

Graupner

Assembly instructions for the B-24 model boat, Order No. 2135

The original vessel

This boat was developed by Ocke Mannerfelt and is the result of protracted aerodynamic research aimed at achieving best possible performance. It has been awarded two design prizes and is patented. The newly designed double-step hull bottom features patented speed rails: specially designed stringers which distribute the air-enriched water under the bottom of the boat and thereby reduce the wetted area. The boat planes over the water on a layer of "air lubrication" evenly distributed over the hull surface. The vessel is extremely slim in an effort to minimise air resistance. The lateral wings on the hull produce upthrust due to their profile and also due to ground effect.

The model

Our model is based on the original drawings and is moulded using all-GRP technology, with the exception of the driver's cabin. The boat can be fitted with a scale power system utilising a Z-drive 600 and SPEED 700 TURBO 9.6 V motor, but can also be equipped with two electric motors and contra-rotating semi-cavitating surface-piercing propellers for higher speed, according to the builder's individual preferences.

The model is suitable for the Mono 1 and Mono 2 racing boat classes when fitted with the appropriate power system.

Specification

Hull length approx.	655 mm
Overall length approx.	740 mm
Beam approx.	235 mm
All-up weight include. RC approx.	2000 g (depending on power system)
Scale	1 : 10

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.

However, we as manufacturers are not in a position to influence the way you build and operate your model, and for this reason all we can do is point out expressly the hazards involved. We are obliged to decline all liability. Your model can only work properly and fulfil your expectations if you build it carefully, following the building instructions to the letter. To avoid injury to persons and damage to property please handle the model carefully at all times and operate it conscientiously

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

- This is a high-speed model, and this means that you must **NEVER** operate it when persons or animals are 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 injure people.
- Do not work on the power system unless the battery is physically disconnected from the motor.
- Never run your model in protected sites, animal or plant sanctuaries or sites of special scientific interest (SSSIs).
- The shaft system must be lubricated, but be sure to use a non-toxic grease or oil which will not pollute the water (Order No. 570).
- The electric motor must be effectively suppressed. This is done by soldering a 470 nF capacitor (Order No. 3588) between the two motor terminals.
- Deploy all electrical cables as neatly as possible; don't cross them over each other.
- Do not exceed the recommended power supply voltage. Higher voltages may cause the motor or speed controller to overheat, and the electrical connections could even melt. The result would then be a ruined model or even a fire.
- Read and observe the instructions and recommendations provided by the manufacturer of your radio control system and accessory components.

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- Before you run the model check that all radio control functions are working perfectly.
- The batteries must be charged and the range of the radio control system must be checked before you run the model.
- Ensure that the channel you intend to use is not already in use. Never run your boat if you are not certain that your channel is free.
- If you wish to operate the model on moving water (e.g. a river) remember that it could be washed away downstream if a malfunction occurs or if you run the battery dead flat.

The model

- Before you start building the model please read right through the instructions, referring to the plan and the parts list all the time. The instructions and parts list follow the sequence of assembly.
- The vacuum-moulded parts are best cut out with a pair of scissors (we particularly recommend our Lexan shears, Order No. 26), although in many areas a sharp knife (e.g. Order No. 982) can also be used. Cut along the marked lines, but leave the parts slightly oversize so that you can sand the material back to exact size.
- It is important to keep minimum weight in mind at all times. The all-up weight of the boat stated in the Specification should not be exceeded.
- Sand all wooden parts carefully and apply several coats of GLATTFIX sanding sealer (Order No. 207) before installing them permanently.
- It is not essential to paint the model, as it is supplied in a white overall finish (suiting the "ACQUA LIMONE" version).
- To obtain really strong glued joints, remove all traces of grease from mating surfaces before applying the adhesive. You can do this either by sanding lightly, or by rubbing with a non-greasy cleaning agent. The same procedure should be used for areas which are to be painted, otherwise the paint may not adhere well. Before you attempt to glue any part to the hull, de-grease the GRP thoroughly with acetone, and roughen the surface with abrasive paper, otherwise there is little chance of a permanent bond.
- Recommended adhesives:

Material - material	Adhesive
Wood - wood	UHU hart, white glue
Wood - metal	Stabilit Express
ABS - ABS	Cyano-acrylate, Stabilit Express, UHU Plast
ABS - GRP	Cyano-acrylate, Stabilit Express
GRP - wood	Stabilit Express
GRP - metal	Cyano-acrylate, Stabilit Express
Rubber - metal	Cyano-acrylate

Be sure to read the instructions supplied by the glue manufacturers.

Assembly instructions

Both versions:

- Press all the wooden parts out of the sheet. Assemble the boatstand from parts 2, 3 and 4 and glue the components together.
- The next step is to install the power system:
 - For variant 1 with Z-drive 600 continue with sections 1-1 to 1-7
 - For variant 2 with 2 x MULTISPEED 601 continue with sections 2-1 to 2-11

Version with Z-drive 600:

- 1-1 Refer to the plan for the position of the holes in the boat's stern (part 1) and mark them, then drill all the holes using a 3 mm Ø drill. Use a round file to open up the central hole to the final size of 16 mm Ø.
- 1-2 Cut out the servo console (part 6) and check that your servo fits in the opening. Glue the console in the hull permanently as shown in the drawing. Install the servo.
- 1-3 Drill out the holes in the hull for the rudder linkage to 6 mm Ø. Slide the rubber bellows (part 9) onto the sealing tubes (part 8) and seal the joints with cyano. Glue these units in the 6 mm Ø holes as shown in the drawing.
- 1-4 Screw the pushrod connectors (part 7) permanently to the holes in the Z-drive unit.
- 1-5 Bend one end of the steering pushrods (part 10) to the shape shown in the drawing. Slip the steering pushrods into the rubber bellows and connect the formed ends to the servo output arm. Secure these ends with the retainer clips (part 11).
- 1-6 If you have selected the "NIMBUS" version, the hull should be painted at this stage, otherwise you will find it difficult to paint round the Z-drive unit later.
- 1-7 The next step is to mount the Z-drive unit on the hull. The procedure for mounting the power unit is described in the operating instructions supplied with the Z-drive unit 600.
- 1-8 Fit the steering pushrods in the pushrod connectors; you may have to disconnect the pushrods at the servo first. Align the Z-drive unit exactly in the "straight ahead" position, then tighten the screws to secure the steering pushrods.

Version with 2 x MULTISPEED 601:

- 2-1 Refer to the plan for the position of the holes in the boat's stern (part 1) and mark them, then drill all the holes using the sizes of drill stated in the drawing.
- 2-2 Trim the retaining rails (part 5) as shown on the plan and glue them together.
- 2-3 Glue the motor, the coupling housing and the stern tube together and place the assembly in the model.
- 2-4 Cut a square-sided balsa block 34 x 30 x 30 mm in size and fit it between the coupling housings to ensure that the stern tubes are parallel to each other. Fix the coupling housings to the retaining rails using four screws.
- 2-5 Place this assembly in the hull, position it with the stern tubes projecting by 50 mm at the stern, and glue the parts in the hull using Stabilit Express.
- 2-6 Cut out the servo console (part 6) and check that your servo fits in the opening. Glue the console in the hull permanently as shown in the drawing. Install the servo.
- 2-7 Drill out the holes in the hull for the rudder linkage to 6 mm Ø. Slide the rubber bellows (part 9) onto the sealing tubes (part 8) and seal the joints with cyano. Glue these units in the 6 mm Ø holes as shown in the drawing.
- 2-8 Screw the pushrod connectors (part 7) permanently to the holes in the rudder.
- 2-9 Bend one end of the steering pushrods (part 10) to the shape shown in the drawing. Slip the steering pushrods into the rubber bellows and connect the formed ends to the servo output arm. Secure these ends with the retainer clips (part 11).
- 2-10 If you have selected the "NIMBUS" version, the hull should be painted at this stage, otherwise you will find it difficult to paint round the rudder later.
- 2-11 Now screw the rudder to the hull. Fit the steering pushrods in the pushrod connectors; you may have to disconnect the pushrods at the servo first. Align the rudder exactly in the "straight ahead" position, then tighten the screws to secure the steering pushrods.

Both versions:

- Drill the five 2 mm Ø holes in the hull for the handrail components as shown in the drawing, taking care to drill them in an exactly straight line. Bend the handrail (part 12) to the shape shown in the drawing using the brass rod supplied. Slip the handrail stanchions (part 13) onto the handrail, then temporarily plug the handrail into the deck “dry”, i.e. without glue. Tack each stanchion to the rail with a drop of cyano. When the glue has set hard, remove the handrail from the boat again, apply more glue to the handrail joints and then paint the whole assembly. The handrail can then be glued to the boat permanently.
- Cut out the driver’s cabin (part 14) along the marked line, leaving a narrow flange about 2 mm wide all round. Sand the cabin back carefully until it is a snug fit on the hull, engaging accurately on the hull rebate. This is important if the boat is to be watertight when completed.
- Cut out the two ventilators (part 15), sand the cut edges smooth and glue them permanently to the driver’s cabin in the position shown in the drawing. Use cyano for these joints.
- Drill a 1.5 mm Ø hole in both the spruce blocks (part 20) and fit the ring-screws (part 21) in them. Sand the blocks back so that they fit the curvature of the hull accurately, then glue them in place using thick cyano.
- At this stage you can paint the driver’s cabin. If you don’t wish to have transparent windows, paint the whole cabin, then apply the glazing panel decals provided in the kit. If you prefer transparent windows, cut out the window decals accurately and apply them BEFORE painting the cabin, so that they act as masks. Paint the cabin, then peel off the masks to reveal the clear windows.
- Drill the two holes for the windscreen wipers (part 16) and glue them to the cabin as shown on the plan.
- The rear-view mirrors (part 17) are only required for the “NIMBUS” version. Drill two 2 mm Ø holes in the driver’s cabin as shown in the drawing and screw the rear-view mirrors in place permanently.
- Make up the external aerial from steel wire (part 19) as shown on the plan, and install it as shown. Cut a piece about 3 cm long from the steel wire.
- Make up the hinges from scrap smoked-tint plastic and the short piece of steel rod as shown in the drawing, and glue them to the driver’s cabin.
- Install the receiver and speed controller as shown on the plan. The drive batteries are held in place with the Velcro tape supplied.
- Secure the driver’s cabin with the rubber band (part 22). For competition work and rough water conditions we recommend that you tape all round the driver’s cabin to produce a completely watertight seal.
- The hull can now be painted, and the self-adhesive decals applied.

Painting

For painting the model we recommend Graupner ACRYLFIX colour spray paints:

“ACQUA LIMONE” variant

Hull, deck:	Order No. 929.8 white
Driver’s cabin, handrail:	Order No. 930.7 black

“NIMBUS” variant

Underwater hull	Order No. 929.8 white
Exposed hull:	Order No. 929.23 gentian blue and 931.6 silver
Driver’s cabin, rear-view mirror, handrail:	Order No. 930.7 black

For the small parts we recommend Graupner ALKYFIX colour paints:

“ACQUA LIMONE” and “NIMBUS” variants:

Bow tip:	Order No. 1470.2 red
Handrail:	Order No. 1470.7 black

To complete the colour finish we recommend self-adhesive trim striping tape, Order No. 623.2.

Alternatively you can paint on the lines using red Alkyfix, Order No. 1470.2.

TIP: Stick a piece of aluminium foil to thin card. Cut out two pieces which fit exactly in the rear-view mirrors, and glue them in place. The card keeps the foil smooth.

Maiden run

Charge up the batteries and carefully test all the model's working systems. Secure the hatches with tape. You are now ready for the boat's maiden run. Start by running the boat at low speed until you feel confident about its handling and running characteristics. Bear in mind that this model is capable of very high speeds, and is therefore more difficult to control than a slower boat.

We hope you have many hours of fun building and running your B-24.

Parts list

Part No.	Description	No. off	Material	Dimensions in mm
1	Hull	1	GRP	Ready made
2	Front support	1	Plywood	4, as drawing
3	Rear support	1	Plywood	4, as drawing
4	Connecting piece	2	Plywood	4, as drawing
5	Retaining rail	2	Spruce	60 x 10 x 5 mm
6	Servo console	1	Smoked plastic	Vac. moulded
7	Pushrod connector	2	Plated brass	Ready made
8	Sealing tube	2	Aluminium	10 x 6/5 Ø
9	Bellows	2	Rubber	Ready made
10	Steering pushrod	2	Stainless steel	200 x 1.5 Ø
11	Retaining clip	2	Plastic	Ready made
12	Handrail	1	Brass rod	280 x 2 Ø
13	Handrail stanchion	3	Plastic	Ready made
14	Driver's cabin	1	Smoked plastic	Vac. moulded
15	Ventilator	2	Smoked plastic	Vac. moulded
16	Windscreen wiper	2	Plastic	Ready made
17	Rear-view mirror	2	Plastic	Ready made
18	Door hinge	4	ABS + steel rod	Make from scrap
19	External aerial	1	Steel rod	330 x 0.5 Ø
20	Support block	2	Spruce	10 x 10 x 5
21	Ring-screw	2	Steel	Ready made
22	Rubber band	1	Rubber	Ready made

As drawing: take dimensions from the plan.

You will also need the following items (included in the kit)

- 1 Decal sheet
- 2 M3 x 3 grub screws, steering pushrod
- 2 Plastic M2 nuts, steering connector
- 1 M2.5 x 10 cheesehead screw)
- 3 Washers) aerial mounting
- 1 M2.5 nut)
- 2 Self-tapping screws, rear-view mirror
- 1 Velcro tape (10 cm), for mounting receiver, speed controller, drive batteries

You will also need the following items (not included in the kit)

- 1 Z-drive 600 Order No. 1985
- 1 SPEED 700 TURBO 9.6 V Order No. 3308
- 1 Sanyo 10N/1700 RC drive battery Order No. 2544
- or
- 2 Multispeed 601 power sets Order No. 1972
- 1 36 mm Ø propeller, L.H. rotation Order No. 2318.36L
- 1 Rudder system Order No. 2322
- 2 Sanyo 8N-2000 CUP drive batteries Order No. 2256
- 1 Battery link lead Order No. 3031

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Radio control equipment

1 2-channel RC set, 27 MHz or 40 MHz band
1 PICO MOS 35 electronic speed controller

Order No. 7182

Construction plan text

- (1) Side view
- (2) Top view
- (3) Stern view with Z-Drive
- (4) Stern view with 2 Electric motors
- (5) Z-Drive
- (6) Electric motor
- (7) Servo
- (8) Drive battery - 10 NC
- (9) Rudder system
- (10) Stern tube and shaft
- (11) Coupling box
- (12) Drive battery – 2x 6 NC
- (13) Speed controller
- (14) Suppressor capacitor
- (15) Receiver
- (16) Link lead
- (17) Section A-A
- (18) On/Off switch
- (19) Longitudinal section
- (20) Top view (without deck)