

Building instructions for the PX1 RACING CATAMARAN, Order No. 2022

The model

The PX-1 racing catamaran is a semi-scale model boat capable of speeds of 40 to 60 km / hr or even more, depending on the motors installed. The boat can be fitted with SPEED, ULTRA or INLINE motors. The PX-1 is a real head-turner with its attractive painted colour scheme and the option of two different decal sheets. The robust GRP hull provides plenty of scope for the experienced racing boat fan to try out his own ideas in the power department, using either one or two electric motors. The suggested motors, shafts and rudder should only be considered as a basic recommendation for a standard version, and variations are certainly possible.

Specification

Length approx.	1070 mm
Overall length approx.	1140 mm
Beam approx.	310 mm
Dry weight approx.	1800 g

Order No.	Description
2022 .2	GRP hull
.3	GRP hatch cover

Motor and accessories

Motor Order No.	Shaft and stern tube Order No.	Bearing bracket Order No.	Shaft coupling Order No.	Drive Dog Order No.	Adaptor Order No.	Axial ballrace Order No.	Propeller Order No.
SPEED 820 RACE 20 V 6375 2 required	399.300 2 required	2997.10 2 required	3345 2 required	2321 2 required	2320 2 required	377.4 2 required	2317.51 and 2317.51L

Water-cooling pick-up Order No.	Water-cooling coil Order No.	Rudder system Order No.	Speed controller Order No.	Drive battery Order No.	Battery link lead Order No.	Y-lead Order No.	Air intake Order No.
2356 2 required	3325.2 2 required	2364.2 Aluminium (large)	POWER MOS 60 7176 2 required	ECO-POWER 10-3000 NiMH 12 V / 3.0 Ah 2596.10 4 required	3031 2 required	3936.11	2022.4 2 required

Important safety notes

You have purchased a kit which can be assembled to produce a fully working RC model when fitted out with the appropriate accessories. As manufacturers, we at GRAUPNER are not in a position to influence the way you install, operate and maintain the model, nor the other components used in connection with the model. 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, loss of trade or turnover, interruption of business or other indirect or direct damages which are caused by the operation of the model. Under all circumstances and in all cases the company's overall liability is limited to the amount which you actually paid for this model.

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The model is operated at the sole risk of the individual controlling it. To avoid injury to persons and damage to property please handle your model boat carefully and operate it conscientiously at all times.

Before you run the boat for the first time it is important to check that your private third party insurance policy provides cover when you are operating model boats of this kind. If you are not sure, take out a special insurance policy designed to cover the risks of RC modelling.

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

Guarantee conditions

The guarantee provides for free repair or replacement of any part which exhibits proven manufacturing or material faults within the guarantee period of **24** months from the date of purchase. We will not consider any claims beyond these conditions. The cost of transport, packing and carriage are payable by the purchaser. We accept no liability for transit damage. If you send goods to GRAUPNER or to the approved Graupner service centre for your country, be sure to enclose an accurate description of the fault together with the dated purchase receipt. The guarantee is invalid if the component or model fails due to an accident, incompetent handling or incorrect usage.

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.
- This is a high-speed model, which means that you must **NEVER** operate it when there are persons or animals in the water, otherwise there is a serious risk of causing injury.
- Check where any people are located on the bank. If a fault develops, or you make a mistake at the controls, the boat could jump out of the water, run up the slope and cause injury. Inform such people of the risk, and ask them politely to leave the hazard zone.
- Never run your boat in a protected site, an animal or plant sanctuary or a site of special scientific interest (SSSI). Check with your local authority that the stretch of water you wish to use is suitable for model boats.
- Do not run the model in salt water.
- Never run your boat in adverse conditions, e.g. rain, storm, strong wind, choppy water or strong currents.
- Before you run the model check that the radio control system is working reliably, and that all connections are secure.
- If you are using dry cells as a power supply, please note that these must never be recharged. Only batteries marked specifically as "rechargeable" can safely be recharged.
- It is important to charge the batteries and check the range of the radio control system before each session. The transmitter and receiver batteries in particular must be fully charged at the start of each run.
- Ensure that the channel 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.
- Read and observe the recommendations and instructions supplied with your radio control system and accessories.
- Do not work on the power system unless the motor is disconnected from the drive battery.
- When the drive battery is connected, keep well clear of the area around the propellers, as this represents the greatest risk of accident and injury. Make sure any spectators do the same.
- Do not exceed the recommended voltage of the drive battery. Increasing the voltage may cause the motors and / or the speed controller to overheat, and the electrical leads can even melt. In the worst case this may cause the model to go up in flames and be completely ruined.
- Check that all the drive train components work smoothly and freely. This applies in particular when you are running the model, as leaves and other detritus can get caught up in the power train. If this happens and you do not remove the obstruction, the motor, speed controller or rudder servo may be ruined due to overloading.
- Ensure that the servos are not mechanically obstructed at any point in their travel.
- Dry cells and rechargeable batteries must never be short-circuited. Do not allow them to come into direct contact with water.
- Allow the drive motors and speed controller to cool down after each run. Don't touch the hot surfaces!
- Remove all batteries from the model prior to transporting and storing it.

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- Do not subject the model to high levels of humidity, heat, cold, vibration or dirt.
- Secure the model, batteries and RC equipment carefully when transporting them. They may be seriously damaged if they are free to slide about.
- If you wish to operate the model on moving water (e.g. a river), remember that it could be washed away downstream if the battery fails or a malfunction occurs.
- If you have to **salvage** the model, take care **not to risk your own life or that of others**.
- Check regularly that the boat is completely watertight, as it may sink if too much water enters the hull. Check the boat for damage before every run, and ensure that water cannot penetrate the hull through the shaft or rudder openings.
- Take care to seal the model before every run, so that water cannot enter. **ALWAYS** seal the hatch cover all-round with adhesive tape.

Care and maintenance

- Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets into any of the RC components, dry them out and send them to your nearest GRAUPNER Service Centre for checking.
- Clean the model and RC components using suitable cleaning agents only. Ask your model shop for information.
- Lubricate the propeller shaft at regular intervals.
- If the model is not to be operated for a considerable time, it is important to dismantle all the moving parts (propeller shafts etc.), and clean and re-lubricate them.

Notes on building the model

- Before you start building the boat it is important to study the plan and read right through the instructions, referring to the parts list constantly. In general terms the instructions and parts list reflect the sequence of assembly.
- Please bear in mind that many tools can be dangerous if misused or handled carelessly.
- Each electric motor must be suppressed by fitting a 470 nF capacitor (Order No. 3588); solder the capacitor across the motor terminals to form a bridge. Suppressors are not necessary if you are using ULTRA, ULTRA BRUSHLESS or SENSORLESS motors, as these types are fitted with suitable measures as standard.
- Deploy all electrical cables neatly, without crossing them over. Take great care to avoid any bare positive wire touching any negative wire.
- Be sure to use cable which is capable of carrying the high currents which flow when the boat is operating.
- Deploy the receiver aerial as far away as possible from any high-current cables (at least 3 cm).
- The shaft bearings must be lubricated using a type of grease or oil which does not soil or contaminate water (e.g. grease: Order No. 570). Apply a drop of oil to the bearings at regular intervals.
- Please take the greatest care with screws which have to be fitted into GRP parts. If the screws are over-tightened, the threads in the GRP material may strip. If this should happen despite your care, seal the hole completely with high-viscosity cyano-acrylate (thick cyano), then fit the screw into the cured adhesive without drilling it out beforehand. You can repeat this process as many times as necessary. A plywood part is used to reinforce the rudder area in this model.
- Be sure to remove all traces of grease from areas which are to be glued. A good method is to rub the surfaces down with abrasive paper, then rinse them with a non-greasy liquid detergent. The same applies to surfaces to be painted, otherwise the paint may not adhere well. Before gluing any part to the hull, be sure to clean the surface using fine abrasive paper, then de-grease it with acetone or similar solvent. Ignoring this advice will inevitably result in poor-quality glued joints.
- Recommended adhesives for joining particular materials:

Material - material

Metal - metal
 GRP - wood
 GRP - GRP
 GRP - metal
 GRP - plastic (air scoops to GRP)
 Wood - wood

Suitable adhesives

Cyano-acrylate, UHU plus
 Thick cyano-acrylate, UHU plus
 Cyano-acrylate, UHU plus
 Cyano-acrylate, UHU plus
 Cyano-acrylate
 Cyano-acrylate, UHU hart, white glue

Read the instructions supplied with the adhesives, and be sure to observe any special notes in the instructions regarding particular adhesives. If you are using acetone, methylated spirits or any other solvent as a cleaning agent, special safety measures are necessary. Read the instructions supplied with these materials.

Assembly instructions

1. The hull (1) and the hatch cover (2) are supplied as ready-made GRP mouldings. Sand all the joint areas on the inside of the hull (shown on the plan) using fine abrasive paper, then de-grease these areas with white spirit or acetone.
2. Place the motor bulkheads (3) in the hull in the positions shown in the drawing, trim them to fit accurately, and fix them in place with epoxy resin. Take care to produce really strong joints.
3. Locate the mounting plates (4) for the rudder and the servo mount, and epoxy them in the hull in the positions shown in the drawing.
4. Working from the plan, measure off the position of the holes for the stern tubes, the pushrods, the rudder system and the cooling water inlets. Mark them accurately on the transom and the hull bottom, and drill the holes using the sizes of drill stated in the drawing.
5. The brackets and the stern tubes should now be fixed together. Tip: to aid alignment, slip a length of thin wire through the lubricating hole in the bracket, and adjust the position of the stern tube until the wire fits in the lubricating hole in the stern tube.
6. Attach the electric motors and shaft couplings to the motor bulkheads (3) using M5 x 10 socket-head cap screws.
7. Fit the stern tubes through the holes in the rear end of the hull. Position the tubes exactly as shown on the plan (they should project from the stern by about 60 mm), then fix the shafts in the couplings.
8. The brackets should be epoxied to the hull bottom, with one packing strip (5) under each, but only after the shafts have been aligned accurately as shown on the plan. Glue the stern tubes in place when you are satisfied.
9. Cut openings in the hull bottom for the cooling water inlets, and glue them in place, flush with the underside of the hull.
10. Place the rubber bellows (7) on the sealing tubes (6) and glue the parts together using cyano. Glue these assemblies in the 6 mm Ø holes as shown on the plan.
11. Fix the rudder system to the boat's transom using M3 x 10 screws and 3.2 / 6 Ø washers.
12. The rudder servo and steering pushrods (8) can now be installed using your favoured method: we recommend a servo mount, Order No. 1024, and two pushrod connectors, Order No. 1173 (neither part is included in the kit).
13. The two pushrods (8) feature one M2 threaded end. Screw the pushrods into the ball-links (9), and connect the links to the tiller on the rudder system using one M2 x 10 cheesehead screw and one M2 nut each.
14. Connect the cooling water hoses (10) as shown in the drawing.
15. Fix the receiver and speed controller to the central area of the hull bottom using Velcro tape, Order No. 1603.2.
16. Install some means of fixing the drive batteries to the hull floor; they must be securely held to avoid any chance of them shifting or falling out if the boat should turn over.
17. Pack the stern tubes with non-contaminating grease (Order No. 570), fit the propellers and check that they rotate in opposite directions when fitted to the model.
18. The model can now be painted and the decals (supplied in the kit) applied in the arrangement shown in the kit box illustrations.

Maiden run

1. Charge the batteries fully and test the model's working systems one by one.
2. Secure the hatch cover all round with adhesive tape to prevent water penetrating the hull. You may wish to fit retaining screws in the four corners of the hatch cover.
3. If all is well, you are ready for the boat's maiden run. Keep the boat running at low speed at first, and take your time to get used to its handling characteristics. Please bear in mind that the model is capable of reaching very high speeds, and is then much more difficult to control accurately and safely than a slower boat.

Important: when you wish to take the boat through a turn, reduce the throttle setting (to around half-throttle) before applying a rudder command, otherwise there is a danger that the boat will turn over or spin on the spot.

In general terms we recommend that you only use full-throttle on the straights.

We hope you have loads of fun building and running your Racing Catamaran.

September 2005

Parts List

Part	Description	No. off	Material	Size and thickness in mm
1	Hull	1	GRP	Ready made
2	Hatch cover	1	GRP	Ready made
3	Motor bulkhead	2	Plywood	5, laser-cut
4	Mounting plate	2	Plywood	80 x 50 x 4, oversize
5	Packing strip	2	Square strip	70 x 10 x 10
6	Sealing tube	2	Aluminium	6 / 5 Ø x 10
7	Bellows	2	Rubber	Ready made
8	Pushrod	2	Plated mild steel	M2 x 200
9	Ball-link	2	Aluminium	M2
10	Cooling water hose	4	Silicone	500 x 7 / 3 Ø
11	Sealing hose	2	Silicone	20 x 9 / 6 Ø
12	Exhaust pipe	2	Aluminium	80 x 11 / 10 Ø

The following parts are also required (included in the kit)

4	M3 x 10 socket-head cap screws	Rudder mounting
4	3.2 / 6.0 Ø washers	Rudder mounting
4	M5 x 10 socket-head cap screws	Motor mounting
4	5.3 / 10.0 Ø washers	Motor mounting
2	M2 x 10 cheesehead screws	Ball-link mounting
2	M2 nuts	Ball-link mounting

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