

### The model

During race events in the USA Hans Lehner's SX-4000 established two world's speed records at 149 km/hr in the 6-cell class, and 156 km/hr in the 7/8-cell class.

Straightway races are held over a 100 m course; the boat has to complete the course in both directions from a flying start, and the average speed of the two passes is calculated.

The boat is designed for straight running only, and the primary purpose of the rudder is simply to provide course correction.

The model features a carbon fibre hull and a GRP deck. It is supplied with the following parts factory-installed: stern tube and propeller shaft, motor mount, rudder and steering linkage, servo mount, shaft coupling (5.0 Ø x 1.5 mm) etc.

### Specification

Length approx.	670 mm
Overall length approx.	700 mm
Beam approx.	285 mm
Empty weight approx.	450 kg

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

#### Content 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 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.

## **The model is operated at the sole risk of the operator. 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.

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

- If this model is fitted with the suggested power system, it must never be forgotten that it is capable of extremely high speeds, and that the rudder is only capable of providing minor course corrections. For this reason the boat should only be run if you have access to an unobstructed water course at least 300 m long. It may only be run once in the 'out' direction, and once in the 'back' direction - that must be the end of the run. If you neglect this warning, there is a risk that the high currents which flow in the power circuit could damage the motor, the speed controller or the drive battery. A second attempt must not be made until the equipment has had a chance to cool down thoroughly.

If you are aiming at maximum speed, it is also essential to run the boat in good weather conditions, i.e. flat-calm and totally smooth, clean water. Please bear in mind also that the world's records were established by a pro-standard operator with forty years of experience behind him.

We recommend that you carry out the initial test-runs using a low-pitch carbon propeller, to allow yourself a chance to become properly conversant with the boat's handling characteristics.

Please note that the model's handling varies substantially according to the type of batteries you use, i.e. NiMH packs or LiPo packs. The latter are much lighter, and therefore alter the model's Centre of Gravity considerably.

- This model is not suitable for children or young persons under 18 years of age. It is only appropriate for competition boat operators with plenty of prior experience. This model is **totally unsuitable** for modellers without such experience, and it would be completely foolhardy and irresponsible for such persons to attempt to operate it!
- Please be aware of the potential hazards when using tools.
- You must **never** operate this boat when there are persons or animals in the water, otherwise there is a serious risk of causing injury.
- The model's extremely high speed makes it easily capable of sliding up sloping banks, and

- injuring people and animals standing on them.
- 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.
  - Read and observe the recommendations and instructions supplied with your radio control system and accessories.
  - It is essential to use a radio control system set to SPCM mode, so that you can program a Fail-Safe for the speed controller. This is a safety function which ensures that the model immediately comes to a halt if interference should occur.
  - Before you run the model, check that the radio control system is working reliably, and that all connections are secure.
  - If you insist on using dry cells as a power supply, please note that they must never be recharged. Do not recharge any battery unless it is expressly stated to be 'rechargeable'.
  - The range of the radio control system must be checked before you even think about running this boat. This involves carrying the model about 100 m from the transmitter, with both systems switched on, while an assistant operates the transmitter for you. All functions must work perfectly at all times, without the slightest hint of interference.
  - Ensure that the channel you intend to use is not already occupied by other modellers. Never run the boat if you are not certain that your channel is free.
  - Remember that other radio equipment and transmitting apparatus may cause serious interference to your model. If possible ensure that no such equipment is switched on in the vicinity, and is not operated at any time while you are running the model.
  - Do not work on the power system without first disconnecting the motor from the drive battery.
  - When the drive battery is connected, keep **well clear** of the area around the propeller, 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 motor 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.
  - Dry cells and rechargeable batteries must never be short-circuited. Do not allow them to come into direct contact with water.
  - Remove all batteries from the model and the transmitter prior to storing the boat.
  - 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.
  - **Never** operate the model on moving water (e.g. a river), as 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 hull is completely watertight, as any model boat 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.
  - Open the boat and let it dry out thoroughly after each run.
  - During the initial test-runs it is essential to check that the propeller shaft system is watertight. If water penetrates through the shaft tube, dismantle the system and lubricate it with plenty of grease (Order No. 570).

## Care and maintenance

- Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets inside 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. All you need is a lint-free cloth. **Never** use chemical cleaners, solvents, white spirit, methylated spirit or similar.
- After each session lubricate the drive shaft with a small drop of oil applied to the bearings. The external shaft bearings adjacent to the propeller must also be lubricated. Use only non-contaminating, water-neutral oil (e.g. Order No. 206) to lubricate the power train. At the end of the season the propeller shaft should be dismantled and re-lubricated using water-neutral grease (e.g. Order No. 570).

## • Assembly Instructions

- The first step is to solder three G3.5 connectors (Order No. 2970 - not included in the set) to the motor wires.  
The recommended speed controller is fitted with G3.5 connectors as standard. However, it is also possible to fit G6 connectors to the motor, controller and battery at the builder's discretion. The motor is attached to the motor mount using two M3 x 6 mm socket-head machine screws. The next step is to pack the stern tube with grease before fixing the shaft coupling to the motor shaft. Slide the propeller shaft into the coupling from the stern. Check the length of the propeller shaft; you may need to shorten it slightly.
- Place the rudder servo in the mount, and secure it with four self-tapping screws. Attach a swivel pushrod connector to the servo output arm using an M2 nut. The steering pushrod is clamped in the pushrod connector using the grub screw provided.
- At the stern of the boat a connector system is installed which enables you to switch the power supply to the receiver on or off if a separate receiver battery is used. However, if you are using a speed controller with integral BEC system, the BEC facility must be disabled by withdrawing the central pin (+ = red). This avoids the danger of supplying current to the receiver from both the drive battery and the receiver battery. If you program the speed controller correctly (see drawing on separate sheet), it is possible to switch the motor off externally in an emergency.
- If the power supply conductor to the receiver battery is interrupted (disabled), power is fed to the speed controller when the drive battery is connected to it, but it receives no signal from the receiver (see wiring diagram).

## Fine-tuning the racing boat

This model racing boat requires fine-tuning to ensure that it runs at maximum efficiency. The following points are particularly important if you are aiming at a boat which handles and runs well:

1. The Centre of Gravity should be located at a point 20 to 80 mm from the end of the trim tabs; please note that the optimum balance point varies greatly according to the propeller you are using. The crucial point is that the propeller must not skip when the boat is running at full speed.
2. The adjustable trim tabs should be set at an angle of about 4°.
3. The angle of attack of the propeller should be around 2°.
4. Since the boat spends more time flying across the water than passing through it, the all-up weight should be kept as low as possible, and should not be greater than 1400 g. For this reason all the components you install should be as light as possible.

## Maiden run

Give the batteries a full charge, and test the model's working systems in turn. Seal the hatch cover with adhesive tape to ensure that water cannot penetrate. You should now be ready for the boat's maiden run. Take your time to get used to the model's handling characteristics, bearing in mind that this boat is capable of extremely high speeds, and is therefore not as easy to control as a slower model.

**Important:** if you have to turn the boat, it is always best to bring it to a halt first, and then initiate a turn - preferably to the left - at a low power setting.

We recommend that you only apply full-throttle when the boat is running straight ahead.

**Particular care** is required when switching the receiver battery on and off. Do not allow your fingers to get anywhere near the propeller!

## Recommended accessories

### Motor and accessories

Drive motor  
Order No.  
Lehner Type 1920  
**6544**

Drive battery  
Order No.  
NiMH GP 6N-4600  
7.2 V / 4.6 Ah  
**98946.6** or  
LiPo 5000/2  
7.4 V / 5.0 Ah  
**7665.2**

Speed controller  
Order No.  
GENIUS 100  
**7167**

Propeller  
Order No.  
**2299.37-3**  
or  
**2299.39**

### Servos

Type	Order No.	No. reqd.
C 351	<b>5123</b>	1

### Radio control system

Min. mx-12, 40 MHz band, Order No. **4723**

### Receiver

smc-14 S, Order No. **7034**