Graupner

Building instructions for the JULES VERNE, Order No. 2097

The full-size vessel

Our model of the JULES VERNE was developed in conjunction with the Dutch designer Rene van der Velden. This is a “retro-look” motor yacht, and is similar in shape and colour scheme to the characteristic mahogany vessels constructed in the 1930’s and 40’s. The full-size JULES VERNE was built in 1998, and combines in an ideal way the essential design elements of those earlier boats with modern facilities and refinements. The result is one of the most elegant yachts of the “retro-style” to be produced to date. For reasons of cost timber-built hulls are virtually never built nowadays, so the hull of the JULES VERNE is made of aluminium and painted mahogany brown. The boat’s two engines, each rated at 660 BHP, endow it with a top speed of around 26 kn.

The model
Our model of the JULES VERNE is designed to a scale of 1:20, and is based on the designer’s original drawings. The kit does call for certain manual skills and a modicum of experience in marine modelling, so it is only recommended to the experienced boat-builder. All the rounded parts are vacuum-moulded in ABS, and the parts which normally present problems are also CNC-trimmed (machined), including the hull, stern steps, deck and superstructure. The wooden parts are die-stamped, machined or laser-cut in order to shorten the building time. The kit includes injection-moulded plastic fittings such as windscreen wipers, ventilators, lamps, radar unit etc. as standard. The lamp housings in the fittings set can easily be made to work by fitting miniature 2.4 mm Ø filament bulbs.

Specification	Model	Full-size
Length approx.	925 mm	18.50 mm
Beam approx.	250 mm	
All-up weight inc. RC approx.		4.6 kg
Dry weight approx.	2.3 kg	
Scale	1:20	

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 assemble, operate and maintain the model, nor the way you operate 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, defective handling or 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 covers you for 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.
Never 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.
Do not run the boat in salt water. Even salt-laden sea air can attack the technical components of your model and may even destroy them.
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 power supply, note that they must not be recharged. Only batteries marked as “rechargeable” can be recharged safely.
Ensure that all batteries are fully charged before every run. Check the range of your radio control system. It is particularly important that the transmitter and receiver batteries are fully charged before each session.
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 instructions and recommendations provided by the manufacturer of your radio control system and accessory components.
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 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 motor 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.
Do not subject the model to severe 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.
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 great care to prevent water entering the boat. Secure the superstructure carefully, so that there is no chance of it falling off when the boat is running.
If you are using drive batteries connected in parallel they must not be inter-connected until the boat is ready to run; the packs may affect each other under no-load conditions, and this can cause damage to the batteries. You can avoid this problem by not connecting the batteries until the boat is otherwise ready to run, and disconnecting them immediately after each run. Never store batteries connected by parallel cables.

Care and maintenance

Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets inside any RC component, dry the unit out and send it to your nearest GRAUPNER service department for checking. No claim under guarantee will be considered for damage caused by water.
Clean the model and RC components using suitable cleaning agents only. Ask your model shop for information.
Lubricate the propeller shafts and rudder shafts at regular intervals.
If the model is not to be run for a considerable time it is important to dismantle all the moving parts (propeller shafts etc.), and clean and re-lubricate them.

Building the model

Before you start building the boat be sure to study the plan and read right through the instructions. We recommend that you refer constantly to the parts list as an aid to construction. The instructions and parts list reflect the sequence of assembly.
You will find small lugs connecting the machine-cut wooden parts to their sheets. Cut through the lugs with a pair of scissors.
The vacuum-moulding process inevitably produces slightly rounded shapes. Where wooden parts are to be glued to moulded plastic components, sand the joint surface of the wooden part slightly concave to obtain a snug fit, without gaps.
The laser cutting process inevitably generates a black edge to the cut wooden parts. This can easily be sanded off.
Don't throw away scrap wood, ABS and wire immediately as these materials may be required to make other small parts.
If you wish to fit auxiliary working systems, be sure to plan for the installation before you start construction. You will find information and tips on such systems at the end of the building instructions.
The Centre of Gravity of this model should be as low as possible.
Bear in mind that tools can be dangerous; always be careful when handling them.
The electric motors must be suppressed. The minimum is one 470 nF capacitor (Order No. 3588) for each motor, soldered between the terminals as a bridge (see sketch on the plan).
Deploy all electrical cables in an orderly fashion, without crossing them over. Never allow a positive (+) contact to touch a negative (-) contact.
Use cable of adequate cross-section, capable of carrying the high currents which will flow when the boat is running.
Deploy the receiver aerial as far from high-current cables as possible (at least 3 cm).
Lubricate the shaft system using a type of grease or oil which does not soil or contaminate water, e.g. Order No. 570.
Before gluing parts together clean the joint surfaces carefully, i.e. remove all traces of grease. This is best done by sanding, followed by wiping with a non-greasy liquid detergent. The same applies to all surfaces which are to be painted, otherwise the paint will not adhere well. Before gluing parts to the hull sand the surfaces with fine abrasive paper and de-grease them using methylated spirits ("meths"). If you neglect to do this, the joints will be weak and may fail at any time.
Recommended adhesives for various types of joint:

Material - material	Suitable adhesives
Metal - metal	Cyano-acrylate, UHU plus
ABS - wood	Cyano-acrylate, UHU acrylit
ABS - ABS	Cyano-acrylate, UHU acrylit, UHU plast spezial
ABS - metal	Cyano-acrylate, UHU acrylit
Wood - wood	Cyano-acrylate, UHU hart, white glue
Wood - metal	Cyano-acrylate

Read the instructions supplied with the adhesives. 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

Assemble the boatstand from the two side panels (part 1), the front support (part 2) and the rear support

(part 3). Note that the parts must first be glued together in pairs, i.e. each part consists of two panels which must be glued together with their edges flush. Fix the stand components together using white glue. **TIP**: weight the doubled wooden parts down while the glue is hardening, so that the surfaces make good contact overall. **TIP 2**: apply felt or some other soft material to the contact surfaces of the stand to avoid scratching the painted model.
Cut the brass tubes which form the rudder bushes (part 5) to a length of 25 mm. Sand the joint surface of the tubes and glue them in the two 4 mm Ø holes in the hull (part 4) in the position shown in the drawing. Ensure that both tubes are exactly parallel and angled as shown on the plan. **TIP**: this is easier to check if you fit the rudder units (part 6) in the bushes temporarily. Glue the two tubes securely to the hull and apply a generous fillet of UHU acrylit round them, as they have to withstand considerable loads when the boat is running.
Push a collet (part 8) into each of the tillers (part 7) and fit a retaining screw (part 9) in each one. Fit the tillers on the rudder units. Cut off the excess rudder shaft material just above the tillers, otherwise the rudder system will foul the stern steps (part 33).
The rudder link rod (part 10) is made from 1.5 mm Ø steel rod: cut a piece about 85 mm long from the rod supplied, and bend both ends down at right-angles to leave a straight centre section about 65 mm long. It is important that both tillers are exactly parallel, as shown on the plan. Connect the link rod to the tillers and secure each end with a pushrod keeper (part 11).
The rudder pushrod (part 12) is made up from the same 1.5 mm Ø steel rod. Bend the final 10 mm at one end at right-angles. Connect the formed end to the tiller and secure the end with another pushrod keeper (part 11).
Cut out the servo mount (part 13). Fix the rudder servo (part 14) in the opening using the screws supplied with the servo. **TIP**: push a pointed object such as a thin nail through the plastic at the hole positions, then drive the screws directly into the ABS. Open up the linkage hole in the servo output arm to 2 mm Ø and install the pushrod connector (part 15) in it. Secure the pushrod connector with the retaining nut (part 16). Glue the servo mount in the hull in the position shown. Fit the rudder pushrod through the pushrod connector (you may need to remove the output arm from the servo in order to insert the pushrod), then set the servo and rudders to centre and tighten the grubscrew (part 17) in the pushrod connector to clamp the pushrod in place. Remove the excess pushrod length, leaving about 4 mm projecting from the pushrod connector.
Fix the stern tubes (part 18) to the brackets (part 19) using the retaining screws (part 20). Drill a 2 mm Ø hole in the stern tubes through the opening in the brackets; this forms the lubrication hole for the stern tubes. **TIP**: if you wish you can fit a piece of tubing onto the lubricating nipple, e.g. Order No. 1668.3.
The next step is to fix the two motor mount units together: screw the shaft coupling (part 21) to the motor (part 23) using the grubscrews (part 22). There should be a slight gap between the coupling and the motor. Screw the motors to the motor mounts (part 24) using the motor retaining screws (part 25). Cut the two slots in the motor mount on the stern tube side using a sharp knife. Fit the retaining screw in the small holes and fit the nut (part 26) loosely to prevent it falling out again.
Solder the suppressor capacitors (part 27) to the motor terminals together with the power leads (part 28). Note that the second motor unit must be connected with reversed polarity so that it rotates in the opposite direction (see wiring diagram).
Now fit the motor assemblies on the stern tubes and fix them in the correct position by tightening the screws. Note: you may have to adjust the holes in the hull slightly. Make up the motor mount braces (part 29) from the 10 x 10 mm spruce strip supplied. Ensure that the braces do not force the motor assembly upwards; the mounts must make good contact with the hull. Glue the braces in place when you are satisfied. Drill 1.5 mm Ø holes in the braces then fix the motor assembly in place using the retaining screws (part 30). Check once more that the assembly is not under stress or tension.
Screw the propellers (part 31) on the end of the stern tube shafts. The propellers are handed, so make sure you fit them on the appropriate shafts.
Cut out the fin strake (part 32) as shown and glue it to the bottom of the hull using UHU acrylit, taking care to keep it aligned “straight ahead”. The strake protects the rudder and shaft systems from damage if the hull strikes bottom, so make sure that the glued joint is really sound.
The hull and the stern staircase (part 33) must now be trimmed to ensure that they make good contact where they join. This applies in particular to the edges, as the manufacturing technique produces a small flange which will need to be sanded smooth. The staircase will need to be chamfered on the inside in the area where the deck will later be glued. This is essential, otherwise the joint between the deck and the staircase will not be neat and accurate.
The hull can now be glued to the stern staircase: align the edges of the staircase and the hull and press the joint surfaces together using clamps (e.g. Order No. 542.1 or 542.2) while the glue is setting. This technique is necessary in order to avoid an offset in the top surface of the hull, and this in turn means less

filling and sanding. Any openings or gaps should be sealed carefully on the inside using UHU acrylit. Fill any gaps in the outside surfaces and sand back flush. The joints will need to be fine-sanded, but this is not carried out until the deck has been fitted.

Installing the optional bow thruster: suppress the motor of the bow thruster (part 34) using one suppressor capacitor (part 27), and connect the power leads (part 28) to the motor terminals. The bow thruster must be assembled inside the model; don't glue the parts together outside the boat, otherwise it will be impossible to install. Tack the assembly in place using cyano, with the electric motor standing upright at an angle, then apply plenty of UHU acrylit all round the joints with the hull sides. Work carefully here, as the joints must be 100% watertight.

Omitting the bow thruster: if you do not wish to fit a bow thruster, the holes in the hull must be sealed. Cut plates from scrap ABS sheet, making them large enough to cover the hole with a generous overlap all round. Glue them in place with cyano, and apply a fillet of UHU acrylit. Here again take care to make the joints 100% watertight. **NOTE**: it is very difficult to install a bow thruster once the model is complete, so the decision to install one really has to be made at this stage.

Glue the RC plate (part 35) in the hull in the position shown on the plan. Allow plenty of space around the bow thruster (if fitted) so that you have good access to it for maintenance. As an alternative you may prefer to omit the RC plate completely and fix the receiving system components directly to the hull sides using Velcro (hook-and-loop) tape. There are no technical disadvantages to this option.

The deck (part 36) must be trimmed carefully to fit, as already described for the hull and stern staircase. The deck can then be glued to the hull. Start by gluing it in the area of the stern staircase by applying a fillet of UHU plast spezial adhesive about 30 cm long and fixing the glued joint with spring clamps (e.g. Order No. 524.1) while the glue is setting. Once the glue has set, repeat the procedure with the next section, and continue until the deck is completely attached to the hull. **NOTE**: the glue penetrates into the gap between deck and hull through the capillary effect, but this only works with low-viscosity (thin) adhesives. **IMPORTANT**: ensure that the edges of the deck and the hull line up as accurately as possible, otherwise you may build a twist into the finished hull. You don't need to be concerned about excess glue being squeezed out of the joint, as the glued edges have to be sanded back later in any case.

Check carefully that there are no openings or gaps at any point round the hull / deck joint. If you find a gap, seal it on the inside using plenty of UHU acrylit. It really is essential that the hull should be 100% watertight. **TIP**: if you have to fill a fairly large opening, apply a piece of adhesive tape over the outside before applying UHU acrylit on the inside. This prevents glue penetrating to the outside, in which case you would have the tiresome task of sanding it off again when dry.

Now apply filler to all the areas where the deck, the hull and the stern staircase meet, and sand the filler back flush. You do not need to fill the areas where the wooden deck components will be fitted later; in this case it is sufficient to check that any gaps are completely filled with glue, and that the surfaces line up flush so that the wooden parts lie flat when fitted.

Locate the edges where the 3 x 3 mm ABS strips are to be fitted, and sand them to as sharp an edge as possible. Cut the lower rubbing strakes (part 37) from the square-section ABS strip; note that one side must be sanded to a slight taper (don't chamfer the face which is to be glued). You will find a line moulded into the hull where the strip is to be fitted. Cut the upper rubbing strakes (part 38) from the same material. Pre-bend the strips in such a way that they approximately follow the shape of the hull sides, then glue the strips to the hull. It is important that the strips are flush with the deck, i.e. the wooden parts of the deck must rest flat on them.

Use double-sided tape to attach the wooden deck (part 39) to the deck temporarily. Just use a few small pieces of tape to ensure that the wooden deck cannot shift, and check that it is a snug fit on the inside in the superstructure area. The next stage is to sand back the hull flush with the wooden deck. Work carefully here, and take great care not to sand away the wooden deck. Carefully remove the wooden deck again when the task is finished. The hull can now be fine-sanded overall and painted.

Apply several coats of clear lacquer to both sides of the wooden deck. Carefully rub down the top surface of the deck after applying each coat using fine abrasive paper (600- or 800-grit). Take care not to remove too much material, otherwise the laser engraving of the planking joints will disappear. The deck is finished when the surface is perfectly smooth, with an even, semi-matt gloss.

Stain the ornamental linings (part 40) in a teak colour, and apply clear lacquer to them on both sides when the stain is dry. Stick the linings to the wooden deck, taking care to avoid glue getting onto the surface.

The wooden deck can now be glued to the boat. For this we recommend a high-viscosity (thick) cyano-acrylate glue, as it hardens relatively slowly. Apply drops of adhesive to the deck at regular intervals, and carefully place the deck on the model. Ensure that the deck is correctly positioned, and take care not to allow any glue to run onto the painted surfaces of the hull. **TIP**: to be on the safe side it is a good idea to mask off the area of the hull most likely to be soiled in this way.

When the glue has set hard, carefully sand the hull again to provide a flat surface to accept the rubbing

strake. Touch up the sanded edge using the same colour as the hull. The next step is to prepare and fix the rubbing strake (part 41): first glue the two long pieces to the hull sides using cyano, then prepare the rubbing strake for the bow area by carefully pre-bending it to follow the outline of the hull. Glue the pre-formed strake in place. **TIP**: it is a good idea to paint the rubbing strake sections before sticking them to the hull. **TIP 2**: once again it makes sense to mask out the areas of the hull where glue might run onto the finished surface.
Trim the staircase treads (part 42) and the bathing platform deck (part 43) to fit. Finish the parts in the same way as the wooden deck, and glue them to the hull. Take care to fit the staircase treads in the correct order, as their width varies: the narrowest step is the top one, the widest one the bottom one. The steps only fit in one particular position, and it is easiest just to try them out on the model. **TIP**: once you have sorted the treads, mark the underside to avoid having to repeat the procedure.
Check that the superstructure (part 4) makes good contact with the deck all round; carry out any minor trimming required.
The next step is to trim the wooden superstructure cladding components to fit, starting with the side cladding (part 45). Attach these panels to the superstructure temporarily using a little double-sided tape, then carefully sand the panels back to obtain the correct angle relative to the lateral window claddings (part 46), taking great care to avoid scratching the glazed areas of the superstructure (mask them out).
Temporarily stick the central window frame (part 47) in place using double-sided tape. Ensure that the window is exactly central; you may need to trim it slightly to meet the side panels accurately.
Now temporarily stick the side window frames in place using double-sided tape. The side at which they meet the central window frame must be chamfered (mitred) so that there is no gap between the two panels. Now trim the outside edges to fit the side cladding. From the point of view of appearance it is important to ensure that the windows are not angled, and that the window frames are the same width, i.e. always remove material from both sides when trimming the panels.
Remove all the superstructure cladding again, and stain and lacquer the panels as already described.
The superstructure can now be painted. Mask off the exposed glazing areas and paint the superstructure. The glazed area of the two rooflights should also be masked off before painting. Once the paint is dry, the finished cladding panels can be fixed in place permanently using cyano. Ensure that no cyano gets onto the glazed areas. **TIP**: since normal cyano has a tendency to “bloom” (leave white smears), we recommend that you use solvent-free cyano (styrofoam cyano), e.g. Order No. 5820.
Place the rear bridge panel (part 48) on the superstructure and check that it fits correctly, butting up to the side cladding without any gaps. Stain and lacquer the panel and glue it to the superstructure.
Trim the bridge deck (part 49), the bridge step (part 50), the after deck (part 51) and the fore deck (part 52) to fit in the superstructure. When you are satisfied, finish the wooden panels as described for the wooden deck and glue them to the superstructure. Take particular care with the fore deck, which should be rounded out on the underside to ensure that it fits snugly in the superstructure, and lies flush at the top.
Cut the guard rails (part 53) for the two rooflights from 1.0 mm Ø ABS rod. The rooflights are marked to indicate the position and length of the bars. Cut the rods to the correct length and glue them in the appropriate position using tiny drops of cyano. **TIP**: the easy way to ensure that the bars are equally spaced and parallel is to cut a piece of wood to the correct width and place this against one bar whilst positioning the next. **TIP 2**: a good method of applying tiny drops of cyano is to take a length of thin wire and dip it in the adhesive. The wire allows you to position the drops with great accuracy. Paint the guard rails the colour of stainless steel. You will find that you only have to paint the top half of the round material in order to give a convincing impression. If you prefer, you can also cut the guard rails from a length of 1.0 mm Ø steel wire; the wire should have as shiny a surface as possible.
Make up the screening plate (part 54) for the rear rooflight from scrap ABS as shown on the plan. Paint the face which will be visible through the rooflight in a dark colour, and glue the plate to the underside of the superstructure. Ensure that the plate is well glued, as the Velcro tape which secures the superstructure is fixed to it later.
Cut out the roof (part 55) along the marked lines. In the area of the side windows it is important that the roof should be cut to the same curved outline as the window frames. If the two curves are different, producing a non-parallel frame outline, this tends to spoil the boat’s appearance. Don’t glue the roof in place permanently at this stage, as the wooden window frames for the bridge windows must be fitted first; these are installed later.
Make up the spacers (part 56) from scrap ABS and glue them to the inside of the roof (in the area where the Jules Verne placards will be located later). **TIP**: these parts can also be cut from scrap plywood from the window frame sheets.
Temporarily attach the roof to the superstructure using double-sided tape, so that you can trim the vacuum-moulded cockpit components to fit against it. Use just enough tape to hold the roof in place, otherwise it will be difficult to remove again later.

Now cut out the following ABS parts: the cockpit (part 57), the bottom cockpit section (part 58), the companionway (part 59), the skipper's seat (part 60) and the two parts of the upper bench seat (parts 61 + 62). Work carefully when cutting; it is best to trim the mouldings gradually to obtain a snug fit. We suggest that you cut out the parts slightly oversize initially, then sand back the material gradually until all the parts fit together. The laser-engraved joint lines on the bridge deck act as a useful guide for positioning these parts. **TIP**: ensure that the support surface of the bench seats follows the camber of the deck. **TIP 2**: if you find that the joint area of the vacuum-moulded parts tends to distort, cut small stiffening plates from 4 mm thick scrap wood and glue them in the bottom of the mouldings. This also provides a larger gluing area when fixing the parts in place.
Repeat the procedure outlined above with the lower bench seat (parts 63 + 64 + 65). Cut the back panel (part 66) for the lower bench seat from scrap ABS; it only needs to cover the exposed area which projects above the side cladding. When you are satisfied that all the parts fit together well, glue them together and paint them. Repeat this process with the section of the superstructure which is not covered by the roof.
TIP: we recommend that you apply the decals to the cockpit section before installing this in the model. The cockpit fittings are best fitted at a later stage, as they can easily be broken off during subsequent work otherwise.
Assemble the upper table (parts 67 + 68 + 69 + 71 + 73) and the lower table (parts 67 + 68 + 70 + 72 + 74). Before you glue the two table tops in place you should paint the components and stain and lacquer the wooden parts. The completed tables can then be glued to the model.
Make up the handrail (part 75) for the rear bridge panel from the flexible beech strip. After staining and lacquering the rail glue it centrally to the rear bridge panel using thick cyano. Take care that no cyano runs onto the back panel.
Trim the outer window frames (part 76 + 77 + 78) and the inner cladding panels (parts 76 + 79 + 80) for the roof, as already described for the superstructure. Check that the frames on both sides of the glazed areas line up accurately, as offset frames look untidy.
Cut the ventilator flaps (part 81) from scrap ABS and glue them to the window frames. Drill a series of 1.5 mm Ø holes in the window frames for the windscreen wipers. Don't install the wipers at this stage; they are fitted later.
Carefully sand the top edge of the window frames absolutely flat, and cut the trim rails (parts 82 + 83 + 84 + 85 + 86) to shape as shown. Paint the rails and glue them carefully to the frames using thick cyano. Ensure that no cyano runs onto the wooden parts. **TIP**: the rails will be easier to glue in place if you pre-curve them first.
Cut a door template from scrap ABS or wood to enable you to mark the position of the two doors using a soft pencil.
The roof can now be glued to the superstructure. Check that the roof makes good contact with the superstructure all round, without requiring pressure; trim the moulding if necessary. This applies in particular to the area of the bench seats and the companionways.
Cut the two handrails (parts 87 + 88) from the flexible beech strip. Finish the handrails as described for the rear bridge panel handrail, and glue these to the side cladding panels. Cut a notch in each handrail at the marked door positions; without the notch it would not be possible to open the doors. Note that the handrails should project outward slightly, i.e. they should not be fitted centrally.
The stern handrail is made up from the handrail stanchions (part 89) and the handrail (part 90), which consists of 2 mm Ø ABS round rod. First mark the two holes in the side panels; the other holes are marked on the superstructure. Drill 2 mm Ø holes at the marked points and push the handrail stanchions in the holes (don't glue them yet). Thread the handrail through the first stanchion, then pull it through all the remaining stanchions. The plastic handrail will take up the correct shape automatically. Glue the handrail to the stanchions, but not to the superstructure. Remove the handrail assembly and shorten the ends of the rail. Paint it stainless steel colour, then plug it into the superstructure again and glue the assembly in place. Cut off excess stanchion material on the inside, otherwise the superstructure will not rest properly on the deck.
The next step is to assemble the derrick (crane) from the following parts: base (part 91), external outrigger (part 92), internal outrigger (part 93), tongue (part 94), turnbuckle (part 95) and split pin (part 96). Cut out the vacuum-moulded parts and glue the internal outrigger into the external outrigger. Note that a piece about 5 mm long should project out of one end. Glue the outrigger to the base. Straighten the ends of the tongue and attach it to one end of the turnbuckle using the split pin. Place the other end in the recess in the derrick base and glue the tongue to the outrigger. Now glue the other end to the base. Paint the derrick black overall except for the turnbuckle. This is intended to represent a hydraulic cylinder, so the threaded part should be painted silver.
Cut the two shells of the inflatable boat - bottom section (part 97) and top section (part 98) - to approximate size, leaving a gluing flange at least 5 mm wide. Glue the two shells together, allow the glue

to set hard, then sand back the joint line to an even width of about 1 mm to 2 mm. Glue together the two shells of the outboard motor (part 99), applying plenty of UHU acrylit on the inside; there must be enough adhesive in the area of the glued joint to ensure that the two halves remain together when the joint line is sanded back. When the glue has set hard remove the outer flange around the outboard motor and sand the edge smooth. Cut the shaft spigot (part 100) from a scrap piece of 1 mm Ø ABS round rod. Drill a hole in the appropriate part of the outboard motor and glue the spigot in it. Paint the outboard motor and glue the propeller to the shaft spigot.
Make the two supports (part 102) for the inflatable boat from scrap ABS or wood, and glue the supports to the underside of the boat.
Cut out the cover (part 103) for the inflatable boat. **Option**: you will find marked points at the peaks of the cover; if you drill these out you can lash the cover to the inflatable boat using thin thread or similar; in this case you don't need to fit out the inside of the inflatable boat.
The inflatable boat should be painted white overall. If you wish to fit out the interior, use the colours of your choice but make sure that they harmonise with the main colours of the JULES VERNE.
The outboard motor can now be glued to the inflatable boat. The bottom fin of the motor should rest on the boat, and the cover should fit over the motor. Fit the steering wheel (part 104) to the instrument panel. Bend the throttle lever (part 105) to shape from 1.5 mm Ø steel rod, drill a hole for it in the instrument panel and glue the throttle lever in place. Fix the cover to the inflatable boat with a few strips of double-sided tape so that it can be removed again at any time.
Glue the inflatable boat and the derrick to the superstructure.
Glue the two halves of the stern flagstock (part 106) together, and carefully sand the flagstock to a round profile when the glue is dry. Drill a hole in the superstructure at the indicated point and glue the flagstock in place permanently from the underside. The hole in the deck is designed to clear the flagstock when the superstructure is fitted on the boat. If the hole does not provide clearance, enlarge it until the superstructure fits snugly.
Prepare the ventilators (part 107) by cutting them down at the first ring. Paint them silver and glue them to the superstructure at the marked points.
Prepare the forward handrail (part 108) by very carefully sanding it to a round section at the top. **TIP**: sand just a short section at a time, holding the rail firmly at the bottom; this reduces the risk of breakage. Stain and lacquer the railing and glue it to the fore deck using thick cyano. Repeat the procedure with the roof railing (part 109). **NOTE**: if the railing components should break in spite of your care, glue the parts together again with a little white glue. Take care that NO white glue remains on the surface, as this would prevent it accepting stain, i.e. wipe off the glue immediately with a soft cloth.
Glue the three parts of the mast (part 110) together using white glue. Sand the surfaces smooth and round off the corners when the glue has set hard. Do not round off the area which will be glued to the rear bridge panel later. Using a saw blade 1 mm wide cut straight slots in the mast in the positions shown on the plan to accept the radar support (part 111), the transverse support (part 112) and the two lamp bearers (part 114). Glue the two supports in the slots. Glue the radar strut (part 113) under the support; you may need to trim the strut slightly to fit.
Glue the two lamp bearers in the slots and glue the anchor light bearer (part 115) to the top of the mast. Ensure that all the lamp bearers are at right-angles to the surface of the mast which will be glued to the rear bridge panel.
Cut the two hinge plates (part 116) from scrap ABS and glue them to the sides of the mast.
Glue the mast to the rear bridge panel using thick cyano. Check that the mast is vertical as viewed from the stern.
Make up the stern lamp bearer (part 117) and its strut (part 118) from scrap ABS material. Glue the strut to the underside of the bearer, trim this assembly to fit against the angled part of the superstructure and glue it in place.
Assemble the radar housing (part 119) and glue the radar antenna (part 120) to it. Glue the completed radar assembly to the mast.
Paint the boat lamps (part 121) and the anchor light (part 122 - the lamp without the straight back panel) in the stated colours, and glue them in the appropriate positions on the mast and the stern lamp bearer.
All the following fittings can now be glued to the superstructure: the ship's wheel (part 104), the two throttle levers (part 123), the telephone handset (part 124), the foghorn (part 125) and the windscreen wipers (part 126). **TIP**: the ship's wheel is easier to attach if you cut a short piece of 1.5 mm steel rod and glue this in the cockpit beforehand.
Cut out the holder (part 127) for the lifebelt (part 128). Glue this to the inside of the side cladding as shown on the plan, and insert the lifebelt in the holder.
Mark the position of the railing stanchions (part 129) on the hull. Drill 1 mm Ø holes at the marked points to a depth of about 4 mm. **TIP**: attach a collet to the drill bit at the correct height to avoid accidentally

drilling the holes deeper than intended. Winding adhesive tape tightly round the drill also works, but this is not 100% reliable as the tape may slip.
Shorten the railing stanchions as shown on the plan, fit them in the holes and align them carefully by fitting a piece of thin wire through the rail holes. This should ensure that the braided wire which forms the lower rail has a straight run. When you are sure the railing stanchions are correctly aligned, glue them in place using low-viscosity (thin) cyano.
The two handrails (part 130) are made from the flexible beech strip supplied. Bend the rails to shape as accurately as possible, and check that they retain their shape as far as possible before finishing them with stain and lacquer in the usual way. Mark the position of one centre railing stanchion on the handrail, punch a point in the centre of the rail and drill a 2 mm Ø blind hole to a depth of about 1.2 mm. **TIP**: as mentioned previously, a collet on the drill helps avoid drilling right through the handrail. Fit the rail on the railing stanchion and mark the position of the two adjacent stanchions. Drill blind holes at the marked points, and continue to work in this way until you have drilled the holes for all the stanchions. Shorten the ends of the handrail and trim them to fit neatly against the deck.
The handrail can now be glued to the stanchions using cyano. When the glue has set hard glue the two ends to the hull permanently using cyano. **TIP**: cyano activator (Order No. 953.150) is helpful here, as it accelerates the hardening of the adhesive.
Repeat the procedure with the second handrail.
Apply several coats of clear lacquer to the handrail. It is particularly important to avoid the wood absorbing moisture, as it will then swell up considerably and ruin the handrail's appearance.
The next step is to fit the lower rail (part 131) through the railing stanchions. Fix one end of the braided wire in the hole with cyano, place the wire under tension and fix the other end with cyano in the same way. Ideally the braided wire should be under light but even tension along its entire length, without any hint of sagging. When you are satisfied, fix the rails to all the stanchions with a drop of cyano. Finish the job by cutting off the overhanging ends.
Make the forward flagstock (part 132) from the beech dowel supplied and sand it to a slight taper. Cut the round top cover plate (part 133) from scrap ABS and glue it to the tip of the flagstock. To reinforce the flagstock joint we recommend that you drill a hole in the bottom and glue a short piece of rod in it. Drill a hole in the hull at the stated position and glue the flagstock in place permanently.
Cut down the cleats (part 134) as shown on the plan: they should have an even overhang at both ends. Glue the prepared cleats and the fairleads (part 135) to the hull in the positions shown on the plan.
Assemble the two navigation lamp brackets (part 136 + 137) from scrap ABS. Ensure that the two parts are built up as a mirror-image pair. Trim the two lamp brackets to fit on the railings and glue them in place as shown. Paint the lamp brackets black and glue the navigation lamps inside them. If you do not wish to fit working lamps, you can simply paint them the appropriate colour on the inside; this gives a good overall impression.
Cut out the decals from the decal sheet using a pair of sharp scissors or a knife, and apply them in the appropriate positions on the boat, as shown in the kit box illustration. The white line on the hull sides above the waterline can easily be applied using a strip of white trim tape (e.g. Order No. 623.8).
Cut two pieces of Velcro tape (part 139) about 45 mm long and stick the strips to the deck: one in the small recess in the bow area, one at the rear below the stern rooflight. The two strips hold the superstructure firmly in place when the boat is running. The remaining Velcro tape is used to secure the RC components and drive batteries.
Connect the RC system components as shown in the wiring diagram on the plan. The receiver aerial is fixed to the inside of the hull using Velcro tape (as far as possible above the waterline, otherwise radio reception will be affected). If you prefer, a vertical whip aerial can be mounted on the outside of the model. This is strongly recommended if you wish to run your model at considerable range. If you fit a whip, the aerial wire attached to the receiver must be shortened by the length of the whip aerial.

Optional auxiliary working systems

Working system	Accessories required	Notes on installation and operation
Bow thruster	Bow thruster (Order No. 1785), MICRO SPEED 10 speed controller (Order No. 2736), distributor cable (Order No. 3086)	The method of installation is described in the instructions supplied with the set. The effectiveness of the bow thruster is very good, i.e. the motor should generally be operated throttled well back.
Sound module	POLICE BOAT sound module (Order No. 2460), loudspeaker (Order No. 2354)	The kit includes a vacuum-moulded loudspeaker box (marked with a loudspeaker symbol). Cut out the windows in the forward rooflight. The box is designed to be installed with the loudspeaker located under the open windows. Fix the box using Velcro tape so that access is still possible to the bow thruster for maintenance.
Lighting system	Navigation lights (Order No. 1087.6), masthead and stern lights (Order No. 353.6a), anchor light (Order No. 353.6a), interior lighting system (Order No. 351)	Wire the lighting system in such a way that the navigation lights, masthead light and stern lights are always switched on at the same time. The anchor light should only come on alone or together with the interior lighting. Interior lighting should be designed to provide only gentle illumination. Check the voltage of the bulbs, as different operating voltages are available. The operating voltage is left up to you (we suggest: 6 V). It is advisable to run the bulbs at slightly lower voltage than rated (e.g. 4.8 V for a 6 V bulb), as the lamps then last much longer. **TIP**: railing stanchions can be used as conductors for the power supply to the navigation lights.
Rotating radar	3V mini geared motor for radar antenna (Order No. 1752)	To actuate the radar antenna use a length of very thin steel wire glued into the rotating antenna. Run the wire down through the superstructure and connect it to the geared motor underneath. This is done by soldering an M2 threaded coupler (e.g. Order No. 3526) to the wire and screwing this to the geared motor's output. A mounting bracket for the motor can be made from scrap ABS material.

NOTE: with the exception of the bow thruster, these instructions do not describe in detail the electrical connections of the auxiliary working systems, nor the method of controlling them using the radio control system. We assume that the modeller installing such systems has sufficient expertise, as this model is not intended for beginners in any case.

Painting

Ask your model shop or local paint supplier for recommendations regarding paint types.
We strongly recommend that you use ONLY paints of a single type made by the same manufacturer, otherwise the colours may interact, and dissolve each other or produce bubbles. Be particularly careful when combining spray cans with brushing paints; always carry out a test on a piece of scrap material to ensure that they are compatible with each other.
To ensure that the paint adheres well, sand the surfaces overall with fine wet-and-dry paper (600- to 800-grit) beforehand, then de-grease the surfaces using a non-greasy liquid detergent or methylated spirits. Try not to touch the cleaned surfaces after this, as your skin contains grease which will then be deposited on the model.
Wooden parts which are not exposed and therefore do not need to be stained should be given several coats of sanding sealer (e.g. GLATTFIX, Order No. 207) or clear lacquer (e.g. HYDRO-AEROFIX, Order No. 926.1), to prevent them absorbing moisture.
When spraying, carefully mask off all areas which are not to be painted. Seal all openings too, as the fine mist of paint will penetrate into any opening, no matter how small.
Read and observe the instructions supplied with the paints you intend to use.
Before you start construction it is worthwhile considering carefully the order in which the model is to be

painted, as some areas may be difficult or even impossible to paint when already installed in or on the model.

Staining the wooden parts

The wooden parts of the superstructure should be dyed using teak-coloured stain. One suitable stain is CLOU 2528 Teak, which is available from builders' suppliers. Observe the manufacturer's notes when applying the stain; it is important that it should be compatible with the clear lacquer you intend to use. **TIP**: check the behaviour of the stain on some scrap wood beforehand.
Stained wooden parts should not be sanded subsequently, as it is very easy to sand off the stained area. Touching up the stain then produces local darkening and an uneven finish.
Stain will not "take" on wooden parts which are already soaked in glue or paint. Bear this in mind, and be sure to stain the wooden parts before gluing them.
For example, where the handrails are to be glued to wooden cladding panels you should adopt this procedure: make the parts, trim them carefully to fit, then stain and lacquer them completely. Allow the lacquer to dry before gluing the parts together.
Wherever possible the stained wooden parts should be finished using semi-matt clear lacquer, as this looks much more realistic on the finished model than gloss lacquer.

Colour scheme
In the list below the colours are stated only as RAL hues; this should help in selecting the correct colours. Armed with this information you should be able to obtain all the colours you need from any specialist paint supplier. Explain to your contact in the paint shop your intended use for the paints, as this will help him select the most suitable type. We recommend synthetic enamel paints.

Upper hull, superstructure: Mahogany brown, RAL 8016
Underwater hull, roof, seat surfaces, inflatable boat: Traffic white, RAL 9016
Bridge and superstructure sections, seats, tables, cockpit: Earth brown, RAL 8003
Inflatable boat cover, seat surfaces: Pure white, RAL 9010
Ventilators, horn: Silver, if possible chrome effect
Stern handrail, table legs, rooflight guard rails,
rubbing strakes, bridge window rail, outboard motor: Stainless steel effect
Derrick, navigation lamp brackets: Black
Navigation lamps: Red (port), green (starboard)
Lifebelt: Fluorescent orange, RAL 2005

Maiden voyage

Charge up the batteries and carefully check all the model's working systems in turn. When all the checks have been completed satisfactorily, you are ready to launch the boat for its maiden run. Take your time, run the boat slowly at first, and allow yourself to become familiar with the model's handling on the water. Bear in mind that this boat is capable of fairly high speeds, and is therefore more difficult to master completely than a slow-running vessel. We wish you lots of luck and many hours of pleasure building and running your JULES VERNE.

Parts List

No.	Part Description	No. off	Material	Dimensions and thickness in mm
1	Boatstand side panel	4	Plywood	Die-cut, 4.0 mm
2	Boatstand front support	2	Plywood	Die-cut, 4.0 mm
3	Boatstand rear support	2	Plywood	Die-cut, 4.0 mm
4	Hull	1	ABS	Vac. moulded, 2.0 mm, CNC-trimmed
5	Rudder bush	2	Brass	4 / 3.2 Ø x 25 mm
6	Rudder unit	2	-	Ready made
7	Tiller	2	Plastic	Ready made
8	Collet	2	Plated brass	Ready made
9	Retaining screw	2	Metal	M3 x 6 mm
10	Rudder link rod	1	Steel rod	1.5 mm Ø, 85 mm
11	Pushrod keeper	3	Plastic	Ready made
12	Rudder pushrod	1	Steel rod	1.5 mm Ø, overlength
13	Servo mount	1	ABS	Vac.-moulded, 1.0 mm
14	Servo	1	-	e.g. Order No. 4101
15	Pushrod connector	1	-	Ready made
16	Retaining nut	1	Plastic	M2
17	Grubscrew	1	Browned steel	M3 x 3 mm
18	Stern tube	2	Metal	Ready made
19	Bracket	2	Plastic	Ready made
20	Retaining screw	4	Steel	2.2 Ø x 6.5 mm
21	Shaft coupling	2	Aluminium	Ready made
22	Grubscrew	8	Browned steel	M3 x 3 mm
23	Motor	2	-	Order No. 3302
24	Motor mount	2	Plastic	Ready made
25	Motor retaining screws	4	Browned steel	M3 x 3 mm
26	Retaining screw + nut	4	Metal	M2 x 6 mm + M2

27	Suppressor capacitor	2	-	Order No. 3588
28	Motor power cable	2	-	Order No. 3389 + 2989
29	Motor mount braces	4	Spruce	10 x 10 mm, oversize
30	Retaining screw	4	Steel	2.2 Ø x 13 mm
31	Propeller	2	Plastic	32.5 mm Ø, R.H. / L.H.
32	Fin strake	1	ABS	Vac.-moulded, 2.0 mm
33	Stern staircase	1	ABS	Vac.-moulded, 2.0 mm, CNC-trimmed
34	Bow thruster (optional)	1	-	Order No. 1785
35	RC plate	1	Plywood	Die-cut, 4.0 mm
36	Deck	1	ABS	Vac.-moulded, 2.0 mm, CNC-trimmed
37	Lower rubbing strake	2	ABS	3 x 3 x 300 mm, square strip
38	Upper rubbing strake	2	ABS	3 x 3 x 72 mm, square strip
39	Wooden deck	1	Plywood	Laser-processed, 1.0 mm
40	Ornamental lining	2	Plywood	Laser-processed, 1.0 mm
41	Rubbing strake	3	ABS	3.2 x 1.5 mm, half-round, overlength
42	Staircase treads	8	Plywood	Laser-processed, 1.0 mm
43	Wooden bathing platform deck	1	Plywood	Laser-processed, 1.0 mm
44	Superstructure	1	ABS	Vac.-moulded, 1.0 mm, CNC-trimmed
45	Side cladding	2	Plywood	CNC-machined, 1.0 mm

46	Side window cladding	2	Plywood	CNC-machined, 1.0 mm
47	Central window frame	1	Plywood	CNC-machined, 1.0 mm
48	Rear bridge panel	1	Plywood	CNC-machined, 1.0 mm
49	Bridge deck	1	Plywood	Laser-processed, 1.0 mm
50	Bridge step	1	Plywood	Laser-processed, 1.0 mm
51	After deck	1	Plywood	Laser-processed, 1.0 mm
52	Fore deck	1	Plywood	Laser-processed, 1.0 mm
53	Guard rail	19	ABS	1.0 mm Ø rod, overlength
54	Screening plate	1	ABS	As plan, make from scrap
55	Roof	1	ABS	Vac.-moulded, 1.0 mm
56	Spacer	2	ABS or wood	approx. 60 x 10 x 1 mm, make from scrap
57	Cockpit	1	ABS	Vac.-moulded, 1.0 mm
58	Bottom cockpit section	1	ABS	Vac.-moulded, 1.0 mm
59	Companionway	1	ABS	Vac.-moulded, 1.0 mm
60	Skipper's seat	1	ABS	Vac.-moulded, 1.0 mm
61	Upper bench seat (long)	1	ABS	Vac.-moulded, 1.0 mm
62	Upper bench seat (short)	1	ABS	Vac.-moulded, 1.0 mm
63	Lower bench seat (short, left)	1	ABS	Vac.-moulded, 1.0 mm
64	Lower bench seat (long)	1	ABS	Vac.-moulded, 1.0 mm
65	Lower bench seat (short, right)	1	ABS	Vac.-moulded, 1.0 mm
66	Back panel	1	ABS	As plan, make from scrap
67	Table base	2	ABS	Vac.-moulded, 1.0 mm
68	Table leg	2	Aluminium	4 / 3.2 Ø x 30 mm
69	Upper table top	1	ABS	Vac.-moulded, 1.0 mm
70	Lower table top	1	ABS	Vac.-moulded, 1.0 mm
71	Upper table bottom section	1	ABS	Vac.-moulded, 1.0 mm
72	Lower table bottom section	1	ABS	Vac.-moulded, 1.0 mm
73	Upper table top insert	1	Plywood	Laser-processed, 1.0 mm
74	Lower table top insert	1	Plywood	Laser-processed, 1.0 mm
75	Rear bridge panel handrail	1	Beech	Flexible wood strip, 5 x 2 x 110 mm
76	Side window frame	4	Plywood	CNC-machined, 1.0 mm
77	Outer window frame	2	Plywood	CNC-machined, 1.0 mm
78	Outer central window frame	1	Plywood	CNC-machined, 1.0 mm
79	Inner window frame	2	Plywood	CNC-machined, 1.0 mm
80	Central inner window frame	1	Plywood	CNC-machined, 1.0 mm
81	Ventilator flaps	6	ABS	15 x 4 x 1 mm, make from scrap
82	Trim rail, left, side	1	ABS	3.2 x 1.5 mm, half-round, overlength
83	Trim rail, front, left	1	ABS	3.2 x 1.5 mm, half-round, overlength
84	Trim rail, centre	1	ABS	3.2 x 1.5 mm, half-round, overlength
85	Trim rail, front, right	1	ABS	3.2 x 1.5 mm, half-round, overlength
86	Trim rail, right, side	1	ABS	3.2 x 1.5 mm, half-round, overlength
87	Handrail, left	1	Beech	Flexible wood strip, 5 x 2 x 110 mm
88	Handrail, right	1	Beech	Flexible wood strip, 5 x 2 x 110 mm
89	Handrail stanchions	7	Plastic	Ready made
90	Handrail	1	ABS	2 mm Ø round rod, overlength
91	Derrick base	1	ABS	Vac.-moulded, 1.0 mm
92	External derrick outrigger	1	ABS	Vac.-moulded, 1.0 mm
93	Internal derrick outrigger	1	ABS	Vac.-moulded, 1.0 mm
94	Tongue	1	Plastic	Ready made
95	Turnbuckle	1	Plated brass	Ready made
96	Split pin	1	Metal	Ready made
97	Inflatable boat, bottom shell	1	ABS	Vac.-moulded, 1.0 mm
98	Inflatable boat, top shell	1	ABS	Vac.-moulded, 1.0 mm
99	Outboard motor shells	2	ABS	Vac.-moulded, 1.0 mm
100	Shaft spigot	1	ABS	1 mm Ø round rod, length approx. 10 mm
101	Propeller	1	Plastic	20 mm Ø, ready made
102	Inflatable boat supports	2	ABS or wood	As plan, make from scrap
103	Inflatable boat cover	1	ABS	Vac.-moulded, 1.0 mm
104	Steering wheel	2	Plastic	Ready made
105	Throttle lever	1	Plated steel	1.5 mm Ø x 20 mm

106	Stern flagstock	2	Plywood	Laser-processed, 1.0 mm
107	Ventilator	6	Plastic	Ready made
108	Forward handrail	2	Plywood	CNC-trimmed, 2.0 mm
109	Roof railing	2	Plywood	CNC-trimmed, 2.0 mm
110	Mast	3	Plywood	CNC-trimmed, 2.0 mm
111	Radar support	1	Plywood	Laser-processed, 2.0 mm
112	Transverse support	1	Plywood	Laser-processed, 1.0 mm
113	Radar bearer strut	1	Plywood	Laser-processed, 1.0 mm
114	Lamp bearer	2	ABS	1.0 mm, make from scrap
115	Anchor light bearer	1	ABS	1.0 mm, make from scrap
116	Hinge plates	2	ABS	1.0 mm, make from scrap
117	Stern lamp bearer	1	ABS	1.0 mm, make from scrap
118	Stern lamp bearer strut	1	ABS	1.0 mm, make from scrap
119	Radar housing	2	Plastic	Ready made
120	Radar antenna	1	Plastic	Ready made
121	Boat lamps	3	Plastic	Ready made
122	Anchor light	1	Plastic	Ready made
123	Throttle lever	2	Plastic	Ready made
124	Telephone handset	1	Plastic	Ready made
125	Foghorn	1	Plastic	Ready made
126	Windscreen wiper	3	Plastic	Ready made
127	Lifebelt holder	1	ABS	Vac.-moulded, 1.0 mm
128	Lifebelt	1	Plastic	Ready made
129	Railing stanchion	26	Plated brass	Ready made, some require shortening
130	Handrails	2	Beech	Flexible wood strip, 5 x 2 mm, overlength
131	Bottom rail	2	Braided wire	0.1 mm Ø, overlength
132	Forward flagstock	1	Beech	3 Ø x 70 mm, taper as shown
133	Top cover plate	1	ABS	1.0 mm, make from scrap
134	Cleats	8	Plastic	Ready made
135	Fairleads	8	Plastic	Ready made
136	Navigation lamp bracket, left	1	ABS	1.0 mm, make from scrap
137	Navigation lamp bracket, right	1	ABS	1.0 mm, make from scrap
138	Navigation lamps	2	Plastic	Ready made
139	Velcro (hook-and-loop) tape	1	Plastic	Ready made, overlength
-	Loudspeaker box	1	ABS	Vac.-moulded, 2.0 mm

The Parts List includes components which are not contained in the kit; these must be obtained separately.

You will also need the following items (not included in the kit)
2 x SPEED 600 BB Turbo electric motors, Order No. 3302
1 x suppressor capacitor, Order No. 3588 (pack of 2)
1 x NAVY V 40 R speed controller, Order No. 2875
2 x SANYO 6N-4000 DRL drive batteries, Order No. 2516
1 x G2 distributor cable, Order No. 3068
1 x G2 parallel cable, Order No. 3061
1 x copper flex, 2 m, Order No. 3389
2 x G2 connector systems, Order No. 2989

Radio control system
1 x MC-10 radio control set, Order No. 4721
or
1 x MC-12 radio control set, Order No. 4725
Other Graupner/JR FM computer radio control systems on the 40 MHz band can also be used.