Graupner

Building instructions for the “OTTO LAUFFER” model boat, Order No.: 2102

The original

The steam launch OTTO LAUFFER was built at H.C. Stülcken & Son in Hamburg in 1928. The launch is powered by a 2-cylinder compound steam engine rated at 100 BHP (75 kW). It is capable of a top speed of 9.5 kn, carries a 3-man crew and is licensed to carry 30 passengers.
The launch was built under contract to the Hamburg Finance Committee, and initially bore the name Hafenpolizei (Harbour Police) VI. The vessel later changed hands, and its name was changed to WASSERSCHUTZPOLIZEI (Marine Police) 6 when it belonged to the Hamburg Marine Police service. The boat’s current owner is the Hamburg History Museum, and the launch was assigned the name OTTO LAUFFER in honour of the museum’s first Director.

The model

Our model of the launch is closely based on the full-size vessel, and is drawn to around 1 : 20 scale. The steam launch was designed expressly for the new IST-L steam engine (Order No. 1940). As an alternative it is possible to install an electric power system.
Since the model calls for a modicum of building skill it is not suitable for the beginner to modelling. The steam engine version also requires a certain level of experience in operating steam engines. Auxiliary functions such as a working lighting system can be installed at the builder’s discretion

Specification

Length approx.	810 mm
Beam approx.	210 mm
Draught approx.	95 mm
All-up weight incl. RC approx.	5.7 kg
Scale approx.	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 16 years of age.
- ***NEVER*** operate the boat 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 model in salt water.
- Never run your boat in adverse conditions, e.g. rain, storm, strong wind, choppy water or strong currents.
- Before you run the model check that the radio control system is working reliably, and that all connections are secure.
- 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 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 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.
- Take great care to prevent water entering the boat. For example seal the hatch cover all round with adhesive tape.

Care and maintenance

- Clean the model carefully after every run, and remove any water which penetrates the hull. If water gets inside any RC component, dry the unit out and send it to your nearest GRAUPNER service department for checking.
- 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 shaft, rudder system 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.
- Bear in mind that tools can be dangerous; always be careful when handling them.
- The vacuum-moulded parts are best cut out using a pair of stout scissors (we particularly recommend the Lexan shears, Order No. 26). In many places a sharp knife (e.g. Order No. 982) works well. Always cut slightly outside the marked lines, leaving a slight excess which can then be sanded back to final size.
- Don't throw away scrap ABS immediately as this material is required to make other small parts.
- All wooden parts should be sanded smooth and given several coats of GLATTFIX sanding sealer (Order No. 207) before being fitted. The printed wooden panels, e.g. the planked deck, must not be brush-painted, as the process may smear the printing. These parts should be sprayed with clear waterproof lacquer.
- The electric motor or motors must be suppressed. The minimum is one 470 nF capacitor (Order No. 3588) for each motor, soldered between the terminals as a bridge.
- 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"). This applies in particular to GRP mouldings. 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**
Wood - wood	UHU hart, white glue
Wood - metal	Stabilit express, UHU plus
Wood - ABS	Cyano-acrylate, Stabilit express
Metal - metal	Cyano-acrylate, UHU plus
ABS - ABS	Cyano-acrylate, Stabilit express, UHU plast
ABS - metal	Cyano-acrylate, Stabilit express
Rubber - 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

1. The vacuum-moulded hull (part 1) is supplied machine-trimmed, with all openings pre-cut. It should be rubbed down with fine abrasive paper (400-grit) before applying the final colour finish.
2. Trim the sternpost assembly (part 2) to fit against the hull; the holes may need to be adjusted slightly. To align the parts fit the stern tube (part 12) through the hull and sternpost assembly. Glue the sternpost assembly to the hull using Stabilit express and apply filler paste to the joint lines.
3. Cut the rudder shaft (part 3) to length from 3 mm Ø brass rod and fit it into the rudder blade (part 4). Drill a 1 mm Ø transverse hole through the rudder shaft and secure the blade with the retaining pin (part 5).
4. Now attach the rudder blade to the sternpost by gluing the two hinge pins (part 6) in the stern post from the underside. Cut down the top pin to a length of about 7 mm, as it does not need to function as a hinge. Glue both hinge pins in place using white glue, so that you can release the joint at any time if necessary.

5. Cut the rudder bush (part 7) to length, fit it on the rudder shaft from above and glue it in the hull using Stabilit express.
6. Fit a pushrod connector (part 9) on the tiller (part 8) and attach it to the rudder shaft.
7. The next step is to glue the engine plate (part 10) in the hull using Stabilit express, as shown on the plan, so that the steam engine can be installed temporarily.
8. Fit the stern tube braces (parts 11) on the stern tube (part 12), and trim them to fit snugly against the hull.
9. The propeller shaft can now be slipped into the stern tube and connected to the steam engine by means of the shaft coupling (part 13). Carefully align the entire power assembly so that the steam engine shaft and the propeller shaft are exactly in line, then glue the stern tube to the hull.
10. The steam engine should not be positioned or installed permanently until the superstructure has been completed, to ensure that the funnel of the steam engine is exactly central in the boat's funnel.
11. Install the bracket (part 15), the servo plate (part 16) and the servo mounts (part 17) in the hull; the positions are shown on the plan.
12. Once you have installed the servos, connect the steering servo to the tiller and the throttle servo to the steam engine's control lever as shown in the drawing, using the clevis (part 18) and the threaded pushrod (part 19).
13. Glue the gas tank support (part 20) in the hull in the position shown in the drawing. The gas tank is secured using Velcro (hook-and-loop) tape so that it can easily be removed.
14. When the gas tank is filled or topped up a little gas usually escapes, and this tends to collect in the hull. A flash flame could then be produced when the burner is ignited, and this could damage the hull. **For this reason the gas tank should always be removed from the hull prior to filling.**
15. The condenser support (part 24) consists of two parts which are glued together and fixed to the engine plate. The condenser should also be secured with Velcro tape so that the condensed water can be emptied out after every few runs.
16. To protect the ABS sides of the hull a layer of heat insulation (part 25) has to be installed as shown in the drawing. The insulation takes the form of aluminium-skinned styrofoam.
17. Assemble the boatstand from the front support (part 21), the rear support (part 22) and the two connecting pieces (part 23). Tip: to avoid marking the hull apply a layer of soft foam to the support surfaces of the stand.
18. The illustrations show how the in-fill pieces (parts 27 - 30), the deck formers (parts 31 - 33) and the longitudinal rails (part 34) are attached to both deck halves (part 26); use white glue for these joints. The two deck halves can then be joined together and glued to the hull. Alternatively you may prefer to glue the in-fill pieces, formers and longitudinal rails to the hull first, and then fit the two deck halves.
19. The coaming is designed to prevent water penetrating the hull. Glue the coaming strips (parts 35 and 36) to the deck as shown on the plan; you may need to adjust the length of the coaming components.
20. Cut away the central cross-pieces of the formers (parts 33) so that the steam engine can be installed.
21. The next step is to plank the deck (parts 37): sand the individual planking strakes and glue them in place using white glue, working from the centre towards the outside. The outermost strakes will need to be trimmed to final size. Finish the deck with matt clear lacquer.
22. The bulwark can now be trimmed to fit and glued in place; trim the vertical wall (part 41) to fit at the same time and glue it in place. Tip: the grooves in the transitional area of the hull bulwark should first be soaked in cyano, then filled and finally sanded back, otherwise water may penetrate into the wood of the in-fill pieces.
23. Cut out the raised bulwark section (part 39) along the separation lines and glue it to the bulwark.
24. The two extensions (part 40) of the raised bulwark section are simply cut from 3.5 x 3.5 mm L-section strip, length 130 mm.
25. Cut out the skylight (part 43) and cut circular holes in the moulding to accept the portholes. Cut the sliding hatch (part 44) to size from 0.5 mm ABS sheet and cut the guide rails (part 46) to length from 3.5 x 3.5 mm L-section strip. Glue these parts on the skylight as shown on the plan.
26. Cut the plywood frame (part 45) to fit in the skylight and the hatch opening, and trim it so that the rear vertical panel is flush with the vertical wall (part 41).
27. **The skylight must be removable,** as it provides access to the inside of the hull for removing the gas tank prior to filling.
28. The door planking (part 49) is made up from individual strips of veneer as shown in the drawing. Glue the individual strips to a sheet of paper and then glue the completed door to the rear vertical wall.

29. Make the following small parts from the materials stated in the Parts List and glue them in place as shown on the plan: handle (part 47), door hinges (part 50), door handle (part 51) and door plate (part 52).
30. The next step is to glue the navigation lamps (part 53) to the lamp brackets (part 54) and paint them in the correct colours. Cut the surrounds (part 55) from 1 mm Ø ABS rod and glue them in place. Fix each navigation lamp assembly to the skylight using two supports (part 56) cut from aluminium tube.
31. Bend the handrail (part 57) to the shape shown on the plan and attach it to the skylight using the handrail stanchions (part 58).
32. Flatten the top of the lamp mast (part 61) slightly and glue the lamp console (part 60) to it. Glue the two mast lamps (part 59) in the lamp console. Install the lamp mast using the two mast braces (part 62) (handrail stanchions).
33. Glue the two step treads (part 63) to the wall (part 41) using the two brackets (part 64).
34. Glue the portholes (part 48) in the circular openings in the skylight.
35. The platform (part 66) is assembled from plywood strips. Cut the strips about 5 mm overlength initially, and glue them together as shown on the plan. Sand the rear end of the platform to a rounded shape so that it fits neatly inside the bulwark. Tip: the ends can be cut to approximate shape using sharp scissors.
36. Cut the four platform braces (part 67) to a length of 51 mm from the 3 x 3 mm square section rod supplied, and glue them to the underside of the transverse platform struts. Tip: the platform should only be attached to the model using double-sided adhesive tape, so that it can be removed if necessary to provide access to the rudder system. Paint the platform before installing it on the model.
37. Drill 1 mm Ø holes in the bulwark to accept the stanchions of the railing (part 68). Glue the railing stanchions (part 69) in place, taking care to set them vertical and exactly in line with each other. Thread the braided wire railing through the holes in the railing stanchions. At the bow and stern secure the railing by slipping the ends of the braided wire into 1 mm Ø holes. Bend the ends over at a sharp angle and apply a drop of cyano.
38. Assemble the wire frame (part 71) for the awning (part 70) from 1.5 mm Ø brass rod and solder the joints. Drill holes in the bulwark and push the ends of the frame into them. It should be possible to remove the awning frame at any time if necessary.
39. The awning itself is cut from fabric; glue it to the edge of the frame using cyano.
40. Attach the stern light (part 72) to the mast (part 73) and fix the mast to the wire frame using two mounting lugs (part 74) cut from scrap ABS.
41. Glue the fairleads (part 75) to the bulwark in the position shown on the plan.
42. Cut the base (part 77) for the flagstock (part 76) to size and trim it so that the flagstock is vertical when the base is attached to the raised bulwark section.
43. Attach the anchor (part 78) to the starboard side of the bulwark using the mounting hook (part 79).
44. Glue one cruciform bollard (part 81) and four double cruciform bollards (part 82) to the deck in the positions shown on the plan.
45. The superstructure (part 83) is supplied as a vacuum-moulding. Cut along the marked lines to separate it from the waste material and trim it to fit on the deck. Cut the holes for the funnel and the portholes and the opening for the skylight (part 97).
46. The superstructure is stiffened on the inside by means of a plywood assembly which also serves to protect the plastic from excess heat. The first step is to glue the corner strips (parts 88 and 89) to the roof reinforcement (part 85), then fit the lateral reinforcements (part 84) on each side. Glue the bow section (part 86) and the stern section (part 87) in place to complete the box structure. Glue the two in-fill strips (part 90) on both sides of the lateral reinforcements, and fix the mounting ring (part 120) to the roof reinforcement; the superstructure can now be placed over the assembly.
47. The funnel opening in the superstructure (part 83) must be located exactly over the corresponding opening in the roof reinforcement. Trim the mounting ring (part 20) to follow the camber of the roof.
48. Glue the superstructure to the lateral in-fill strips, to the stern section (part 87) at the rear, and to the mounting ring (part 120) at the top.
49. For heat insulation clad the inside walls of the superstructure with aluminium-skinned styrofoam (part 151) as shown in the illustration.
50. Cut the wheelhouse (part 93) and the passenger compartment (part 94) from the waste material, trim them to fit on the superstructure and glue them in place.

51. The two roofs (parts 95 and 96) are supplied in the kit as ABS sheet panels; the forward roof (part 95) for the wheelhouse must be shortened from 115 mm to 86 mm. Glue the roof panels to the wheelhouse and the passenger compartment, and round off the corners slightly.
52. Cut out the skylight (part 97) and the skylight hatches (part 98) and cut the openings in them as indicated. The skylight hatches should be installed in the open position (see illustration) to allow the warm air from the steam engine to escape. Brace the open hatches with 18 mm lengths of 1 mm Ø brass rod. The portholes (part 100) can also be glued in place once the skylight has been painted. Cut the hinges (part 99) from 0.5 mm ABS sheet, bend them to shape, paint them black and glue them in place as shown on the plan.
53. Make the small parts 101 to 118 from scrap ABS or brass rod as stated in the Parts List. They can be fitted to the model once painting is complete.
54. Cut the funnel (part 119) to a length of 120 mm and check that it fits in the superstructure and the funnel base ring (part 120). Glue it in place after painting. The funnel folding mechanism (part 122) should also be fitted at this stage; it consists of a shaft made from brass rod (part 123) and the balance weights (parts 124). These parts should be cut and trimmed as shown on the plan and fitted after painting. The same applies to the funnel rim (part 121).
55. Cut the wheelhouse planking (part 132), the door planking (part 133) the passenger compartment planking (part 137) and the door planking (part 138) from the walnut veneer supplied. Tip: the veneer is best cut with a sharp knife or scissors.
56. The remaining small parts (part 125 to part 148) can now be made up from ABS, brass rod and tube as shown on the plan and as stated in the Parts List. Paint the items and fix them to the model.
57. **Very important**: when a steam engine is installed in a model boat it is particularly important to ensure that there is a good throughflow of air, so that the hot air which is generated by the heating of the steam boiler can easily be dispersed. For this reason the portholes are left open, i.e. unglazed. However, this measure is not sufficient on its own, and forced ventilation is still necessary. This takes the form of an electric fan mounted in the fan plate (part 149). The fan plate should be placed on the opening under the skylight (part 43), but should not be fixed permanently. To prevent the fan plate slipping, glue the frame (part 150) to the underside of the unit and trim it to fit in the opening. The fan operates from a 12 V/0.5 Ah battery which can be positioned forward of the gas tank in the bow of the boat. The fan can be turned on manually using a switch (e.g. Order No. 4160.1) when the steam boiler is heated up, and then turned off again at the end of the run.
58. Cut the five coal hatches (part 151) from the decal sheet and stick them to the deck. The “OTTO LAUFFER” name placards should be applied to the bulwark in the position shown on the plan. Stick the imitation grating on the gangway (part 126).
59. Construction is now complete, and you can finally screw the steam engine in place, taking care to position the steam engine’s funnel exactly central in the boat’s funnel. There should be no actual contact between the two.
60. The hose supplied in the kit is intended to divert the exhaust steam into the condenser, and from there to the funnel, as shown on the plan.

Painting

General information

- If you intend to brush-paint the model, be sure to use high-quality modelling paints. Ask your model shop or local paint supplier for recommendations regarding paint types. Basically we recommend Graupner colour paints as they have been thoroughly tested on many different types of surface.
- 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.

- When painting small parts it is a good to attach them temporarily to a piece of wood using double-sided adhesive tape. When the paint is dry they can be removed from the tape and glued to the model.
- 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.

Colour scheme

We recommend the following paint colours:

Underwater hull	red oxide, RAL 3009
Upper hull, bulwark, funnel	black
Superstructure, skylights, ventilators etc.	pastel yellow, RAL 1034
Inside of bulwark, cabin roofs, gangway, sliding roof	agate grey
Lifebelts, inside of ventilators, port navigation lamp	red
Starboard navigation lamp	green
Deck and wood planking	clear lacquer

All colour paints should be of the **semi-matt** type

Running the boat

We recommend that you set up the steam engine on a temporary mounting so that it can be run-in before final installation in the model boat. The main point of test-running is to set the flame height accurately. Open the gas regulator valve just to the point where the flame burns cleanly (no soot), and without any yellow coloration. With a full gas tank the engine run is around 25 minutes. However, for safety's sake the tank should be topped up after about 15 to 20 minutes, or kept close to the bank after this time. When the flame goes out the steam engine will stop immediately, and you could then encounter salvage problems. Open the regulator valve slightly when topping up the tank. The liquid gas then pushes out the existing air in the tank (as it is lighter), and when you see liquid gas squirt out of the jet you will know that the tank is full. Don't forget to check the water level in the boiler at the same time.

The condenser provides an effective means of preventing the boat becoming soiled with a mixture of condensation water and oil; it should be drained after every two or three runs.
For more details on operating the steam engine please study the operating instructions supplied with the power plant.

It will be necessary to add lead ballast to the hull so that the boat floats at the correct waterline. It is best to float the model in the bath while you gradually add ballast and establish its correct position.

Installing the radio control system

The model requires a two-channel radio control system. One channel controls the rudder (directional control), while the second channel sets the speed and forward / reverse running. The location of the servos is drawn on the plan. The receiver and receiver battery can be fixed in the stern area of the hull using Velcro tape. Deploy the receiver aerial in any suitable position.

We wish you many hours of pleasure building and running your "OTTO LAUFFER".

Parts List

Part No.	Description	No. off	Material	Dimensions in mm
1	Hull	1	ABS	Vac. moulded
2	Stern post assembly	1	Plastic	Ready made
3	Rudder shaft	1	Brass	3 Ø x 45, overlength
4	Rudder blade	1	Plastic	Ready made
5	Retaining pin	1	Brass	1 Ø x 5, overlength
6	Hinge pin	2	Plated brass	M2 x 10

7	Rudder bush	1	Brass	4 / 3.2 Ø x 20, overlength
8	Tiller	1	Plastic	Ready made
9	Pushrod connector	2	Plated brass	Ready made
10	Engine plate	1	Plywood	250 x 60 x 5, oversize
11	Stern tube brace	1	Plywood	Die-cut, 4
12	Stern tube and shaft	1	Brass / V2A	Ready made
13	Shaft coupling	1	Plastic	Ready made
14	Propeller	1	Plastic	Ready made
15	Bracket	1	Plastic	Ready made
16	Servo plate	1	Plywood	Die-cut, 4
17	Servo mount	2	Plastic	Ready made
18	Clevis	2	Plated steel	Ready made
19	Threaded pushrod	2	Mild steel	M2 x 140 + 170
20	Gas tank support	1	Plywood	Die-cut, 4
21	Front boatstand support	1	Plywood	Die-cut, 4
22	Rear boatstand support	1	Plywood	Die-cut, 4
23	Connecting piece	2	Plywood	Die-cut, 4
24	Condenser support, 2-part	1	Plywood	Die-cut, 4
25	Heat insulation	4	Alum.-clad	Cut as plan
26	Deck, 2-part	1	Plywood	Die-cut, 4
27	Front in-fill piece	2	Plywood	Die-cut, 4
28	Rear in-fill piece	2	Plywood	Die-cut, 4
29	Front centre in-fill piece	2	Plywood	Die-cut, 4
30	Rear centre in-fill piece	2	Plywood	Die-cut, 4
31	Front deck former	1	Plywood	Die-cut, 4
32	Rear deck former	1	Plywood	Die-cut, 4
33	Centre deck former	2	Plywood	Die-cut, 4
34	Longitudinal rail	2	Spruce	450 x 5 x 3
35	Long coaming strip	2	Plywood	Die-cut, 1
36	Short coaming strip	2	Plywood	Die-cut, 1
37	Deck planking	32	Plywood	300 x 8 x 1, oversize
38	Bulwark	1	ABS	Vac. moulded
39	Raised bulwark section	1	ABS	Vac. moulded
40	Bulwark extension	2	ABS	L-section, 130 x 3.5 x 3.5
41	Vertical wall	1	Plywood	Die-cut, 4
42	Hawser guide	4	Plastic	Ready made, No. 305.1
43	Skylight	1	ABS	Vac. moulded
44	Sliding hatch	1	ABS	43 x 43 x 0.5, as plan
45	Frame	1	Plywood	Die-cut, 4
46	Guide rails	2	ABS	L-section, 40 x 3.5 x 3.5
47	Handle	1	Brass rod	10 x 1 Ø
48	Portholes	6	Plastic	Ready made
49	Door planking	-	Wood veneer	Cut out as plan
50	Door hinges	4	Brass rod	5 x 1 Ø
51	Door handle	1	Brass rod	Ring-screw, ready made
52	Door plate	1	ABS	0.5 x 3 Ø, as plan
53	Navigation lamp	2	Plastic	Ready made
54	Lamp bracket	2	Plastic	Ready made
55	Surround	2	ABS rod	100 x 1 Ø
56	Lamp support	4	Alum. tube	6 x 5 / 4.15 Ø
57	Handrail	1	ABS rod	420 x 2 Ø
58	Handrail stanchions	9	Plastic	Ready made
59	Mast lamp	2	Plastic	Ready made
60	Lamp console	1	Plastic	Ready made
61	Lamp mast	1	ABS rod	80 x 2 Ø
62	Mast brace	2	Plastic	Ready made
63	Step tread	2	ABS	1, scrap, make as plan
64	Bracket	2	ABS	L-section, 24 x 3.5 x 3.5
65	Stern hatch cover	1	Plywood	Die-cut, 1
66	Stern platform	5	Plywood	300 x 3 x 1, oversize
67	Platform brace	4	ABS	16 x 3 x 3, square strip

68	Railing	2	Braided wire	19 x 0.1 Ø, 1000 mm total
69	Railing stanchions	18	Brass	Ready made
70	Awning	1	Fabric	180 x 150, oversize
71	Wire awning frame	1	Brass rod	1.5 Ø x 1400 overall
72	Stern light	1	Plastic	Ready made
73	Mast	1	ABS rod	2 Ø x 25
74	Mounting lug	2	ABS	1.5, scrap, make as plan
75	Fairleads	4	Plastic	Ready made
76	Flagstock	1	Plastic	Ready made
77	Flagstock base	1	Plastic	Ready made, shorten
78	Anchor	1	Plastic	Ready made
79	Anchor mounting hook	1	Brass rod	1.5 Ø x 30
80	Cable	2	Cord	2.5 Ø x 500
81	Cruciform bollard	1	Plastic	Ready made
82	Double cruciform bollard	4	Plastic	Ready made
83	Superstructure	1	ABS	Vac. moulded
84	Lateral reinforcement	2	Plywood	Die-cut, 1
85	Roof reinforcement	1	Plywood	Die-cut, 1
86	Bow section	1	Plywood	Die-cut, 1
87	Stern section	1	Plywood	Die-cut, 1
88	Corner strip	2	Spruce	381 x 5 x 5
89	Corner strip	2	Spruce	82 x 5 x 5
90	In-fill strip	2	Spruce	385 x 5 x 5
91	Heat insulation	2	Alum. clad	170 x 120, overall
93	Wheelhouse	1	Smoked tint	Vac. moulded
94	Passenger compartment	1	Smoked tint	Vac. moulded
95	Roof	1	ABS	115 x 86 x 1.0, oversize
96	Roof	1	ABS	115 x 115 x 1.0, oversize
97	Skylight	1	ABS	Vac. moulded
98	Skylight hatch	4	Plastic	Vac. moulded
99	Hinges	4	ABS	0.5, make as plan
100	Portholes	4	Plastic	Ready made, No. 305.2
101	Toolbox	1	ABS	Vac. moulded
102	Cover	1	ABS	Vac. moulded
103	Handle	1	Brass rod	1 Ø x 15
104	Cover	1	ABS	Vac. moulded
105	Handle	1	Brass rod	1 Ø x 15
106	Ventilator, 2-part	2	ABS	Vac. moulded
107	Port companionway	1	ABS	Vac. moulded
107a	Sliding roof	1	ABS	Vac. moulded
108	Guide rails	2	ABS	L-section, 35 x 3.5 x 3.5
109	Door frame	1	ABS	28 x 20 x 0.5, cut as plan
110	Hinges	4	Brass rod	1 Ø x 15
111	Handle	1	Brass rod	1 Ø x 15
112	Sliding hatch	2	ABS	25 x 25 x .05, cut as plan
113	Guide rails	4	ABS	50 x 2 x 0.5, cut as plan
114	Handle	2	Brass rod	1 Ø x 15
115	Handrail	8	ABS rod	2 Ø x 860 total
116	Handrail stanchion	20	Plastic	Ready made
117	Starboard door frame	1	ABS	25 x 20 x 0.5, cut as plan
118	Hinges	4	Brass rod	1 Ø x 5
119	Funnel	1	Alum. tube	32 Ø x 120, overlength
120	Funnel base ring	2	Plywood	Die-cut, 4
121	Funnel rim	1	ABS	Vac. moulded
122	Funnel folding mechanism	1	Plastic	Inj. moulded parts set
123	Shaft	1	Brass	3 Ø x 120
124	Balance weights	10	ABS	20 x 20 x 1.5, oversize
125	Portholes	4	Plastic	Ready made, No. 305.3
126	Gangway	1	ABS	Vac. moulded
127	Grappling hook	1	Brass rod	1 Ø x 15, make as plan
128	Mounting ring	1	Brass tube	3 / 2.1 Ø x 3, overlength

129	Long handle	1	Dowel	2 Ø x 110, total
130	Holder	2	Brass tube	3 / 2.1 Ø x 3, as plan
131	Mounting base	2	Brass tube	1.5 Ø x 15, overlength
132	Wheelhouse planking	44	Walnut veneer	Cut out as plan
133	Door planking	12	Walnut veneer	Cut out as plan
134	Door hinges	4	Brass rod	1 Ø x 5
135	Door plate	2	ABS	0.5 x 3 Ø, make as plan
136	Door handle	2	Brass rod	Ring-screw, ready made
137	Passenger compartment planking	35	Walnut veneer	Cut out as plan
138	Door planking	15	Walnut veneer	Cut out as plan
139	Door hinges	4	Brass rod	1 Ø x 5
140	Door plate	1	ABS	10 x 2 x 0.5, cut as plan
141	Door handle	1	Brass rod	Ring-screw, ready made
142	Lifebelt	2	Plastic	Ready made
143	Holder	2	ABS	Vac. moulded
144	Retaining lug	6	ABS	Vac. moulded
145	Radio aerial	1	Steel wire	0.8 Ø x 160
146	Mounting tube	1	Brass	2 / 1 Ø x 27, overlength
147	Lamps	2	Plastic	Ready made
148	Lamp console	1	Brass rod	1 Ø x 40
149	Fan plate	1	Plywood	Die-cut, 1
150	Fan frame	1	Plywood	Die-cut, 4
151	Coal hatch	5	Plastic film	

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

1 Decal sheet
4 Retaining screws (fan) M2.9 x 16.0
4 Retaining screws (steam engine), M2.9 x 9.5
8 Retaining screws (servo console), M2.2 x 6.5
3 Velcro tape for fixing gas tank, exhaust steam condenser, receiver and fan battery, Order No. 1603.2
1 Hose, 7 / 3 Ø x 330 mm total

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

1 2-cylinder steam engine, Order No. 1940
1 Exhaust steam condenser, Order No. 1949
1 Fan, Order No. 1950
1 Switch, Order No. 4160.1
1 Battery, 12 V/0.5 Ah

1 2-channel radio control system
1 Servo