dangerous; always be careful when handling them.
- **Never** operate the model when there are persons or animals in the water, as its high speed constitutes a considerable injury hazard.
- Do not run your model in protected sites, animal or plant sanctuaries or sites of special scientific interest (SSSIs). Check with your local authority that the stretch of water you wish to use is suitable for model boats.
- **Never** run the boat in salt water.
- **Never** run the boat in adverse conditions, e.g. rain, storm, strong wind, choppy water or strong currents.
- Read the instructions provided with your radio control system and accessories, and observe the recommendations.
- Before you run the model check that the radio control system is working reliably, and that all connections are secure.
- Dry batteries must never be recharged. Only batteries marked as "rechargeable" are safe to recharge.
- Check the range of the radio control system before each session: ask a friend to walk about 100 m away from the model carrying the transmitter. Your assistant will be able to tell you whether all the working

**GRAUPNER GmbH & Co. KG D-73230 KIRCHHEIM/TECK GERMANY**

Keine Haftung für Druckfehler. Technische Änderungen vorbehalten!

#0059939

04/2008

13

functions operate correctly at this range.

- Ensure that the frequency you intend to use is not already in use by other modellers. Never run your boat if you are not certain that your channel is free.
- Bear in mind that other radio equipment and transmitting stations can cause serious interference to the model. Ensure that no equipment of this type is being used in the vicinity while you are operating the model.
- Do not carry out any work on the drive train unless you have disconnected and removed the battery.
- When the drive batteries are connected, **keep well clear** of the area around the propellers, and make sure any spectators do the same.
- Do not be tempted to exceed the recommended operating voltage. Higher voltages may cause the motors or speed controller to overheat, and the electrical cables may even melt. If this should happen, the model could easily be ruined.
- Check that all the drive train components work smoothly and freely. This applies in particular when the boat is running, as leaves and other debris may get caught in the power system components. The motors and speed controller could then be ruined by overloading.
- Dry cells and rechargeable batteries must never be short-circuited. Do not allow them to come into direct contact with water.
- Remove the rechargeable battery and the dry cells in the transmitter and receiver pack if the model is to be transported, or will not be used for a long period.
- Do not subject the model boat to high levels of humidity, heat, cold or dirt.
- Secure the model and your RC equipment carefully when transporting them. They may be seriously damaged if they are free to slide about.
- **Never** operate the boat in moving water (e.g. a river), as the model could drift off downstream if a fault should occur.
- If you have to **salvage** the model, take care **not to risk your own life or that of others**.
- Take particular care to ensure that the boat is completely watertight, as it will sink if too much water enters the hull. Check the model for damage before every run, and ensure that water cannot penetrate through the shaft bearings or the rudder bushes.
- Allow the boat to dry out thoroughly after each session.
- Be sure to check repeatedly during the first run that the shaft systems are watertight. If water enters the hull through the shaft tubes, remove the shafts and lubricate the tubes with plenty of grease, Order No. 570.
- **NOTE:** it is important not to dispose of the electric motors installed in the model in the ordinary household waste. They must be removed from the boat and taken to the appropriate collection point for electrical waste.

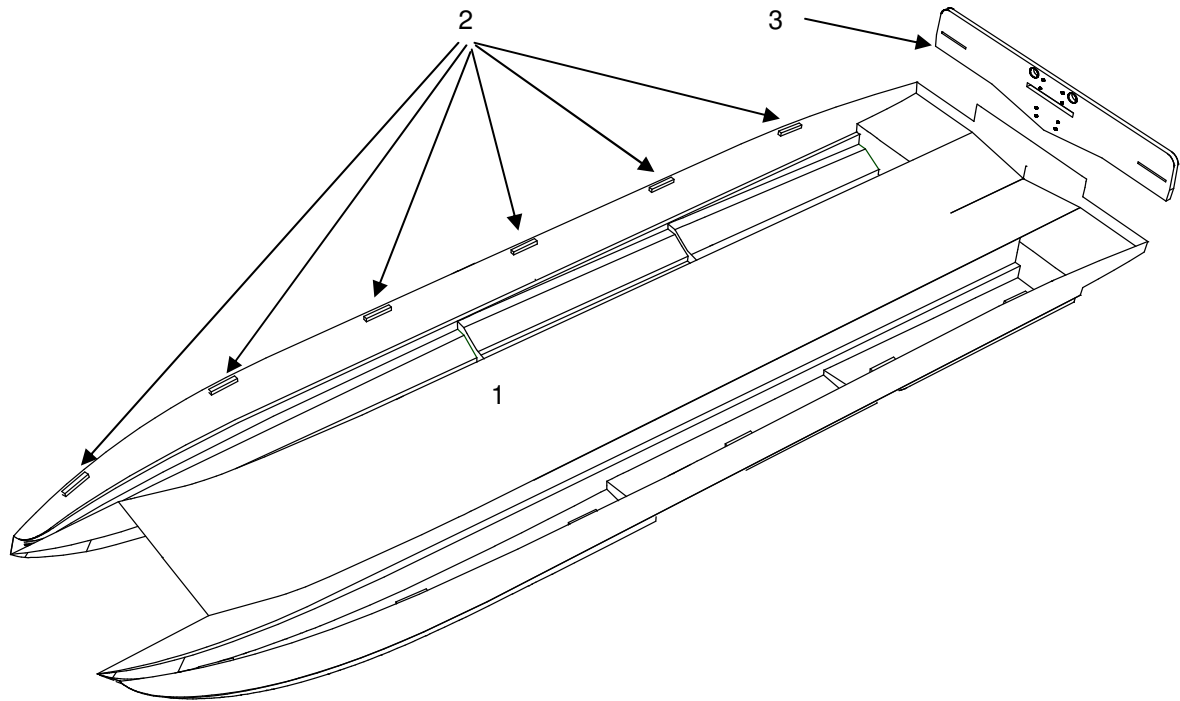
### Care and maintenance

- Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets into the RC components, dry them out carefully and send them to your nearest GRAUPNER Service Centre for checking.
- Clean the model and transmitter using suitable cleaning agents only. All you need is a lint-free cloth. **Never** use chemical cleaners, solvents, methylated spirits, white spirit or similar.
- Lubricate the propeller shafts at regular intervals by applying a small drop of oil to the bearings. The external shaft bearings adjacent to the propellers must also be lubricated. Use a type of oil which does not soil or contaminate water, e.g. Order No. 206. At the end of the season we recommend that you remove the propeller shafts and re-lubricate them using water-neutral grease, e.g. Order No. 570.

### Assembling the model

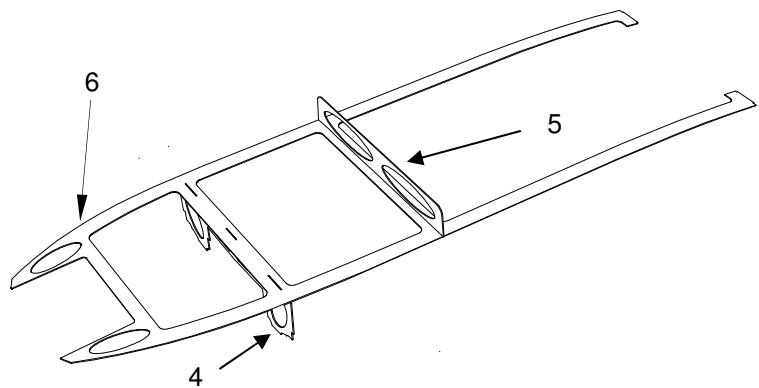
- Check the contents of the kit against the Parts List.
- It is important to clean all the plastic parts to remove any traces of grease and mould release agent; use a liquid detergent solution for this.
- Lightly sand the joint areas of the ABS parts to roughen the surfaces.
- Lay the bottom hull section (part 1) on a flat surface.
- Draw a pencil-line round the inside face of the hull at a point 2 mm below the machined cut-line.

- Check the contents of the kit against the Parts List.
- It is important to clean all the plastic parts to remove any traces of grease and mould release agent; use a liquid detergent solution for this.
- Lightly sand the joint areas of the ABS parts to roughen the surfaces.
- Lay the bottom hull section (part 1) on a flat surface.
- Draw a pencil-line round the inside face of the hull at a point 3 mm below the machined cut-line.
- Locate the 3 x 3 mm square-section ABS strip (part 2), and cut twelve pieces about 20 mm long from it.

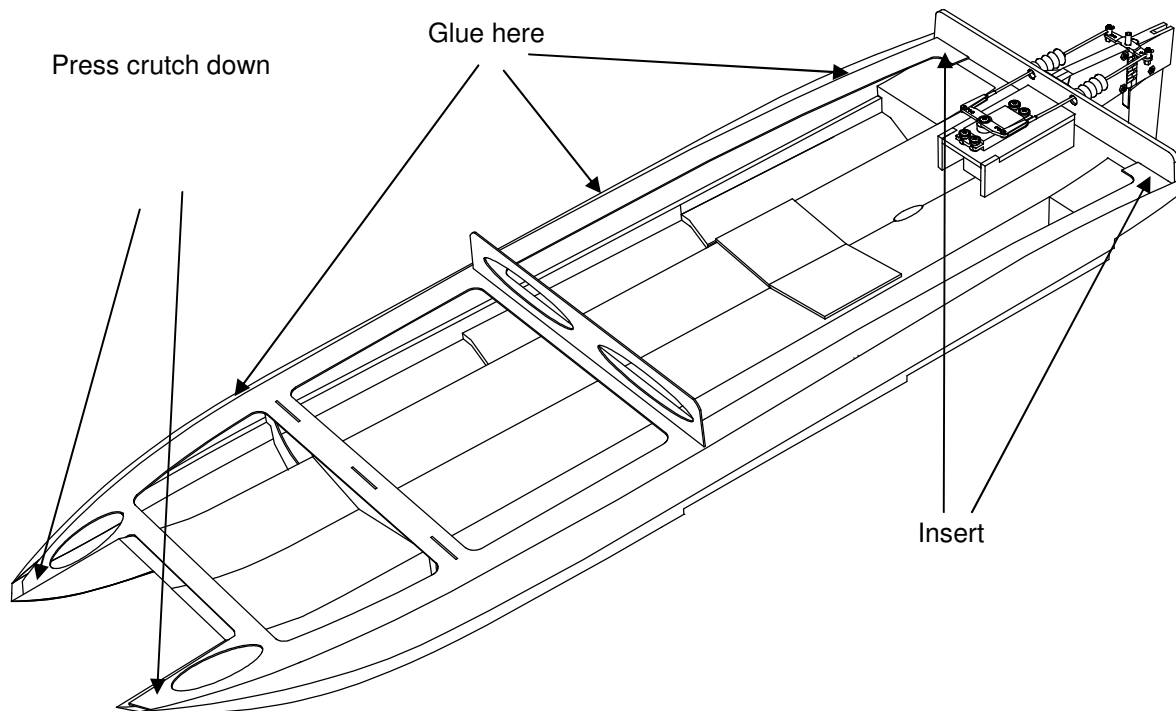


- Starting at the stern, glue these strips to the inside of the hull with the top edge aligned with the pencil-line; space them out at intervals of about 120 mm. Use UHU-Plast Spezial or cyano-acrylate adhesive for this.
- Remove the transom reinforcement (part 3) from the 4 mm plywood sheet, apply several coats of Glattfix (cellulose lacquer - Order No. 207) to it, then glue it to the inside of the transom using Stabilit Express or cyano.
- **Important:** the holes and slots must not be clogged up with glue.

- Press parts 4, 5 and 6 out of the 1 mm plywood sheet, and remove any rough edges.
- Glue the sponson former (part 4) in the slots in the horizontal crutch (part 6) from the underside.
- Glue part 5 in the rear slots in the horizontal crutch, this time working from the top.
- **Caution:** take care to glue the formers at right-angles to part 6.
- Allow the glued joints to harden thoroughly before applying several coats of sanding sealer to the wooden surfaces, to ensure that they are waterproof.

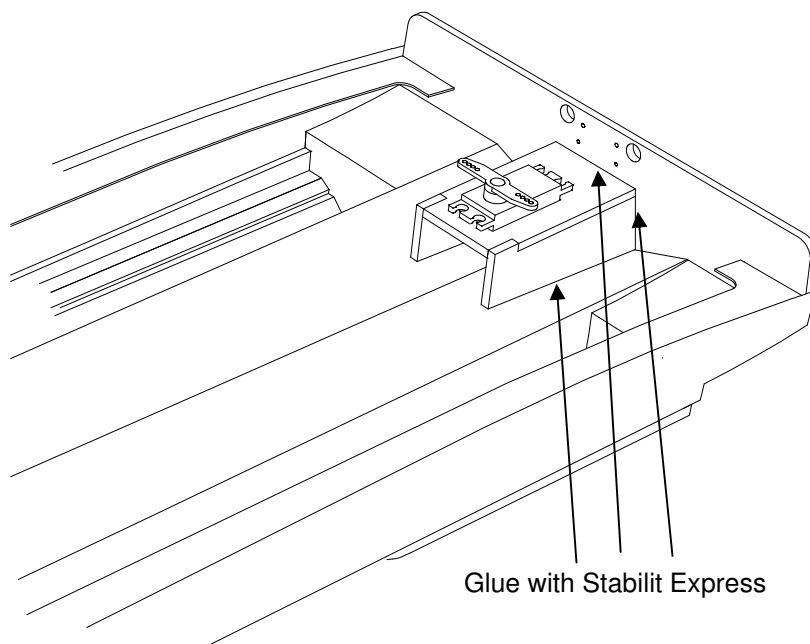


- Locate the two rear lugs in part 6 and insert them in the slots in the transom reinforcement, pushing them in as far as they will go.
- Lay the horizontal crutch on the ABS strips (parts 2), which are glued to the sides of the hull.
- **Important:** check that the wooden framework and the hull are not distorted when the parts are joined.



**This is accomplished by laying the bottom section of the boat on a flat surface, sponsons down, and placing a weight inside the hull to keep it in this position. The six steps of the sponsons must be left resting squarely on a flat surface until the glue has set hard!**

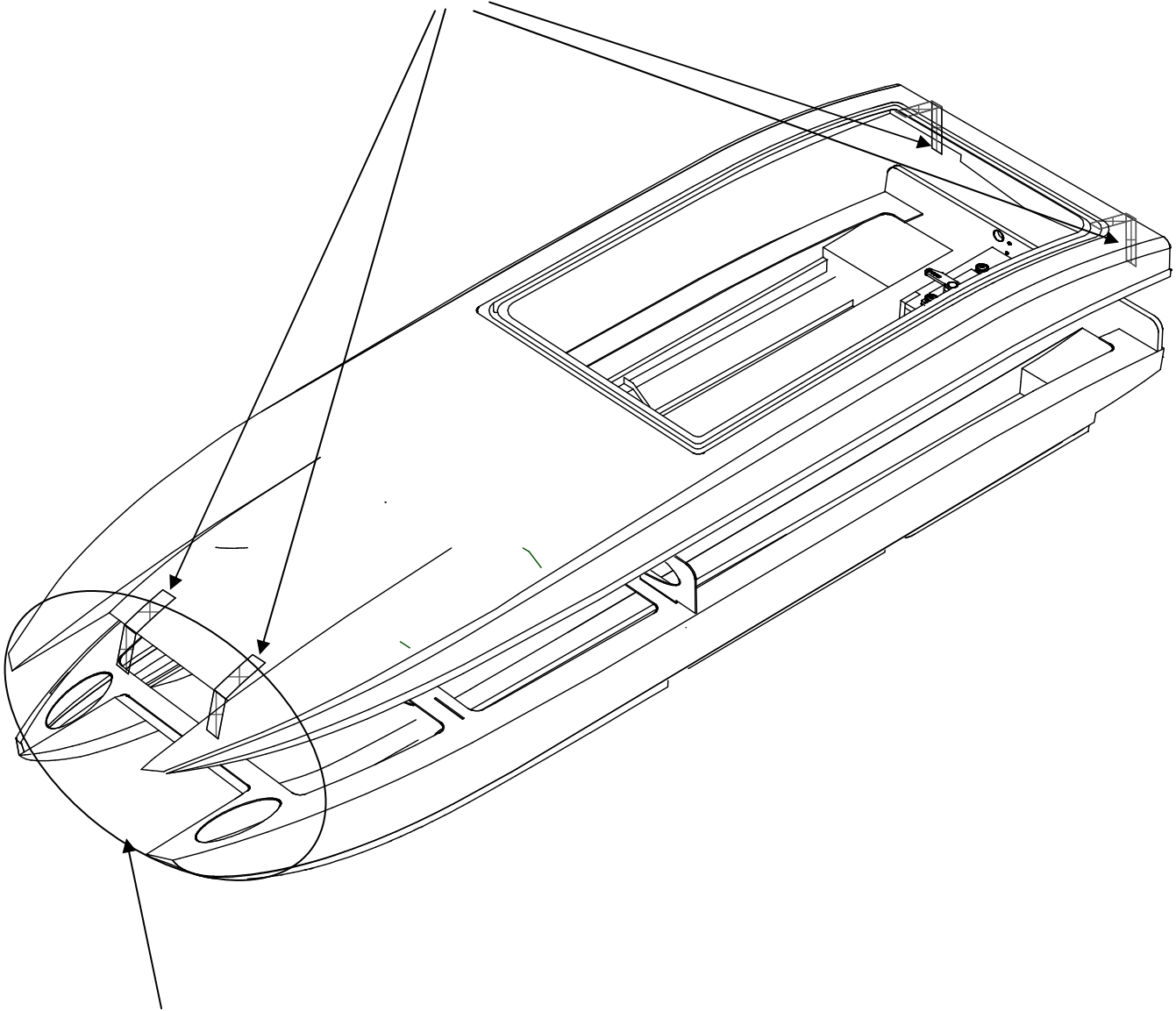
- Tack the horizontal crutch (part 6) to the ABS strips (parts 2) using cyano.
- When the glue has set hard, apply Stabilit Express or Acrylit to the full length of the joint between the crutch and the sides of the bottom hull section.
- The sponson former (part 4) only needs to be spot-glued to the hull floor.
- Assemble the servo mount from parts 7 and 8, and glue it in the slots in the transom reinforcement and the hull floor.



**Important**

- Leave the boat weighted down on the flat surface while you check that the upper hull section fits accurately.
- The first step is to apply Stabilit Express to the **front area of the top and bottom hull sections**, then place the top section on the bottom shell and position it accurately.

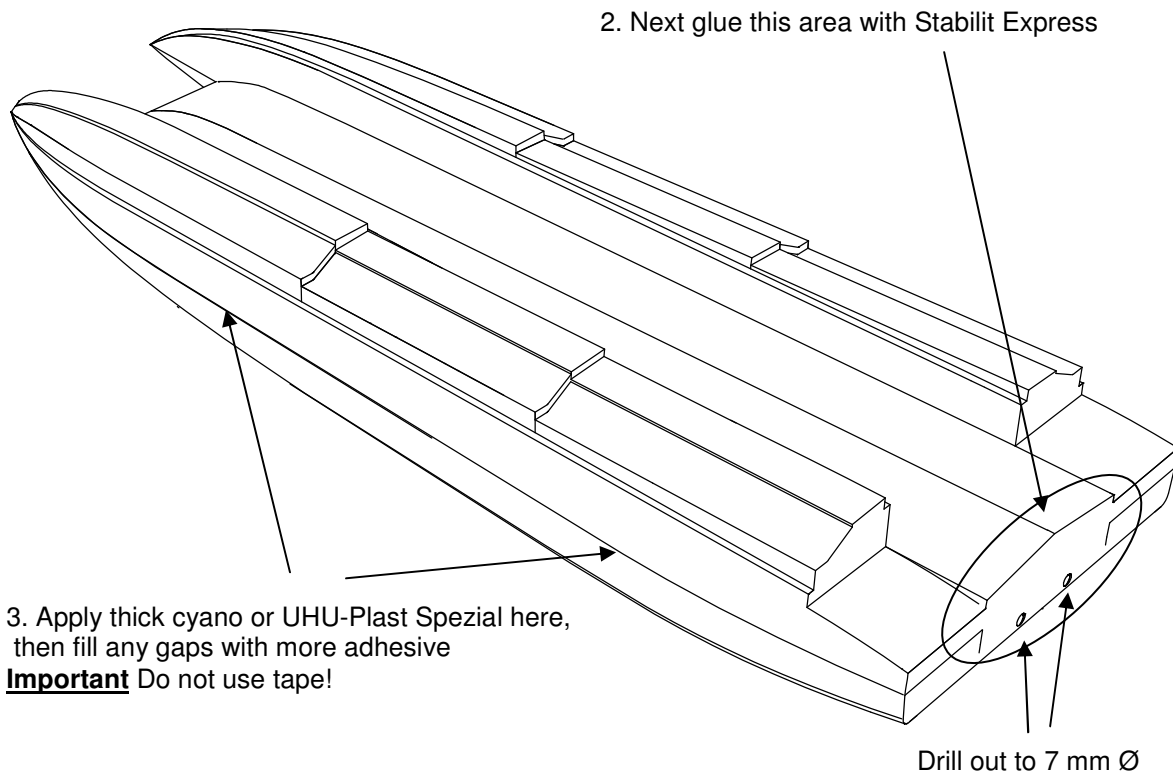
- Fix the upper hull section to the bottom shell using a few strips of adhesive tape.



1. Start by gluing  
this area with Stabilit Express

Apply the tape at the transom and the front of the centre section only (see drawing) to avoid distorting the hull.

- When the glue has set hard, remove the weight and turn the boat over.
- Remove the strips of tape at the stern, and apply Stabilit express to the central area at the stern. Press it against the transom, apply more adhesive tape, and leave the glued joint to set hard.
- **Important:** place the planing steps of the boat on a flat surface and weight it down once more while the glue is curing.
- When the joints have set hard, turn the boat over again and lay it down on its deck.
- Now complete the joint with the bottom hull section by applying thick cyano or UHU-Plast Spezial all round the flange in the top shell.
- **Important: don't use tape to hold the side-joints of the boat together, as this could cause distortion in the hull sides.**
- Allow the glue to set hard, then check for gaps all round the hull seam and fill them with more adhesive.



- When the glue has hardened fully, turn the boat over and reinforce the joint between the top shell and the bottom section from the inside by allowing adhesive to run along the channel above the horizontal crutch.
- Continue the two 7 mm Ø holes through the transom reinforcement (part 3).

- Sharpening the edges of the hull steps increases the boat's top speed and stability, and this can be achieved by gluing the planing panels (parts 15) to the underside of the hull using cyano.

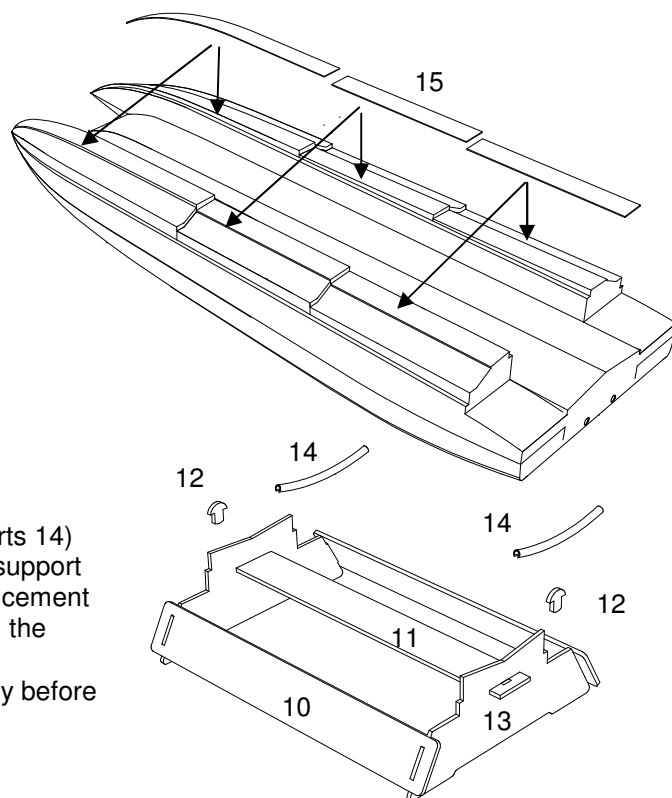
- Fitting the panels inevitably produces gaps along the sides, and these can be filled with filler paste if you wish; it is not essential to do this.

- Now assemble the boatstand from the laser-cut 4 mm plywood parts, as shown in the drawing.

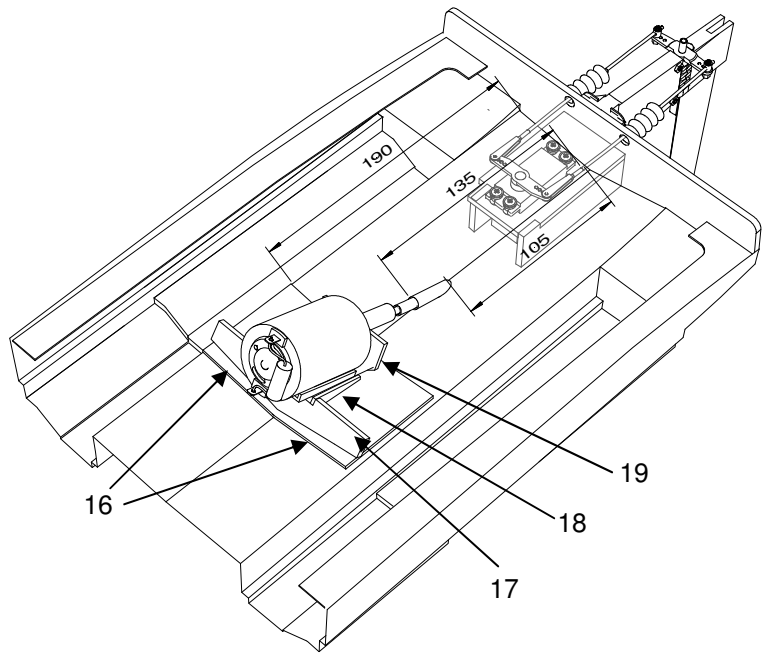
- Apply several coats of Glattfix (cellulose lacquer, Order No. 207) to the stand to render it waterproof.

- Slit the two pieces of silicone tubing (parts 14) along their length and glue them to the support surfaces of the boatstand using contact cement (Order No. 1096); this avoids scratching the boat's surface.

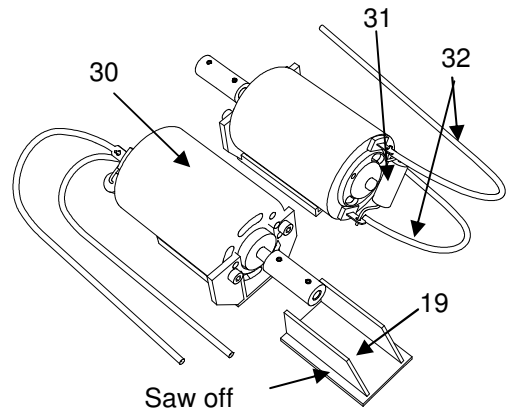
- Allow the boatstand to dry out thoroughly before placing the boat in it.



- Glue the two plywood motor mount supports (parts 16) to the central area of the hull, at a point 190 mm from the transom; use Stabilit Express for these joints.
- Drill two 4 or 5 mm Ø holes in the hull floor exactly on the central 'V', located 105 mm and 135 mm from the rear edge, then form a fore-and-aft slot by cutting out the piece of plastic between the holes using a sharp balsa knife. **Caution: the blade will tend to slip! It is better to make several light cuts than one heavy one.**

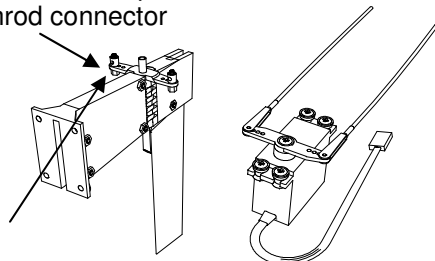


- The rudder system can now be screwed centrally to the transom.
- Slide the flexi-shaft through the strut and the hole in the hull floor.
- Solder the suppressor capacitor (part 31) between the two motor terminals to form a bridge, and solder the motor power leads (parts 32) to them at the same time.
- Saw off the projecting areas of the motor mount (18), as shown in the drawing.
- Fix the motor to the motor mount using the retaining screws provided.
- Attach the shaft coupling to the motor shaft by tightening the clamping screws.
- Push the coupling and motor onto the end of the flexi-shaft. Slide the prepared plywood mount between the plywood supports (parts 16) and the plastic motor mount (part 18). Sand back the plywood mount to match the angle of the supports.

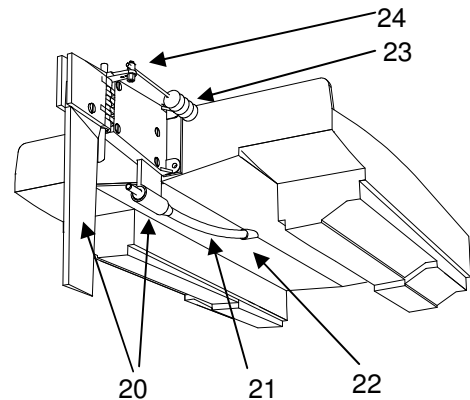


- **Important:** the flexi-shaft must not be kinked: it should run in a smooth curve from the strut to the shaft coupling at the motor. You may need to adjust the slot in the hull floor to achieve this.
- When you are confident that everything fits properly, glue the motor mount to the supports using Stabilit Express.
- When the glue has set hard, withdraw the flexi-shaft, slide the protective aluminium tube over the Teflon sleeve and fit the Teflon sleeve from the strut into the inside of the boat. Now open up the slot in the hull floor until the aluminium tube fits through it without distorting the shaft.
- Screw the flexi-shaft to the shaft coupling at the motor, and glue the protective aluminium tube to the hull floor by applying Stabilit Express to the joint on the inside and outside of the hull. Check that the flexi-shaft rotates freely

Drill out to 2 mm Ø to accept the swivel pushrod connector



- Drill out the holes in the rudder lever using a 2 mm Ø bit, and fit the swivel pushrod connectors in the prepared holes; the connectors must swivel smoothly when installed.

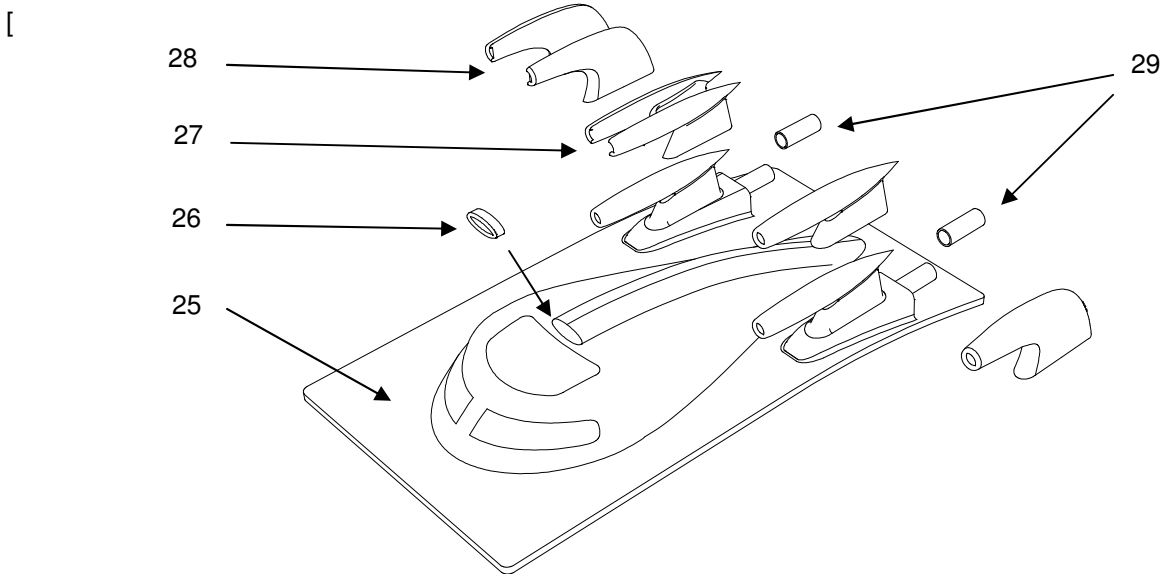


- Press the rubber grommets (supplied in the servo accessory pack) into the servo mounting lugs, and

push the brass spacer sleeves into the holes in the grommets **from the underside**.

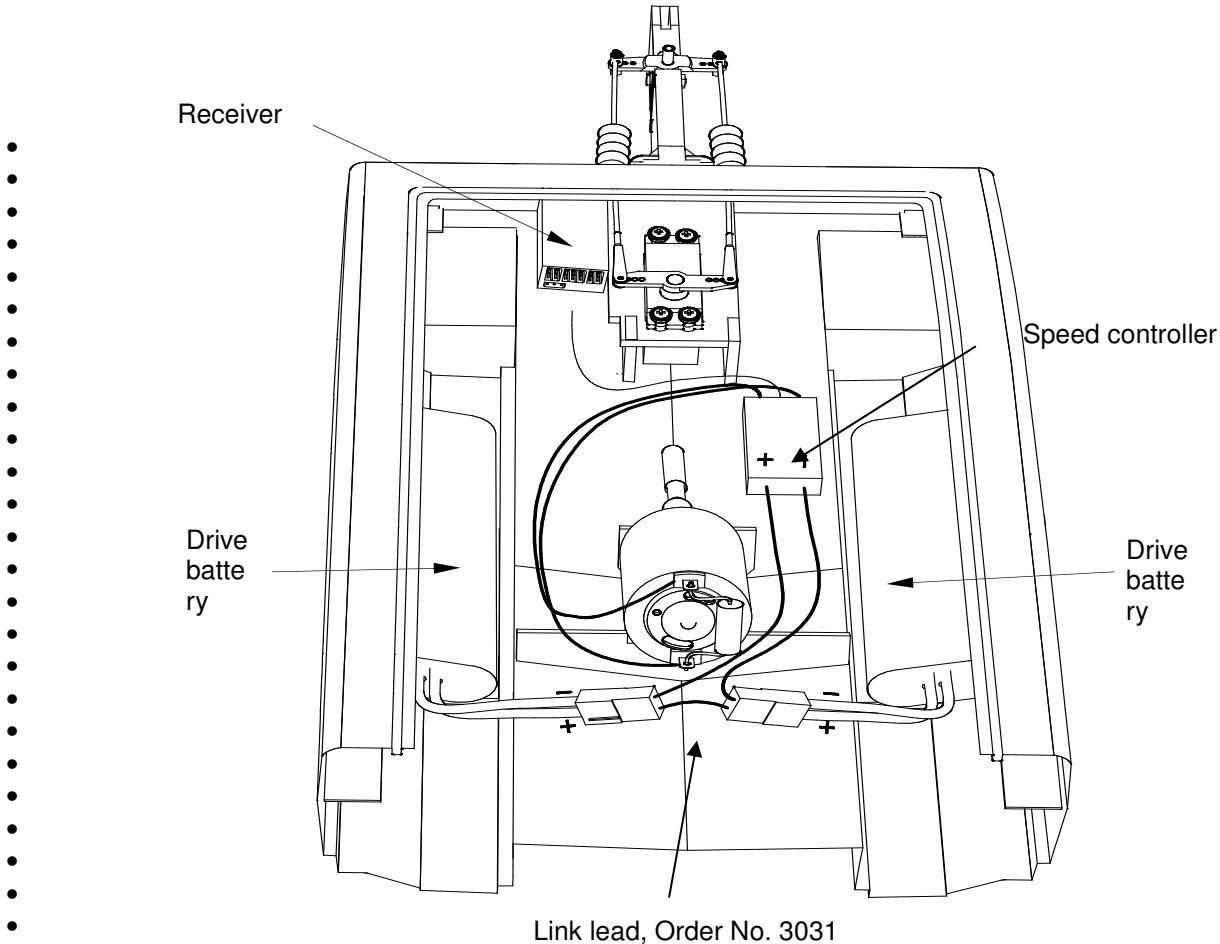
**TIP:** slip the spacer sleeves onto a small screwdriver first; this makes them easier to insert.

- Screw the servo to the servo mount as shown in the drawings.
- Cut out the hatch cover (part 25) from the vacuum-moulded sheet; the cut-line is indicated by a bulge on the inside. Cut out the front air intake (part 26), sand the cut edge flat, and glue it to the front face of the air tube (part of the hatch cover). Don't drill through the air intake or otherwise open it up, as this would allow water to enter the hull if the boat capsizes; the model would then sink.
- Two different air intakes are included in the kit.  
Select the air intakes 27 or 28 to suit the specific boat you wish to emulate.
- These parts should also be cut out along the line marked by the inner bulge; sand them flat and glue the half-shells together.
- Use Stabilit Express, UHU-Acrylit or UHU-Plast Spezial for this. When the glue has set hard, fill and sand the joint line on the outside. Glue the air intakes on the stub pipes, but do not open them up (see above).
- Glue the exhaust pipes 29 to the rear of the ventilator plinths using simple butt-joints. Do not open the ventilators.



**Painting** Sand all the glued joint seams and make good any imperfections using filler paste where required. Gaps and cracks can be filled using UHU-Plast Spezial.

- When you are satisfied, sand the boat and the hatch cover overall using 400-grit to 600-grit abrasive paper or a fine sanding pad, using light pressure and a circular motion.
- Wash all traces of sanding dust from the model, and wipe it with a liquid detergent solution to remove any traces of grease.
- We recommend that you finish the boat using spray paints or an airbrush.
- The large smooth surfaces of the model are an ideal basis for airbrush pictures.
- Please ask your local model shop or specialist paint dealer for advice on the best paints to use, and be sure to select a paint system which adheres well to ABS plastic. Do not combine paints made by different manufacturers.
- Cellulose paints are not recommended as they tend to attack and dissolve the plastic.
- Allow the paint to dry thoroughly before re-installing the rudder system, shaft and motor.
- Press the rubber bellows into the 7 mm Ø holes in the transom, and run cyano round them to produce watertight joints.
- Screw the clevises onto the rudder pushrods.
- Lightly grease or oil the rudder pushrods and push them through the rubber bellows from the inside of the boat.
- Connect the clevises to the outer holes in the servo output lever. Push the rudder pushrods through the rubber bellows.
- Install the receiver in the hull adjacent to the servo mount using self-adhesive Velcro (hook-and-loop) tape.



- Connect the servo to the receiver.
- Connect the speed controller to the receiver.
- Switch the transmitter on, and check that all sticks and trims are at centre (neutral).
- Connect one of the drive batteries to the speed controller; the servo and the speed controller will now take up their neutral positions.
- Set the rudder system to the 'straight ahead' position and tighten the clamping screws in the swivel connectors.
- You can now program the speed controller (if necessary); please refer to the instructions supplied with your speed controller.

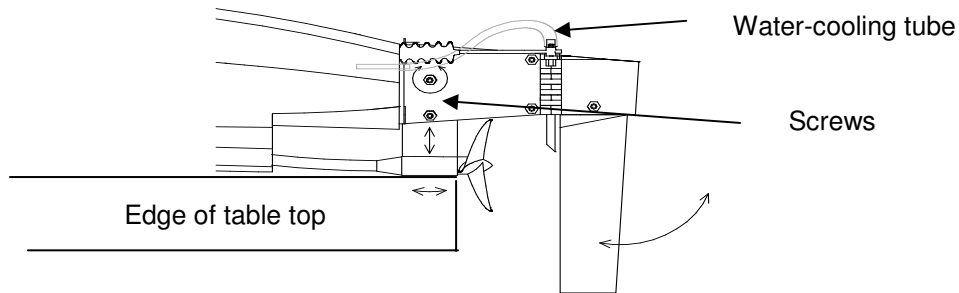
Cut out the decals and apply them to the boat in the arrangement shown in the kit box illustration.

**Running the boat**

Fix the two batteries in the sponsons using self-adhesive Velcro tape. The correct position of the batteries must be established by test-running the boat. The boat should balance at a point 165 mm forward of the rear edge of the sponsons.

**Trimming the boat**

Place the model on a flat table top. Loosen the two slot-head screws on the right-hand side of the rudder outrigger, and set the strut to the correct height and angle: the strut and the hull should rest flat on the table top (see side-view). The optimum setting must be established by test-running the boat. The model should remain horizontal when planing.



**Important:** Remember to re-tighten the screws after making any adjustments.

## Parts List - Powercat

Part No.	No. off	Description	Material	Dimensions
1	1	Bottom hull section	ABS, vac. moulded	ABS, 1.5 mm
2	0.5 m	Square ABS strip	ABS strip	3 x 3 x 500 mm
3	1	Transom reinforcement	Plywood, 4mm	Laser-cut
4	1	Sponson former	Plywood, 1mm	Laser-cut
5	1	Deck former	Plywood, 1mm	Laser-cut
6	1	Horizontal crutch	Plywood, 1mm	Laser-cut
7	1	Servo mount, top	Plywood, 4mm	Laser-cut
8	2	Servo mount, side	Plywood, 4mm	Laser-cut
9	1	Top hull shell	ABS, vac. moulded	ABS, 1.0 mm
10	2	Boatstand support, side	Plywood, 4mm	Laser-cut
11	1	Boatstand support, top	Plywood, 4mm	Laser-cut
12	2	Wedge	Plywood, 4mm	Laser-cut
13	2	Support	Plywood, 4mm	Laser-cut
14	0.25m	Silicone tubing	5 x 7 x 1 mm	Ready made
15	6	Planing panel	ABS, 1.0 mm	Laser-cut
16	2	Motor mount support	Plywood, 1mm	Laser-cut
17	1	Front motor mount holder	Plywood, 4mm	Laser-cut
18	2	Side motor mount holder	Plywood, 4mm	Laser-cut
19	1	Motor mount	Ready made	1157.2
20	1	Rudder system and strut	Ready made	Ready made, Ord.No. 3341
21	1	Flexi-shaft / Teflon sleeve	Ready made	Ready made, Ord.No. 3364
22	1	Protective tube	Aluminium tube	7 x 6 x 55
23	2	Rubber bellows	Ready made	Ready made, Ord.No. 3356
24	2	Swivel pushrod connector	Ready made	Ready made, Ord.No. 3364
25	2	Hatch cover	ABS, vac. moulded	ABS, 1.0 mm
26	2	Front air intake	ABS, vac. moulded	ABS, 1.0 mm
27	2	Curved air intake (two-part)	ABS, vac. moulded	5 x 4 x 25
28	2	Angled air intake (two-part)	ABS, vac. moulded	ABS, 1 mm
29	2	Exhaust pipe	ABS, vac. moulded	7 x 6 x 40
30	1	Speed 700 electric motor	Ready made	Not included
31	1	Capacitor	Ready made	Not included
32	1	Cable, 2.5mm <sup>2</sup>	Ready made	Not included
33	1	G2 plug + socket, 1 set	Ready made	Not included
34	1	Decal sheet	Ready made	

### Essential accessories, not included

Order No. 2847	Power V 60 speed controller
Order No. 2490.6	Drive battery, 6/3600 (two required)
Order No. 3031	G2 battery link lead
Order No. 6306	Speed 700 BB Turbo Neodymium motor
Order No. 3588	Capacitor
Order No. 3389	Cable, 2.5mm <sup>2</sup>
Order No. 2989	G2 plug + socket, 1 set
Order No. 2318.45	Carbon K-series hydro-propeller, 45 mm
Order No. 3368	Self-adhesive Velcro (hook-and-loop) tape
Order No. 531.19	Cellpack flexible adhesive tape
Order No. 4729	X 408 FM radio control system, 40 MHz
Order No. 6414	Ultramat 14 battery charger
Order No. 3011	Drive battery charge lead
Order No. 3022	Transmitter charge lead
For higher speeds it is also possible to use seven-cell batteries.	
Order No. 2490.7	Battery, 7/3600 (two required)

We hope you have many hours of pleasure building and running your new model boat.

Yours - the Graupner Team