



Building Instruction Fireboat Düsseldorf

Order no. ro1100

Congratulations on purchasing this high-quality model kit. Please note that this kit, especially the installation of special functions, requires experience in model ship construction. This model is not suitable for beginners. At least 3 to 4 ship models should already have been built and also experience with special functions should be available.

General information about the romarin fireboat "Düsseldorf"

The fire-fighting boat "Düsseldorf" comes from a series of three identical boats built by Rheinwerft GmbH & Co, Mainz-Mombach, for use in the Ruhr area. The boats are equipped for disaster situations; be it a ship that has caught fire, oil leaks or a port facility at risk of explosion.

The extinguishing monitors throw water or extinguishing foam at 10.5 bar up to 95 metres wide and 45 metres high.

The two 12-cylinder V-engines of about 930 kW (1260 hp) together give the boat a speed of about 37 km/h.

Technical data	original	model
Length approx.	29.3 m	1160 mm
Width approx.	6.3 m	250 mm
Draught approx.	1.3 m	75 mm
Displacement approx.	75.6 t	9 kg
Drive	2x12-cylinder V-engines 930 kW (1260 HP)	2x Max Gear electric motors

Suitable remote control systems:

All remote control systems from two channels in the 2.4 GHz or 40 MHz band. Please contact your dealer or www.krick-modell.de for the current offer.

For the expansion of the model with special functions we recommend the robbe Multi-Switch system in conjunction with 8-channel systems of the Futaba F-14 system.

Accessories not included but required for driving operation to build the model:

piece.	Description	Part No.	Order No.
2	Geared motor Max Gear 2.5:1	18f	42275
2	Interference suppression filter	21	42128
2	Shaft coupling	18e	rb106-65
1	Steering servo	26	79059
2	drive battery, 6 V / 7Ah or 12 Ah	282	667255 or 667256
1	speed controller, from 30 A	283	67052
1	Receiver	284	
1	Silicone cable 2-pole 1.5 mm ²	163	67537
1	Motor connection Plug+socket round	---	67521
1	plug/socket Faston 6.3 mm insulated	---	ro4039
1	Tam. Plug connection socket/plug	---	67513

Fitting set (BS), order no. ro1101

Contains all necessary small parts to decorate the model; e.g. fans, stairs, towing gear, life rings, lamps, metal anchors, railing supports, signal horn.

Special function set (SFS), order no. ro1103

This set contains all the parts needed to install the special functions shown in the construction plans. For example, the following functions are possible with these parts. Proportional horizontal and vertical pivoting of the monitors. Connecting a fire pump, moving the boat crane, light bulbs to illuminate all lamps on board, etc.

Further accessories required for expanding the special functions can be found in the information sheet included in the kit:

Please follow the instructions of the individual devices carefully!

The size and equipment of the romarin fire-fighting boat "Düsseldorf" mounting box is ideally suited for realising the many possible uses of the original also in the model. The fire monitors, crane, anchor windlass, radar, headlight, blue light, horn and siren can be designed and installed in a functional way.

The thick-walled ABS fuselage is spacious enough to accommodate large drive batteries, powerful motors and numerous units for special functions.

The two proven MAX Gear geared motors give the model good speed true to the original. Of course, brushless direct drives can also be used. Four large rudders guarantee extreme manoeuvrability in forward and reverse.

The three extinguishing monitors, which are assembled from prefabricated parts, can be swivelled horizontally and vertically via the remote control. With the recommended electric gear pump you can spray over a distance of approx. 6 metres.

With the finished sprayed boat crane, the deep-drawn rowing boat can be lifted from the afterdeck, swivelled outboard and lowered into the water.

In addition to these main functions, it is also possible to carry out numerous other functional parts:

Radar, turn or swivel headlamps, blue light, switch position lamps on and off.

The parts contained in the set of fittings decorate the model perfectly. The special function set contains all parts required for the special functions shown in the plan, with the exception of the specially offered items, such as motors, batteries, etc.

Suitable and required tools:

Fretsaw with medium fine and fine blades, fretsaw table, glass paper of various grain sizes, wet sandpaper fine, sandpaper file, balsa knife, order no. 416002 or 416005, holding clamps, screw clamps, pins, flat nose pliers, screwdriver, drill, set of drills 1-10mm, set of paint brushes, small hammer, soldering iron with accessories, side cutter, angle or triangle, one pack of strong rubber rings, approx. 120 x 10 x 1 mm.

Glues:

In the building instructions recommended:

UHU Acrylit or DELUXE Fusion Acrylit or Stabilit Express for wood, ABS, metal

UHU - Hart or Deluxe RC Modeller Power Adhesive for Wood - ABS

DELUXE Rokat Rapid - Superglue for ABS - moulded parts.

Similar adhesives can also be used. The processing instructions of the individual adhesive manufacturers must be observed. The instructions indicate where the individual adhesives are to be used. Allow adhesives to cure well before starting the next work step.

General information on painting:

We generally recommend the exclusive use of synthetic resin varnish! All ABS parts must be washed with synthetic resin thinner before painting and then touched as little as possible. All wooden parts, especially parts that are no longer accessible after assembly, should be thoroughly brushed with pore filler 2-3 times beforehand. Then slightly sand the adhesive surfaces again.

If you want a perfect and cleanly limited paint finish, you must always paint in sections, i.e. each individual part that is to have a different colour shade is neatly matched to the model, then painted and then glued to the model. However, if a part is painted in several colours, the demarcations must be made with special masking tape, not crepe tape. The tape must be removed when the paint has dried. Do not allow to dry out. If a lifelike coating is desired, you should use the image of the cardboard for the colouring.

Notes on the building plan and building instructions:

The small letters printed in bold next to the building plan texts are references which refer only to foreign-language building instructions. Direction indications in the building instructions, e.g. on the right, can be seen in the direction of travel. In the text, the BOM numbers of the part to be used are enclosed in parentheses. The abbreviation BS shown in the parts list stands for fitting set, SFS for special function set.

RC system

It is important to find out about the installation options of the planned RC system before construction begins. If a remote control system other than the one suggested by us is installed, you can follow the installation scheme. However, small differences in dimensions must be compensated for by yourself.

Make sure that the RC parts such as receivers, servos and speed controllers do not come into contact with water. It is therefore advisable to arrange these parts high enough in the fuselage. This also applies to the parts of the special functions.

General information for the construction process:

The numbering of the individual components essentially corresponds to the assembly described in the instructions. Before starting construction, please read the entire construction manual in conjunction with the

construction plans with the utmost care.

Use the parts list and the plans to get an exact overview of the various components and the construction process. With the photos inserted in the text we give you information about the current state of assembly. Parts or assemblies are partly unpainted for a better overview. The installation of the respective special function is described at the corresponding point. However, this can also be retrofitted.

Preliminary work:

Before starting work, check together with the BOM the completeness of the individual parts that are indicated as belonging to the assembly in the BOM.

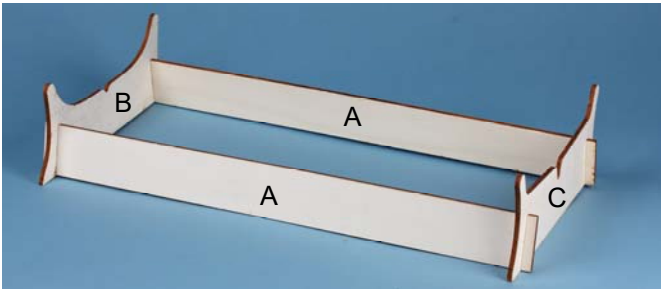
Carefully cut laser parts out of the laser plates with a sharp knife, deburr and re-drill holes if necessary. All wooden parts must be sanded, especially at the edges, and primed two to three times with a pore filler before installation or attachment.

Grinding work on ABS parts or on cut edges of glued together ABS parts must be carried out with fine wet paper. All areas on ABS parts where bonding is carried out must be roughened up beforehand with coarse abrasive paper.

Boat stand:

The first step is to manufacture the boat stand so that your model boat has a secure hold on the worktable. First release the side parts (A) and support plates at the front (B) and rear (C) from the laser plate.

The boat stand can now be assembled and the support can be covered with felt or foam to protect the hull surface.

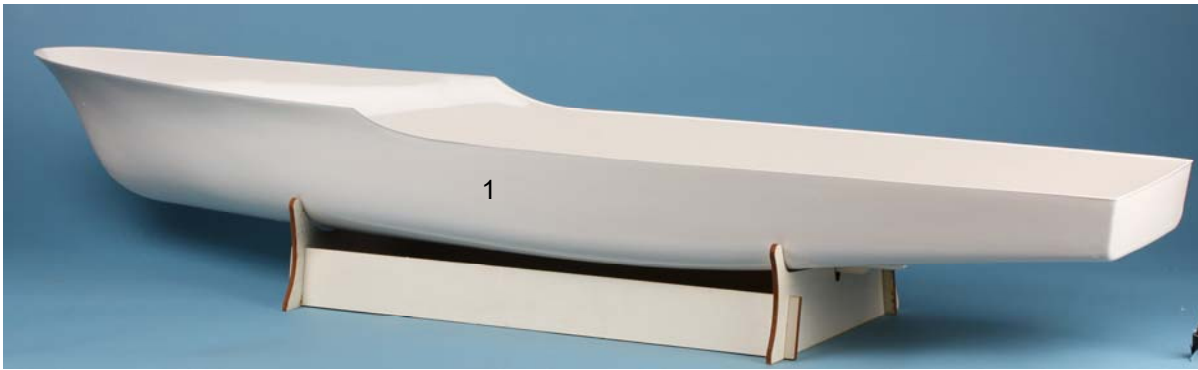


The fuselage assembly

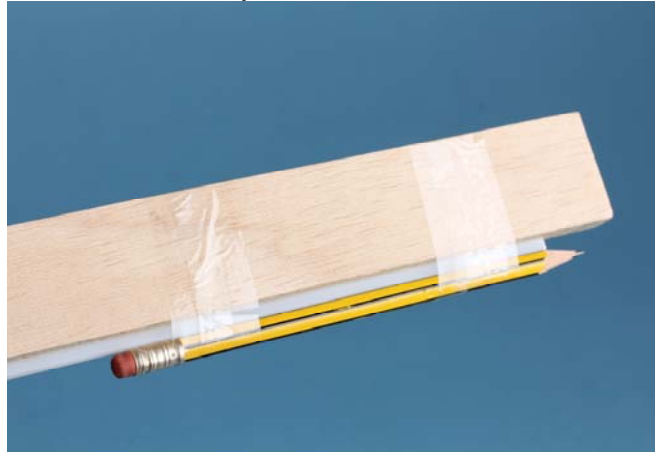
Hull:

The hull (1) made of ABS is roughly worked out with a knife or a fine jigsaw towards the contours visible on the inside. Then use a file, planer or balsa knife and sandpaper to finish the contour of the fuselage exactly to the mark so that no more bulges remain on the outside. (Section B-B, View Y).





Then holes of initially $\varnothing 3$ mm are drilled in the markings for the anchor tubes at the bow, for the stern tubes in the corrugated trousers, for the 4 rudders and only if an extinguishing pump is provided for the suction tube at the keel outlet. Before the corresponding parts are installed, they are then drilled out to fit.



Now make the markings for the deck support strips (2) for the main deck. With the help of the device shown in the picture, the dimension 7.5 mm is set (e.g. 3x3 mm strip between pencil and wide strip and hold together with adhesive tape) and applied from the upper edge of the fuselage inside all around.



In the area of the transition between the main deck and the foredeck, the marking must be continued according to the plan with the aid of a ruler. The deck support strips are glued in later.

Rudder:

Drill the 4 holes for the rudder to $\varnothing 4$ mm at the stern. Remove the support blocks (4) and glue them to the fuselage 35 mm below the upper edge of the fuselage (acrylite) after roughening the bonding area.



The rudder support board (5) is placed on the blocks, roughly aligned over the holes and muffled with acrylite. The rudder guide tubes (7) (tubular rivet) are inserted into the retaining plates (6) up to the collar. Now insert the tubes through the support plate (5) into the $\varnothing 4$ mm holes in the fuselage as shown in the photo. The outer guide tubes should protrude about 3 mm from the bottom of the ship. First precisely align one of the outer tubes in both directions (use the rudder). Secure the holding plates with a clip and glue the tubes (7) and plates (5) firmly with acrylite. Proceed in the same way with the second, outer rudder guide tube (View Y).

Then place the ruler under the fuselage on the outer guide tubes. Push the inner tubes through to the ruler. Slide all oars in as help and align and glue the tubes as shown in the photo.

Next, shorten the $\varnothing 3$ mm brass shank of the rudder (8) to a length of 50 - 52 mm (deburr the interface). Place the lower washers (9) on the rudder stocks and insert the rudders into the tubes (7). Now slide on the sealing rings (10) from above and fit the upper washers (9). The rudder levers (11) are prepared according to plan and photo 3. The unnecessary arms of the rudder levers are shortened or sawn off. The fourth hole is drilled out to 3 mm. Then insert the adjusting rings (12) (7/3mm) and the hexagon socket head screws (13) (M3x10) and place the rudder levers on the rudder stocks according to plan. Slightly tighten the screws by hand. Align the rudders (8) and the rudder levers (11) exactly straight. Slightly press and tighten the levers on the sealing rings. Pay attention to ease of movement. It must not be possible to move the oars up and down in the pipe!



The crossbar 14 made of $\varnothing 2 \times 140$ mm brass-wire is provided with 4 setting rings 15 (7/2) and screwed under the rudder levers with screws 16 (M3 x 6) according to photo 3 and plan.

Then place the 4 rudder levers aligned with the rudders exactly parallel and tighten them with the screws 16 on the crossbar. The rudders must now all move easily to the right and left in parallel.

The steering linkage will be made later.

Drive installation:

The motor bulkhead 17a with its longitudinal columns 17b is cut out of the laser plate. The motors are bolted to the bulkhead and fitted with the coupling without the fixing foot on their end faces. For the suction pipe (if a pump is mounted) a \varnothing 6 mm bore must be provided and widened to 7 mm. Fit the suction tube together with the stern tubes.

Enlarge the holes in the fuselage shaft trousers to \varnothing 6 mm and insert the stern tubes into the fuselage. Align so that the stern tubes protrude 85 mm from the corrugated trousers (see plan). Insert the ship's shafts and tighten the couplings. Then glue the tubes and the motor bulkhead well with acrylite in the ground fuselage.



Fill the stern tubes with shaft grease GLS (or a few drops of thick oil) and insert the ship's shafts. Fit propellers (20) \varnothing 40, 3-blade right and left (40 R and 40 L) with M4 brass lock nuts and check the shafts for smooth running. Prior to installation, the motors must be fitted with filters (21) and connection cables (22) about 150 mm long. Close the intake pipe watertight as a precaution.

Now staple the 4x4 mm deck support strips (2) with clips into the fuselage so that they are below the drawn mark, i.e. 7.5 mm below the upper edge of the fuselage. Glue the strips into the fuselage with instant glue. By swivelling the fuselage, the drops of adhesive run cleanly along the edge.

Then cut the short strip on the transom to length and glue it in place. The slats on the foreship will be fitted later.

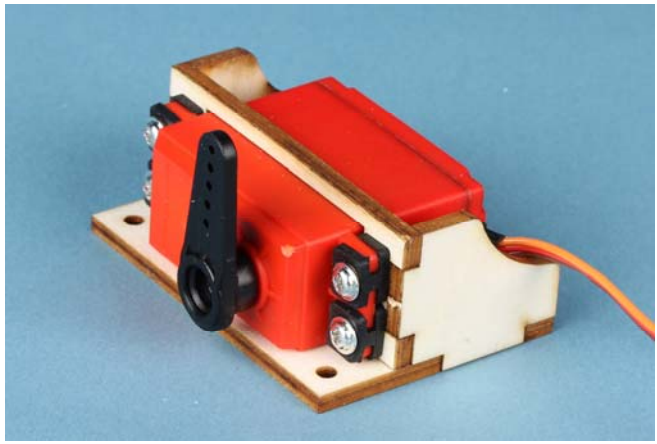
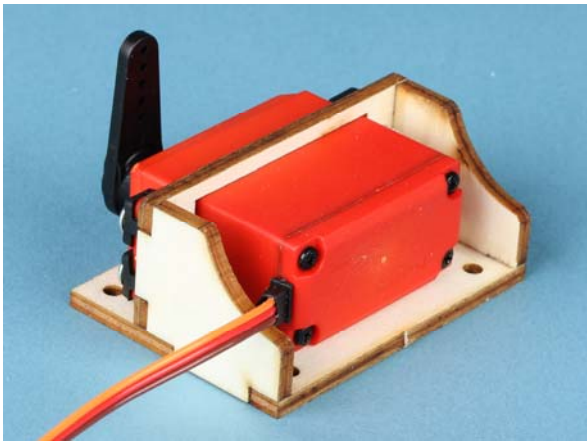


Mark the position of the auxiliary rubbing strakes (3) with a modified device 12 mm from the top edge of the deck. Glue the 2 x 2 mm ABS profiles cut to length according to the plan as described. Glue the transverse strip 3 to the rear as well. The skirting boards themselves are fitted after the fuselage has been painted.

Pump plate:

If you want to use the fire pump later, the suction pipe (23) must be installed now at the latest, since the gluing points are later covered, i.e. subsequent installation is no longer possible.

The fitted and primed pump plate (25) is equipped with the steering servo (26) and the bracket (27) according to the plan. For this purpose, the servo mount consisting of the parts (27a to 27c) is first mounted, painted and the servo screwed in.

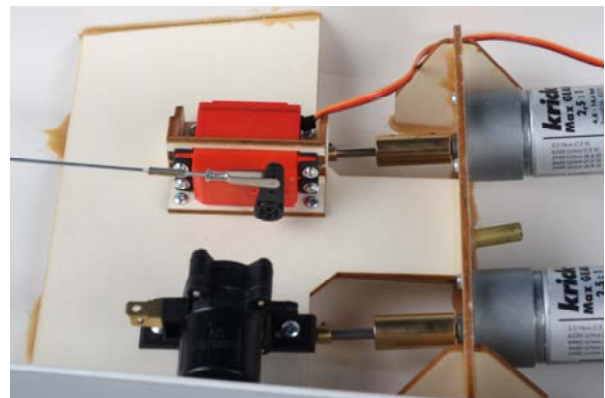
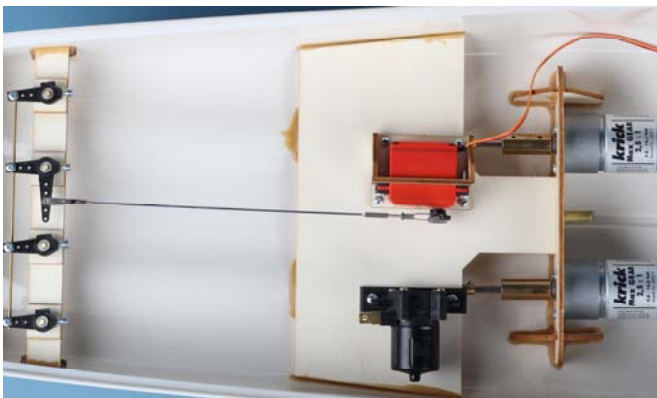


The bracket is to be mounted with the $\text{Ø } 2.9 \times 6.5$ mm self-tapping screws (28). The gear pump serves as an extinguishing pump (29) and is fastened according to plan with the self-tapping screws (30) ($\text{Ø } 2.9 \times 9.5$ mm). The pump must be equipped with a suppression set (31) and appropriate connection cables (22) in accordance with the enclosed instructions. For special requirements it is also possible to install a second and third pump.

The now completed pump plate must now be inserted according to the plan and photo and glued with acrylite.

The next step is to make the steering linkage. The $\text{Ø } 1.5$ mm steel wire (32) is tinned cleanly at both ends. Solder a clevis (33) at one end. Hook the linkage into the angle rudder lever 11.

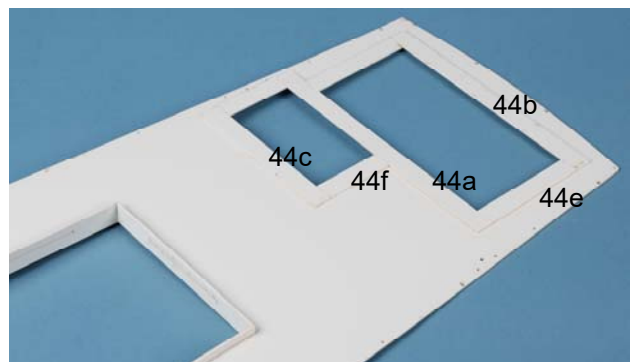
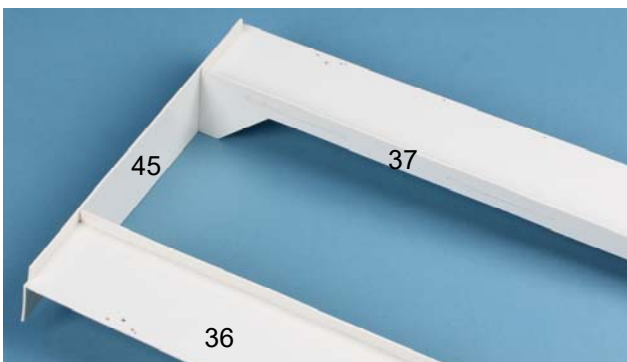
The second clevis (33) with lock nut (34) and threaded bushing (35) is hooked into the servo-rod lever cut according to plan. Determine the length of the boom (32). Cut the wire to length and solder in the threaded bushing.



Main deck:

The edges of the main deck (36) are sanded all around, the glue edges are roughened. Proceed in the same way with the long coaming parts (37) and the transverse edge (38). The hatch (39) and the boat hatch (40) are carefully removed and also sanded and fitted.

Insert the coaming parts (37 and 38) into the deck and glue them together with cyano.



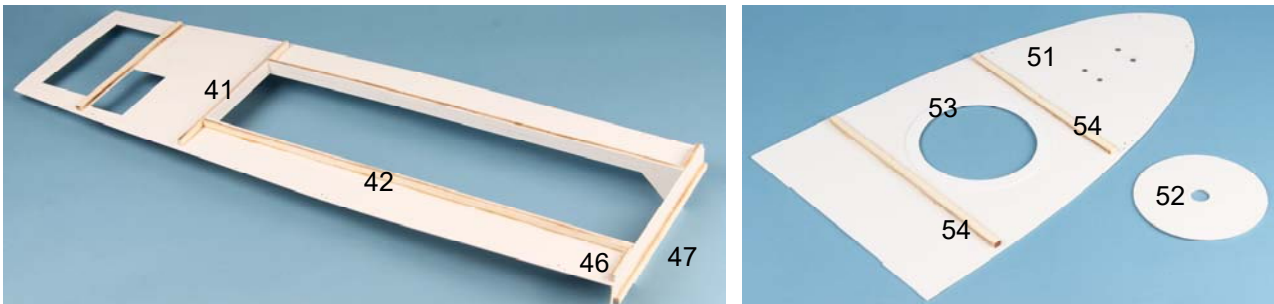
The deck is turned on its back (the hatch is then on the right in the direction of travel), the deck joists and the cross beam are fitted and primed.

The hatch supports (44 a - e) for crane and boat hatches are manufactured from the 10 mm wide lasered ABS strips. They are to be cut to length according to the plan and glued in place with superglue.

First lay the cross member (41) flush against the rear edge of the deck cutout and dimension the length so that part (41) on the right and left is about 6 - 8 mm shorter than the deck width.

Glue with acrylite. Position the deck joists (42) flush with the cross member (41), saw in at a depth of about 3 mm at the "K" mark on the bend in the deck cut-out, carefully adjust the strip to the bend in the deck cut-out and adjust the length. Now glue the deck joists cleanly with acrylite. When gluing, ensure that the deck rests flat to prevent warpage.

Proceed as described with the hatch support (43). Here, too, the edge distance 6 - 8 mm must be maintained. Select the position according to the plan so that the width of the rail reaches half into the escape hatch and half into the boat hatch. Glue with acrylite.



Release and glue the top bulkhead (45). Glue the support (46) for the main deck in the left and right corners.

The front deck support (47) is adapted and glued according to the drawing. Prime the wooden parts well. Make sure the seat is at a right angle. The completed main deck is now ready for installation in the hull.

Fit the deck exactly into the hull and on the support strips (2) and insert. Tighten the hull with rubber rings so that it fits the deck without gaps. The bulkhead (45) must adapt precisely to the curvature of the side wall. Place a drop of superglue in the joint between the hull and deck, starting on one side. By swivelling the entire hull accordingly, allow the glue to run all around the joint between hull and deck. After one hour, repeat the procedure again so that the joint is securely sealed and glued.

Foredeck:

As described for the strips (2), the 4 x 4 x 300 mm long ABS strips are also cut, adapted and glued here as deck support strips (48). The markings for this have already been marked.

The balsa triangular strip (49) is used as deck support in the bow area. Depending on the radius of curvature, this should be cut into pieces of approx. 10 - 30 mm in length. Glue the pieces in individually and sand the deck surface carefully flat and horizontally.

The auxiliary rubbing strake (50) 2 x 2 mm is glued on the outside after marking, as described for parts 3. Proceed particularly precisely in order to achieve perfect all-round bonding.

Prepare the foredeck (51). The part is carefully removed from the laser cut, as is the circular lid (52). Sand all edges. In the bow area, a bevel must be ground so that the deck lies in the hull later without gaps. The Ø 8 mm holes for the anchor tubes are already drilled. Later they are then bevelled through the side of the ship to their final size.

Align the bearing ring (53) on the underside of the deck and glue it with cyano. Primer and glue on tailored deck joists (54).

The finished foredeck is fitted in like the main deck, held down with rubber rings and blocks and carefully glued in with superglue.

Now the anchor tubes (55) can be installed. Use a Ø 4 mm drill to find the direction between the hole on the front deck and in the side wall and then drill carefully in steps Ø 5 - 6 - 7 mm.



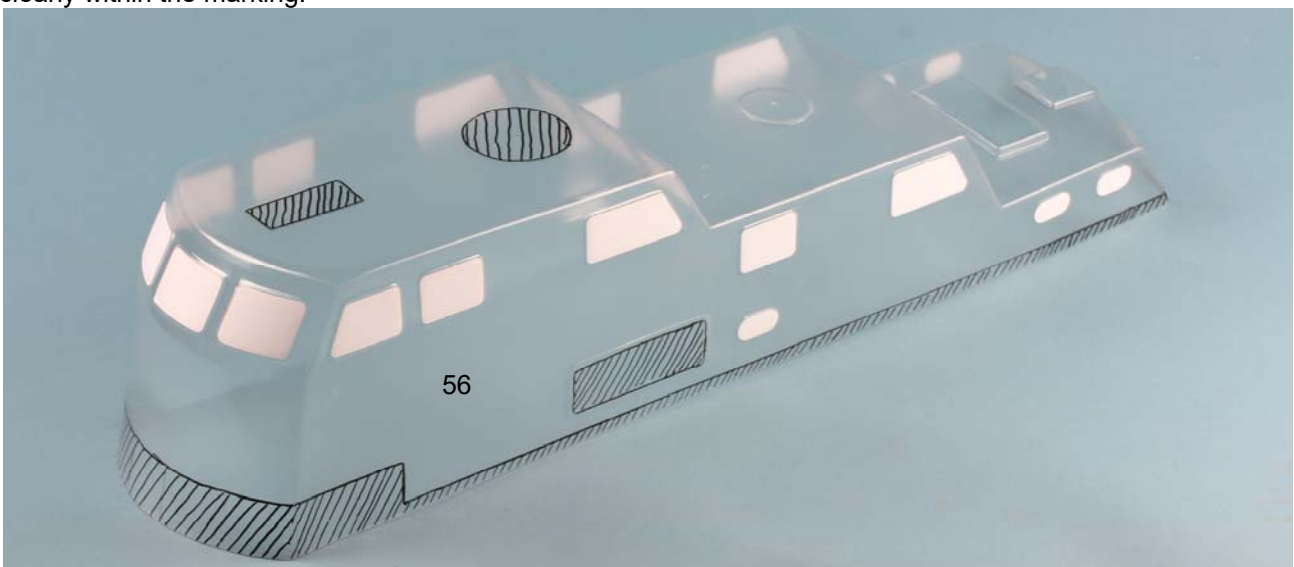
Then insert the pipes (55) and mark the slopes. Remove the pipes and bevel the ends according to the markings. Align the re-inserted pipes exactly and glue them well from the inside with acrylite. Finally, file the transitions between the pipe and hull or deck cleanly and smooth them so that the pipes do not protrude and the anchor chains do not get caught later.

The scuppers of the main deck are now being worked out.

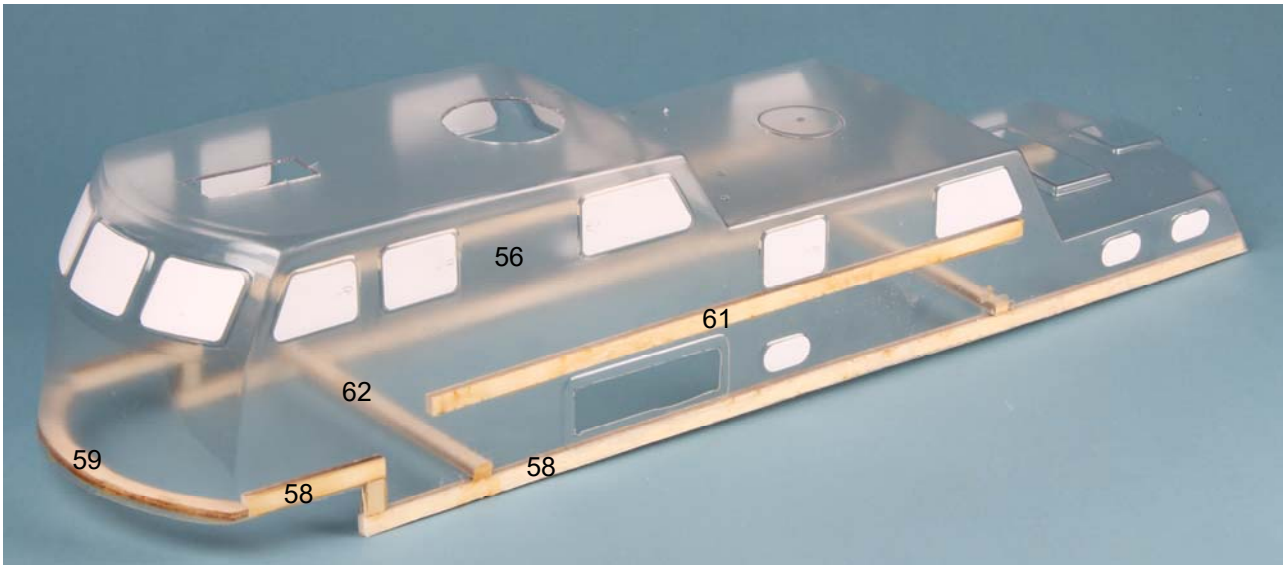
With \varnothing 2.5 mm, drill several holes side by side and then file clean. The fuselage is finished and can be painted according to the cardboard box. Please observe the painting instructions. If you want to recreate the ribbed deck, get some fine tulle and cut it out according to the decks. The hatches (39) and (40) as well as the lid (52) are covered with tulle. With the first coat of paint the tulle is glued to the deck parts. After the second coat of paint, the ribbed deck structure is ready.

Cabin construction:

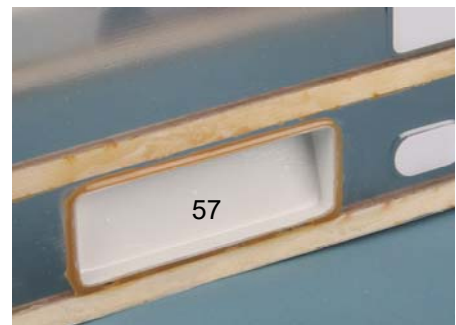
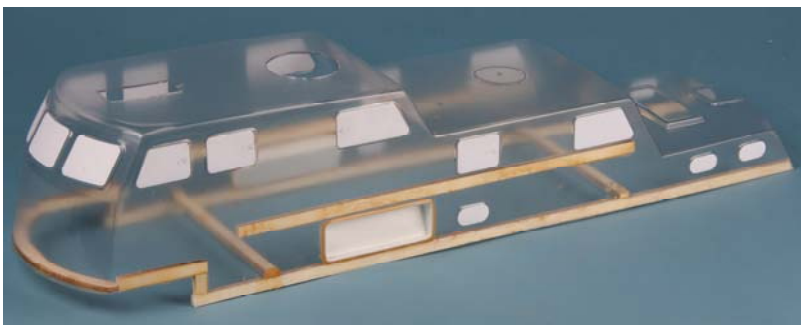
In the transparent cabin (56), all window sections are carefully covered with masking film to prevent scratches. Furthermore, it makes sense to additionally cover the outside area with foil and adhesive tape to protect it from further scratches or adhesive residues. This is not shown in the following pictures for better illustration. The areas hatched in the photo must be roughly cut out. Cut the cut-outs for the slider housings clearly within the marking.



Now the round and square cut-outs on the cabin ceiling as well as the lower contour must be sanded cleanly. At the same time, the lower edge of the cabin is taken care of on the decks so that no gap is visible between deck and cabin. If the cabin fits the decks exactly, the frame parts 58 are cut from 8 x 5 mm plywood strips, primed and inserted according to the photo. Here, too, the bend "K" must be observed, as with the deck girders (42). The slats must be sawed in accordingly. Glue the frame arch (59) into the arched front part of the cabin. Finally, adjust the short frame pieces (58) and glue them in place.



Then cut out the valve housings (57) according to the marking and cleanly grind the cut edges. Place the enclosures in the cabin according to plan, cut AA, detail X and glue together. Grind the recesses in the cabin flush with the inner surfaces of the valve housings.



If everything is well finished, the cabin can be pushed over the coaming with slight pressure. If necessary, minor reworking should be carried out now.

If the cabin is seated correctly, mark the position of the frame arch (59) on the inside of the front deck by transferring the inner contour of the frame to the front deck through the cabin ceiling.

Glue the holding block (60) to this mark according to the plan. This means that the cabin can no longer be moved backwards. Cut the 8 x 5 mm support strips (61) to length according to the plan, prime and glue them in place with acrylite according to the sectional drawing. Accordingly, the cross supports (62) must be cut from 5 x 8 plywood strips, fitted free of tension and glued in place, unless special functional installation is provided.

The ABS laser parts of the doors (63), (64) and (67) as well as the hatches (65) and (66) are machined and adapted to the intended positions. We recommend that all doors are not glued on until the body and the doors themselves have been individually painted.

At the end of this step, glue on the panels (68). The cabin roof (69) is cut out, neatly aligned and glued with acrylite at the edges of the cabin ceiling. Now the shell of the model is finished and.



It is recommended to make the other assemblies and the small parts of the boat, to adapt them to the body or hull and to drill the corresponding holes. However, do not install these parts firmly yet - this only happens after painting. In this way you save yourself the tedious task of masking before painting. Before painting, make sure that the masking films of the windows are pressed well on their edges again so that no paint can creep under them.

Anchor windlass:

The 3 winch housing parts (70) are detached from the laser plate and glued together (UHU hart). If necessary, re-drill the \varnothing 2 mm hole for the crank shaft (71) and the \varnothing 2.5 mm hole for the one sleeve 72. Cleanly sand and prime the part. After the base plate (73) has been glued on, paint the finished housing.

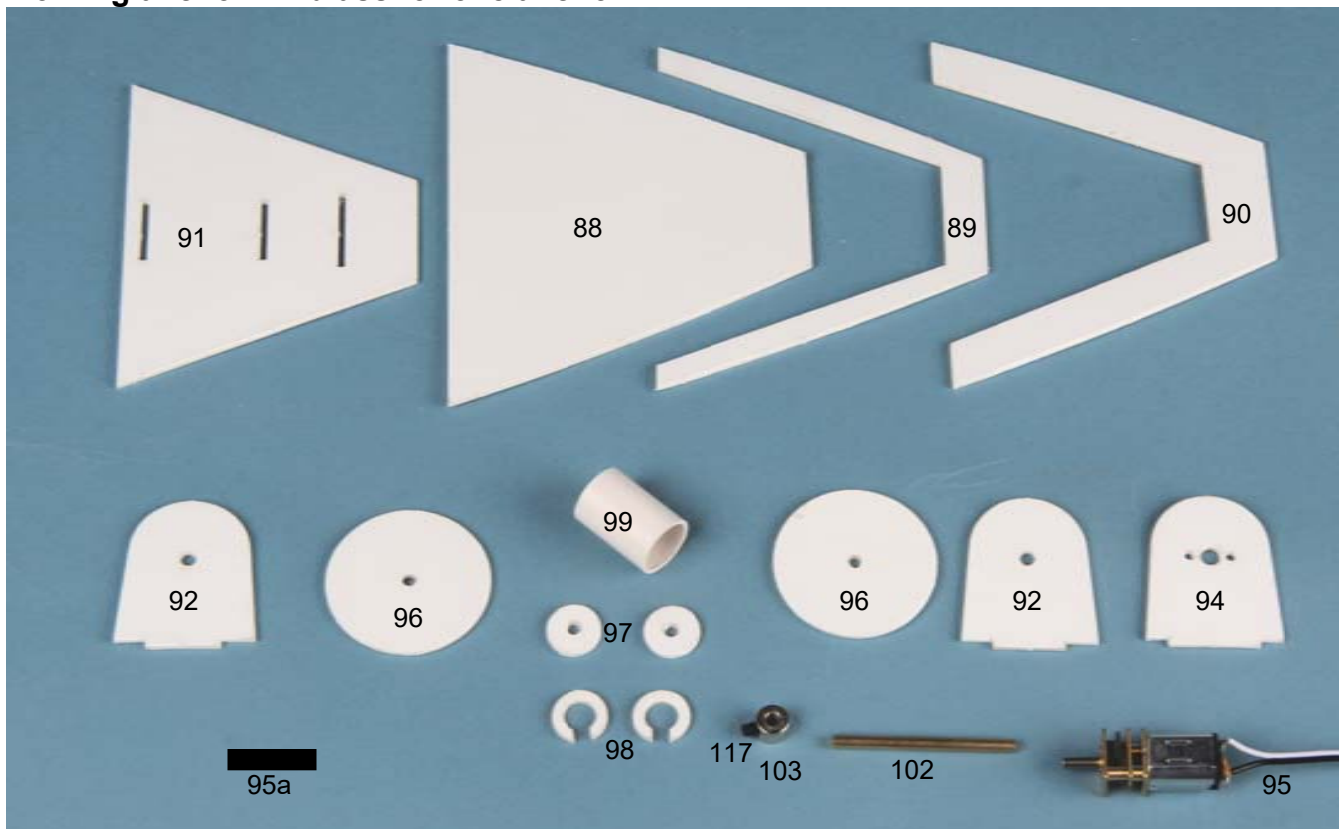
Now bend the 3 cranks (74) according to the drawing, solder or glue them to the handles (75) and insert them into the axles (71) and (76). Solder the second sleeve (72) to the axle (76). Glue the chain wheel (77) to the axle (78) and fit a washer (79). Insert the sleeve (72) into the winch housing (70), push through the chain wheel with axle, push on the second washer (79) and glue on the capstan head (80). The unit must rotate easily inside the housing. Then fit the pre-assembled crank axles (71) and (76) and insert the gear knob (81).

Drill \varnothing 3 mm for the chain links (82) according to the plan and glue on the rivet. Now remove the chain stoppers (83). First drill the holes in the longitudinal direction \varnothing 3 mm, then drill the \varnothing 2 mm cross hole for the crank. Fit the cranks (84) with 2 sleeves (75) each and slide them into the right and left chain stoppers. Glue under the 4 x 4 mm ABS underlay (85) according to the detailed drawing. The slope to the deck and the positioning are adjusted so that the anchor chains can be guided in a straight line from the sprocket and capstan head through the chain stoppers to the anchor tubes (55).

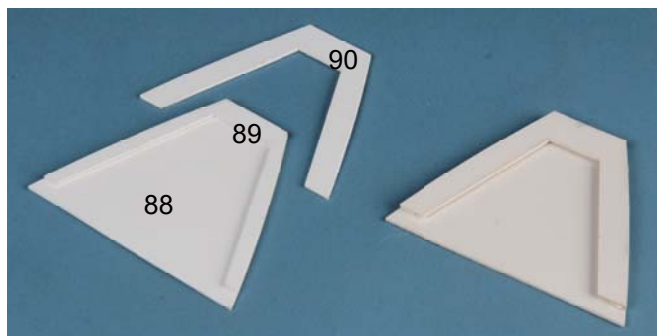
If the windlass is to be dismantled, the following section must be followed.

In the other case now provide the two anchors (86) with 100 mm chain (87) each, pull them in as planned and glue them in the chain pins 82 (UHU hart).

Working anchor windlass for one anchor



In order to avoid entangling of both anchor chains in later functional operation, it is recommended to make only one anchor functional.



The right anchor is shown functional in the plan. In this case, the left anchor must be shut down.

Glue the lasered base plate (88) to the lower frame (89) and the upper frame (90) according to the plan. Finish the base plate (91) so that it can be easily inserted into the frame. Glue the bearing blocks (92) with reinforcement strips (93) into the shorter slots of the base plate. Glue the motor stand (94) with reinforcement strip (93) into the

larger slot.

Suppress the gear motor (95) (reduction 400:1) and solder about 300 mm of cable.

Then screw the motor (95) to the motor stand using M 1.6 screws.

Ream the washers (96) and (97) with \varnothing 3 mm. Place one large and one small disc each on the \varnothing 3 mm axle (102) and glue them together to form stepped discs. Glue the driver plate (98) twice to one disc on the small disc (97). Drill 3 mm \varnothing into the plastic tube (99) for the threaded pin of the adjusting ring (101) and 1.5 mm \varnothing for the split pin (100), insert the split pin (100), shortened to about 10 mm, bend it apart inside and glue it together.



Now glue the step pulleys with inserted adjusting ring (103) and the tube at right angles to the drum.

Then mount the unit with the \varnothing 3 mm brass axis (102) between the base plates (92). Cleanly align the winch unit, check that it runs smoothly and connect the motor support to the geared motor (95) and coupling hose (95a).

(Disassembly: Loosen the adjusting ring, pull out the shaft (102) and remove it from the motor).

The sash fastener (104) with the \varnothing 2.2 x 6.5 mm, self-tapping screw (105) is fitted in the reinforcement strip (93) for securing. A corresponding slot is provided in the base plate (88). The winch is now complete and can be installed in the fuselage. It is recommended that the base plate with the frame is glued in on its own (acrylite) and the winch is inserted later. Separate 10 cm from the chain for the fixed anchor side. Thread the long chain piece on the functional side according to the plan and fasten it to the anchor and winch.

The electrical connection to the RC system is made later.

Notes on fire-fighting monitors.

Assembling the monitors is not particularly difficult, but since they cannot be retrofitted for special functions, it should be determined beforehand which of the possible functions are to be carried out.

It is shown and described:

Function 1: Proportionally controlled, horizontal pivoting with the aid of a normal servo
(pivoting range of the monitors: 270°)

Function 2: Proportionally controlled lifting and lowering of the extinguishing pipes with another, normal servo.

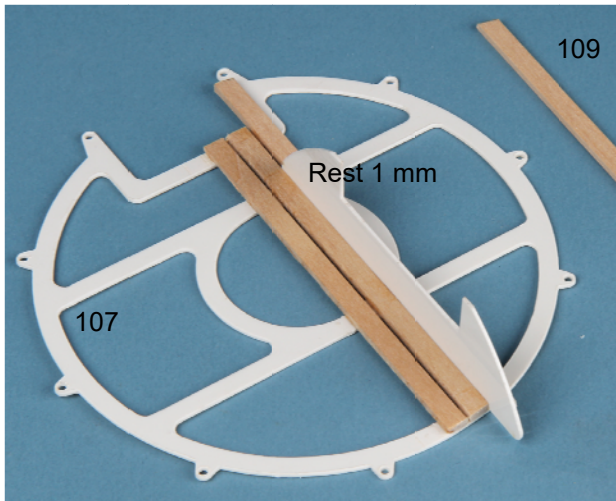
Function 3: Connecting an extinguishing water pump.

It is recommended to paint the handwheels and straightening levers before assembling. The instructions and the plan explain the fully equipped monitors.

Monitor A

At the beginning the grating for all three monitors are built and painted together. Remove the grating frames (106) for monitor "A", (107) for monitor "B" and (108) for monitor "C" from the laser parts and grind them cleanly. Paint the part (106) red, the parts (107) and (108) beige. The frames contain markings for the position of the innermost strips.

The 1.5 x 5 mm linden strips (109) are first primed twice.



Then cut the strips roughly to length according to the photo and glue them to the grating frames. To achieve an even distance between the strips, hold a 1 mm thick ABS waste piece in between. Cut and grind the strip ends on the outer contour and the inner, round opening.

The gangway is made from the same slats (109) according to the plan.

In the case of grating "A" (106), recesses must be provided for the fastening screws (110) at the points shown in the plan.

Rotate the lasered lid (52) on the forebody so that the deck structure (tulle) matches the structure on the lid. Now align the grating "A" according to the plan straight and in the middle. Glue the lid and grating together. For secure fastening of the cover and the later mounted monitor, the entire assembly is fastened with the 3 self-tapping screws (110). For this purpose, the lid and deck are drilled together with \varnothing 1.5 mm. Then drill out the cover with \varnothing 2.5 mm. Insert the bearing bushing (Mo1) into the \varnothing 15 mm opening in the cover which has been removed from the deck from below as centring. Glue the housing (Mo3) to the base (Mo2). Place the foot on the cover and align it so that the housing (Mo3) points exactly in the direction of the grating. (see map and photo).

Then mark the 3 holes of the foot on the cover and drill \varnothing 2 mm. If the monitor "A" is to be pivoted, the base (Mo2) is now screwed to the cover with M 2 x 10 brass screws (111) and M2 nuts (112). (If the monitor "A" is to remain rigid, then drill out the bearing bushing (Mo1) (A 2 mm) under the ceiling! and screw it together with the foot).

Now solder the guide tube (Mo5) on top into the monitor shaft (Mo4) (for monitor "A" 120 mm long) so that it protrudes about 5 mm from the shaft. Cut off the bottom Mo5 flush, but do not solder it. Cleanly deburr the \varnothing 1 mm tube so that the fine hole at the edge is nicely smooth. (Later, a nylon thread is passed through this tube, which should not rub through!)

Now place the rotary head (Mo6) on the shaft (Mo4) so that the thin tube (Mo5) lies laterally left in the \varnothing 7 mm hole of the rotary head. Glue shaft and head together with superglue.

The pipe holders (Mo7) are to be glued cleanly and precisely with superglue. The seams must be sealed, as the extinguishing water pressure is applied to them later. Insert the foam pipe (Mo8), the extinguishing pipe (Mo9) made of aluminium pipe, the spray nozzle (Mo10) and glue (superglue). Place the pipe bends (Mo11) in the rotary head and in the pipe holder so that the thin tube (Mo5) is on the left in the direction of injection.

Adjust the parts so that they can be easily moved up and down, and then glue the pipe holder and pipe bend together with a small drop of superglue. Check again for ease of movement. Now insert the two outriggers (Mo12) into the slots of the rotary head, align them at an angle to the rear and glue them together. Finally, glue on the varnished straightening lever (Mo13).

Insert the spiral spring (Mo14) (\varnothing 3.2 x 60 mm) into the silicone hose (Mo15), which is about 300 mm long for monitor "A", and place the hose on the connection nipple of the pipe holder. Secure the hose against slipping with a drop of superglue and then pull it into the monitor shaft.

A piece of wire that is bent into a small hook at the end is recommended as an aid for pulling in. Hang the hook into the end of the hose and pull in the hose. By slightly stretching the hose diameter decreases and fits easily into the \varnothing 7 mm tube.

Cut off the end of the hose so that the hole in the front of the hose does not leak.

The spring in the hose prevents it from buckling. Check easy movement of the entire extinguishing head, as

well as the tightness of the water-carrying parts. Screw the M 2 x 4 screws Mo16 into the outriggers. The transverse bearing (Mo17) from the Ø 2.5 x 8 mm brass sleeve is drilled through Ø 1.5 mm transversely. Now cut the setting lever (Mo18) from Ø1 mm brass wire to 90 mm and form the hook according to plan.

Hook the setting lever onto the knee of the pipe support (Mo7) and fit the cross bearing and pipe rivet (Mo19). Then hang the cross bearings between the outriggers.

Bend the rear eye of the tension spring (Mo20) so that it can be pushed over the setting lever (Mo18) as shown in the drawing, hang the front eye in the hook of (Mo18).

When in perfect working order, the quenching head always lifts to the position of the highest pipe elevation.

Drill the Ø 7 mm handwheel (Mo21) in the middle Ø 1 mm and slide it onto the end of the setting lever. If the height adjustment is to work, the Ø 0.25 mm Perlon thread (Mo22) (500 mm long) is clamped with the small handwheel and threaded through the thin brass tube (Mo5). Now swivel the erase head to the lowest position and advance the handwheel (Mo21) to the rivet (Mo19).

Shorten the protruding setting lever. The erase head "A" can now be checked manually for all movement functions.

The handwheel (Mo23) as well as the valve lever (Mo24) will be used later.

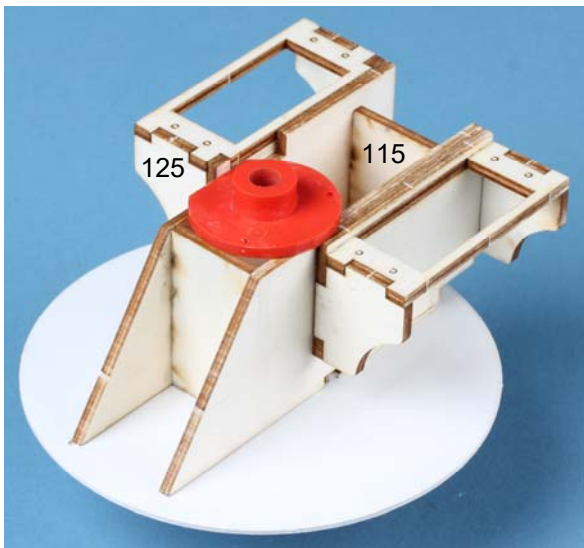
Make sure that everything can be moved easily.

The extinguish heads for the monitors "B" and "C" are assembled in the same way. Only the lengths of the following parts must be observed:

Monitor shaft B (Mo4) = 175 mm long Guide tube B (Mo5) = 180 mm long

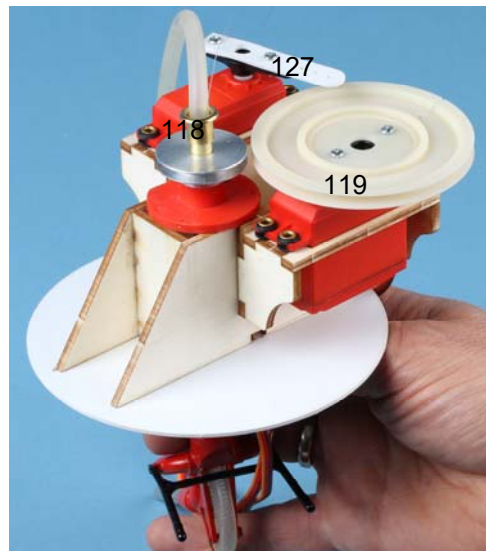
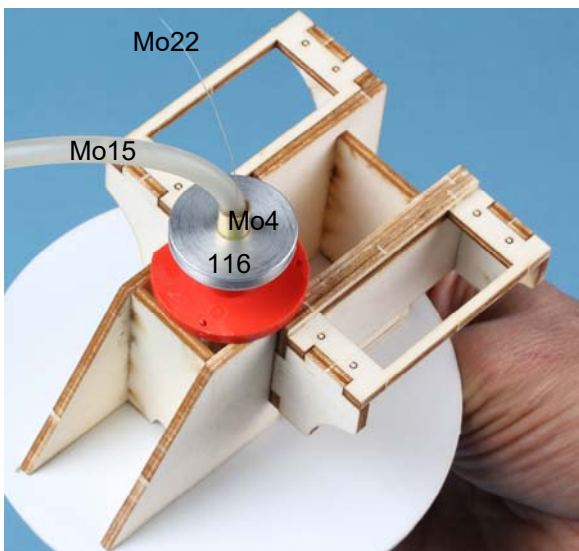
Monitor shaft C (Mo4) = 125 mm long Guide tube C (Mo5) = 130 mm long

Function upgrade for monitor A



Detach and assemble the two servo mounts (113) for the swivel servo and (114) for the lift servo and the spacer plates (115). According to plan, glue parts 113-115 on a flat surface to a right-angled frame (UHU hard). Glue the servo frames 120 and 125 together from their respective parts a, b and c according to the illustration and glue them flush with the upper edge to the plates (113) and (114).

Insert the erasing head "A" into the foot Mo2 on the cover 52 and align the primed frame with bearing bush Mo1 according to the monitor shaft Mo4.



Glue the bearing bushes and frame (superglue) so that the extinguishing head "A" can be turned easily. Make sure that the frame is about 10 mm from the front and rear edges of the cover (52) (drawing). Sand the bearing bush laterally flush with the servo plates (113) and (114).

Now fix the Ø 28 mm belt pulley (116) with the M 3 x 6 grub screw (117) on the pipe (Mo4). Fit the tubular rivet (118) and secure with a drop of "UHU hard". The purpose of the tubular rivet is to protect the nylon cord at the deflection from chafing.

The control disc (servo disc) supplied with the servos is now screwed twice to the large Ø 68 mm belt pulley (119) (M 2 x 6 screw (213) and M 2 nut (112)).

Mount the swivel servo (121) in the holder (120) according to the plan and photos and fit the disc (119).

The unit should be positioned (plan + photos) so that the pulleys are at one height and at least 5mm apart.

Now loop the belt pulleys with the cord (123) once or twice according to the extra illustration and knot the tension spring (124) between them with little tension. Set the servo and erase head to neutral and push the spring to the position indicated on the plan. The monitor A is now ready for horizontal swivelling.

Mount the lift servo (126) in the holder (125). Fasten the perforated, one-sided lifting lever made of ABS (127) to the servo disc with a screw (128). The lever (127) is set later. The unit according to the plan and photos should be aligned so that the lever is at the same height as the edge of the tubular rivet (118). Fix the holder and fasten it with self-tapping screws (122). Move the lift servo with the RC system to the position in which the highest pipe elevation of the monitor "A" is to be achieved. Insert the Perlon thread Mo22 into the inner hole Ø 1 mm (small stroke) of the lifting lever and fix it with the clamping screw (129) with U-disc (130). Now move the servo in the opposite direction to the stop and check whether the erase head has reached the lowest point.

Insert the complete monitor "A" assembly in the boat, screw on the cover and check its function with transmitter and receiver. The final connection is made later, as is the connection to the pump.

Monitors B and C:

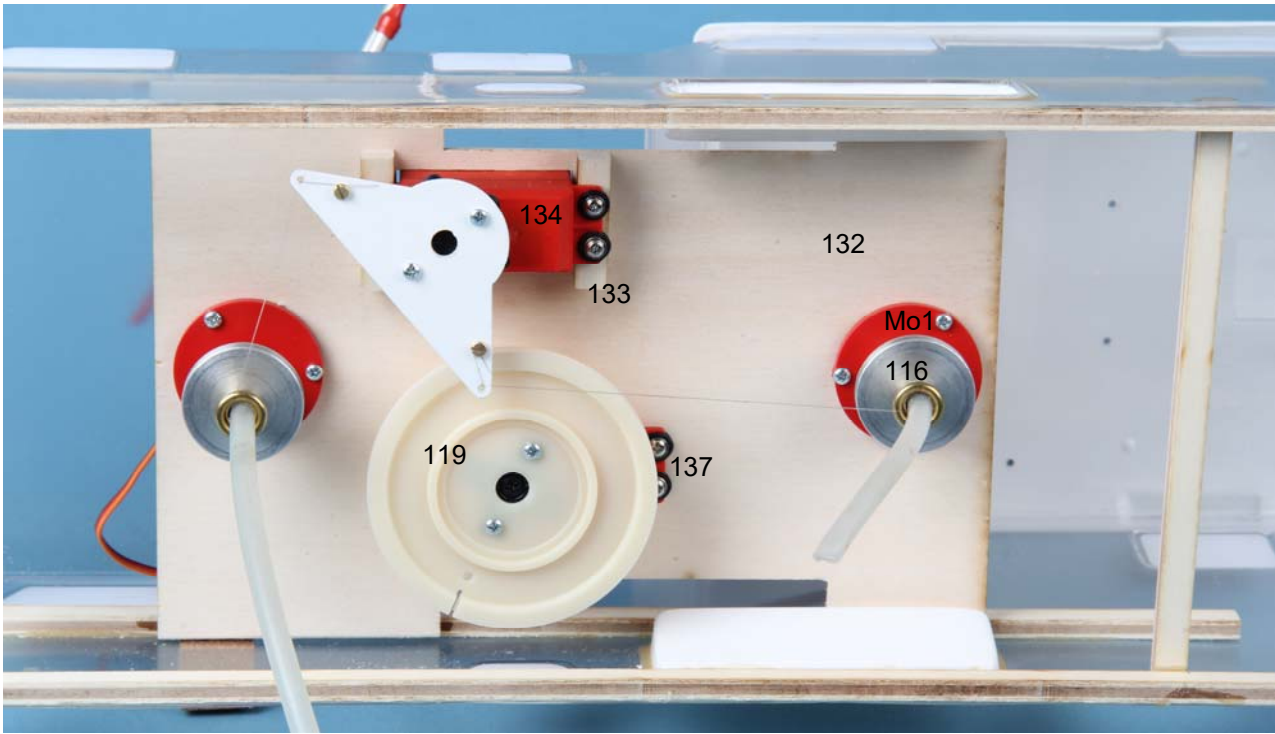
After the monitor "A" is ready for use, the two monitors "B" and "C" are now mounted on the cabin 56, which is ready for use. They are removed again later, before painting the cabin. The ABS disc (131) (Ø 48 mm) is cut out. Under the prefabricated grating "B" (107) the red lacquered disc is aligned and glued. Center the foot (Mo2) with the aid of the bearing bush (Mo1), align it as shown on the grating and drill Ø 2 mm through the washer (131). Align the grating "B" on the roof of the cabin exactly, drill the Ø 2 mm holes. In the middle of the Ø 15 mm hole (part 131) drill through the roof step by step to Ø 8 - 10 mm. Screw on foot and grating "B". (screws (111) and nuts (112))) Drill into the centre of the platform for monitor "C" Ø 8 - 10 mm in steps.

The foot "C" is aligned in its position and bolted as for "B".

Then remove the servo plate (132). The recesses for the servos may need to be widened so that the intended steering gear with the output is at the marked point on the plate. (The distances between the moving parts and the sides of the cab must be sufficiently large).

Double up the plywood spacer blocks (133) 5x8 mm to obtain a height of 10 mm. Glue these for the lift servo (134) and prime the whole plate (132). Insert the plate into the cabin, push it backwards and align it with the monitor shafts "B" and "C" (Mo4) so that they are approximately in the middle of the corresponding recess. Fix the plate with acrylite. Then place the bearing flanges Mo1 (Ø 2.5 mm boring) on the pipes Mo4 and align them so that the extinguishing heads "B" and "C" are very easy to turn. Fix with superglue and fasten the flanges with the screws (135).

To prevent the monitors from moving upwards, they are secured with the 15/7 adjusting ring (136) and the M 3 x 6 grub screw (117). Now the lift servo (134) and the swivel servo (137) can be inserted and screwed in. (8 pcs. Ø 2.9 x 6.5 self-tapping screws (122)). Mount the pulley Ø 68 mm (119) as for monitor "A" and place it on the swivel servo. Align the Ø 28 mm belt pulleys and screw them together. (grub screw 117) . Finally, attach the scale cord with spring (124) according to the construction plan. (See figure on plan 2: One or two full surrounds on all discs!



Set the extinguishing heads "B" and "C" so that the servo swivels them evenly and together to the left and right.

Place the lift lever (138) on the servo disk of the lift servo (134) and screw in the clamping screws $\text{\O} 2.2 \times 6.5$ mm (129) with washers (130). Attach the tube rivets $\text{\O} 8 \times 8$ (118) to the monitor shafts (Mo4) so that the nylon thread (Mo22) does not rub against the tubes. Then thread the yarn from both monitors according to the drawing in the lever, the extinguishing heads are in the highest position and move the servo to the corresponding position. Carefully clamp the nylon threads and move the servo to the "low" position, observing the erasing heads. When correctly arranged, the pipes swivel together from the highest to the lowest position. If everything works, the lifting lever and servo disk are glued and secured with the fourth screw (129). The monitors "B" and "C" can also be moved.

The connection to the pump is made later.

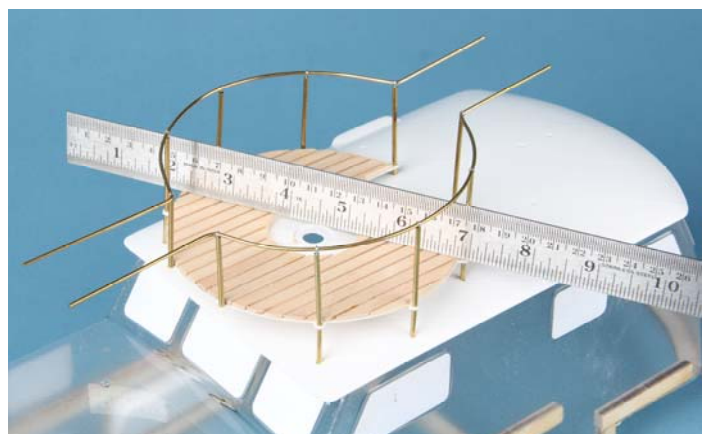
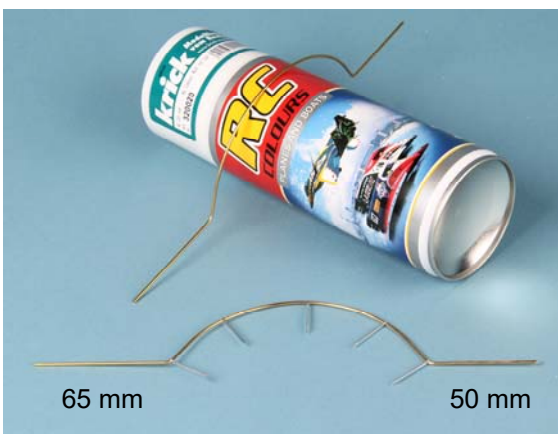
Now completely disassemble the monitors "B" and "C" so that they are not damaged during further assembly. The grating "B" is screwed back onto the cabin to prepare the circular handrail.

Handrails and cabin rails

If necessary, the retaining straps on the grating "B" are drilled out to $\text{\O} 2$ mm.

Now drill carefully, exactly vertically, into the cabin roof. The supports (139) are first sawn off from $\text{\O} 2$ mm brass-tube with overlength. Then insert the supports into the grating and roof.

To make the grating even, it is aligned as shown in the photo, using a ruler. Now adjust all supports to a height of 33 mm (height corresponds to the inserted railing support). Do not stick supports together.



Cut the 2 handrails (140) to 350 mm length and then bend them in one plane according to the photo (I.).

Wire bent around a core with \varnothing 65 mm (e.g. spray can), gives the desired \varnothing 125 mm. Thread the 5 pins (141) onto each handrail and insert them into the supports 139.

The handrail is carefully aligned and everything is soldered (II.)

Only then bend the two 50 mm (to the front) and 65 mm (to the rear) long ends into the final shape. (III.)

Carefully remove the handrails and grating "B" and reassemble and glue them only after painting.

The rear handrail (142) on the monitor "C" is manufactured as described. (plan and photo 20).

The assembly of the side railing at monitor "C" can be seen from the plan and the following view photos. Drill out the 8 rail supports (143) in the upper ball \varnothing 1.6 mm.

Drill the \varnothing 1.2 mm holes in the cabin and insert the railing supports. Cut the lower rail draw 144 from \varnothing 0.7 mm brass wire, insert it into the supports and insert it into a corresponding hole in the front of the superstructure. Carefully solder the tension and supports or glue them together with superglue. The upper rail tension (145) is bent from \varnothing 1.5 mm brass wire according to plan, inserted into the supports and into the superstructure and soldered to the supports. Remove railing parts for painting.

The handrails running around the cabin are manufactured as follows: The handrail (146) is bent from \varnothing 1.5 mm brass wire. Slide on pins (141) and attach spacer sleeves 147 (\varnothing 2 x 3). Angle and solder splints according to plan, mark and drill \varnothing 1 mm holes in the cabin. Check the exact fit of the handrail.

Align the handrails (148) left and right in height according to the connection of the front part (146) and fit them together as described above. One sleeve (147) each serves as connecting part between the handrails (146) and (148).

(plan and photo). The other handrails (149) (left and right) and (150) are manufactured as described.

Remove all handrails for painting. Bend the door handles (151), the step bars (152), the handles (153) and the handle bars (154) from \varnothing 1 mm brass wire, drill holes in the cabin and put them on a piece of balsa wood for painting.

Some of these wire parts are only needed later.





Mast:

The two halves of the mast (155) are glued together and sanded down according to plan. A fine groove can be worked into the back, in which the cables for the lamps are later laid. Prime the wooden pole. Cut out the base frame (156), the small lamp shelf (157) and the large lamp shelf (158), as well as the antenna holder (159).

Bend the antenna wire (160) from \varnothing 1.5 mm brass wire. Place the parts (158), (159) and (160) on a plastic foil and glue according to plan (superglue). Adjust and glue the base frame and the lamp shelves to the mast. Drill the \varnothing 3.5 mm hole for the blue light base (161) at the top of the mast and insert the base. The complete mast is now aligned on the cabin roof and installed with 2 screws \varnothing 2.2 x 6.5 mm (110) according to the plan. Prepare bulb (162). If necessary, extend the connecting wires in the visible area with appropriately cut twin wires (163) (cross-section 2 x 0.07 mm²). Insulate the bare wires and solder joints with paint or heat-shrink tubing. Insert the bulbs (162) for blue light (164) and position lamps (165) on the mast and secure with UHU hard adhesive. The blue light is later connected to the turn signal or speed camera electronic module (166) in the cabin. Here it is recommended to solder a BEC socket with cable to the wires \varnothing 0.07 mm², which can then be plugged directly into the module (166).

Only the lamps that are to light together should switch in parallel and later wire them in the cabin with the other lamps.

If the cables are neatly laid and glued to the rear edge of the mast, the light bulbs are covered with adhesive tape; the mast is painted. Solder the FM antenna made of brass wire \varnothing 1 x 50 mm and the tubular rivet (167) together. Stick the lamps and the VHF antenna to the completed mast.

Typhon, headlight, loudspeaker

For the typhon (168), the base (169) is formed from a plywood block so that the bell stands horizontally. Glue the pedestal to the cabin roof, glue on the typhon later

Headlights and loudspeakers are mounted in one unit and can be swivelled horizontally. Insert a 6 V precision lamp (162) into the headlamp. The loudspeaker holder (171) is drilled through \varnothing 2.5 mm, the headlight housing \varnothing 1.8 mm. The parts are screwed together with the sheet-metal screw (172) (\varnothing 2.2 x 6.5 mm).

Insert the speaker (173) into the eyelet of the holder and glue it together. Insert into the headlight holder (174) swivel axis (175) and glue together. Guide the lamp connection downwards through the axle. At the appropriate point, drill through the cabin roof and ceiling vertically \varnothing 3 mm and insert the unit with spacer (82). The loudspeaker/headlight unit is pivoted using an eccentric. Fit the eccentric lever (176) with 7/3 adjusting ring (177) and grub screw (M 3 x 6) (117). Cut the lever according to plan and fasten an M 2 x 10 bearing screw (128) with nut (112) in the central bore. Place the lever on the swivel axis and tighten slightly. The 1000:1 crimped, interference suppressed micro geared motor (178) with approx. 300 mm cable is screwed onto the ABS motor plate (179) with M 1.6 screws. Screw the plate onto the 5 x 15 x 20 mm bearing

blocks (180) using two \varnothing 2.2 x 6.5 mm self-tapping screws (129). Glue the whole unit under the cabin ceiling according to the plan. Now measure the distance between swivel axis and motor shaft. The eccentric rod (181) made of brass tube and 2 eye bolts (182) must be adjusted to this length and soldered. Drill the eye bolts (182) to \varnothing 2 mm and flatten the thickening. The actuator lever is soldered together from a 7/3 adjusting ring (183) with M 3 x 3 grub screw (101), an eye bolt (102) and an M 2 x 10 screw (128) according to drawing. It is recommended to file a small groove into the adjusting ring, then the eye bolt can be soldered better. The screw head must also be soldered. Now place the drive lever on the motor in such a way that the grub screw engages in the flattening of the motor shaft. Hook the eccentric rod (181) onto the drive lever and eccentric lever and lock with 2 nuts (112) each so that everything moves easily. Remove the loudspeaker/headlamp unit until after painting has been completed.

Radar

For the device shaft (184) made of \varnothing 8 mm brass pipe, drill a corresponding hole vertically through the cabin roof and ceiling and insert the shaft. Then screw the 6 V micro geared motor (185) (400:1) onto the motor plate (186) as already described. Glue two 8 x 5 x 35 plywood blocks (187) on top of each other, screw to part (186). Glue the interference suppressed and cabled complete unit to the ceiling exactly in the middle under the device shaft. As coupling (188), between motor and radar shaft (189) (\varnothing 2 mm brass-wire) serves a piece of rubber hose. Cut the shaft to excess length, slide on the hose and place it on the motor shaft. Mark the shaft about 5 mm above the upper edge of the finished tool shank, remove and saw off. The radar head from the pipe section (190) and the laser parts (190a + 190b + 190c + 190b). If necessary, drill out the radar head a little so that the 2 mm shaft can rotate freely.

The radar reflector 191 is filed, ground and painted according to plan and provided with a bore for the shaft. Then stick to the shaft. After painting the cabin, place the entire radar unit on the motor shaft and it is ready for operation.

Lamps

Assemble the left and right lamp board from the laser parts (192a + 192b + 192c) in mirror image (one right and one left) and stick it onto the shaped platforms of the roof. Solder the tail light (193) to the curved and \varnothing 2.5 mm drilled holder (194) and fix it to the cabin after painting with a \varnothing 2.2 x 6.5 tapping screw (110). Also fit the bow light (195) with holder (194) and prepare it for later gluing to the flag pole holder (221). The last lighting unit to be fitted is the anchor light (196) with a light bulb (162) and attached to the \varnothing 4 mm lamp holder (197). Drill the corresponding \varnothing 4 mm hole in the roof and cabin ceiling.

Ventilators

In the next section, the ventilators are prepared and assembled. They are also painted separately and later glued to the cabin. For the air scoops (198), drill the \varnothing 8 mm holes in the side lights. The hats are later put through the roof so that they stand on the ceiling of the cabin. Glue the shaft (200) (round wood) into each disk ventilator (199). Drill into the cabin of the \varnothing 12 mm hole step by step. The ball ventilator (201) is glued to the \varnothing 8 x 85 mm fan tube (202). It is recommended to glue a small plywood board under the cabin ceiling as reinforcement.

The mushroom ventilator 203 is composed of the discs and rings (203a + 203b + 203c + 203c+ 203c) and sanded clean on the outside. Glue to a piece of round wood \varnothing 8 mm.

The \varnothing 7 x \varnothing 5 x 45 mm plastic pipes 205 are attached to the suction fans 204, glued and ground. Here, too, a reinforcement board is recommended.

Towing gear

The towing gear is assembled according to the extra drawing. The steel wire (206) is to be bent like a "V". Hook the longer leg of the spring into the bolt (207). Insert the unit into the swivel arm (208) using the M 2 x 6 screw. Sand the hook (209) laterally so narrow that it does not get caught on the spring. Fix the hook easily with the 2nd screw. Insert the towing gear with bearing pin (210) and washer (211) (\varnothing 6.3 x \varnothing 2.6 mm) into the corresponding bearing ring on the cab and tighten with nut (212) (M 2.5). Test full mobility. The towing hook is triggered by the lifting servo of the monitors B and C. When the two monitors are in the highest position, the tow hook opens when the trim is switched on at the transmitter.

The nylon cord (238) is guided to the lifting lever by the latch (207) of the towing gear. Set the cord length so that the release functions as described above.

Finishing work on the cabin.

Solder the whip antenna (214) made of \varnothing 0.8 mm steel wire with 5 brass sleeves (75) (\varnothing 2 x 8 mm) and insert another sleeve \varnothing 2 x 3 mm (147). As base (215) the \varnothing 2 x 12 mm tubular rivet is soldered with 2 split

pins (100) and 2 sleeves \varnothing 2.5 x 3 mm (147). A wooden block glued behind the antenna ensures that it is fixed later. Drill holes \varnothing 1.5 mm for cotter pins (100). The ship's bell (216) is fixed as a holder (217) with a piece of \varnothing 1 mm brass wire. The three flag poles (218) are manufactured together. Remove the lengths from the plan and grind the beech bars upwards conically. An M 2 nut (112) is screwed on as knob. The line block (219) and cleat (220) are made from \varnothing 1 x 15 mm splints, which are shortened. Drill flag poles (218) according to plan with \varnothing 1 mm. \varnothing 4 x \varnothing 3.2 x 30 mm brass tubes are used as base (221) for the flag poles. The tubes are provided with a stopper (222) made of \varnothing 3 x 5 mm beech round rod to prevent the flag poles from slipping through. The base at the bow is provided with the prepared bow light (195). Pull in the cable for the bow light in the foredeck. The base on the right cabin wall is glued to the triangular piece (223) in the cabin. Cut a wedge of waste wood for the base at the rear and glue it in place. 2 mm \varnothing holes for the valve bodies (224) are drilled in the valve housings (57). The bodies are provided with a \varnothing 7 mm handwheel (225) and later glued in silver at the corresponding points. On the cabin windows you had attached an adhesive strip to protect against scratches. This will now be removed. The self-adhesive films for the windows are carefully applied, if not already done. Then finish the cabin. If the foils are then carefully removed, you will have clean window contours. Foil residues can be removed with alcohol if the paint has dried for several days.

You paint the components according to the carton image and then finish the cabin. Furthermore, it will be attached:

The \varnothing 10 mm hose connections (226) with outer ring (226a) and the C hose connections 227 (\varnothing 12 mm) as well as the door hinges (228) made of the \varnothing 1.5 x 8 mm brass pieces. Hang the lifebuoys (229) with corresponding hooks (151).

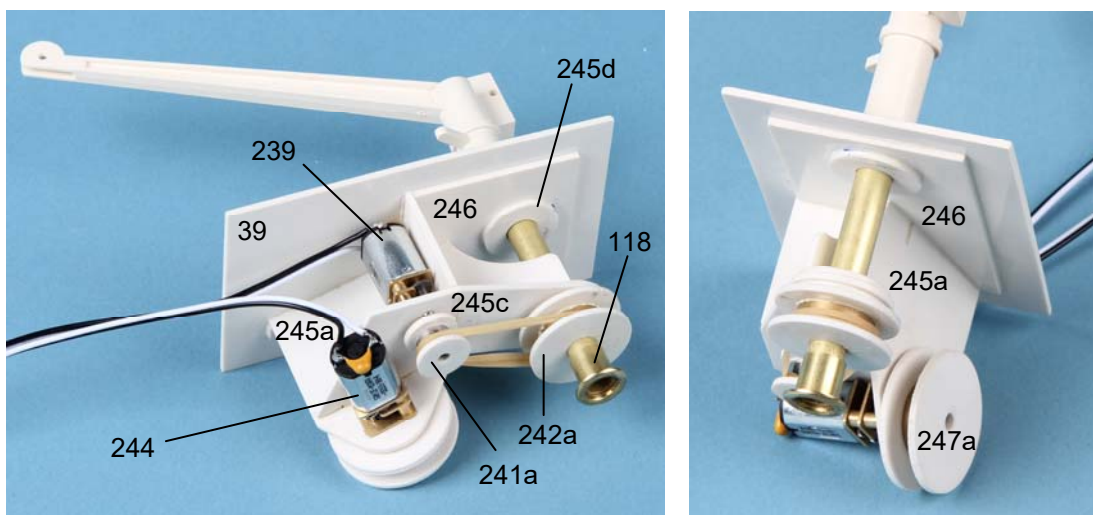
The 4 plywood hatches (230 - 233) with the lasered, matching lids (234-237) are manufactured according to the plan, painted and completed with the bent wire parts. Glue the finished hatches to the cabin or decks. Adjust the gangways (256), paint and glue cleanly.

Since all bulbs used have a voltage of 6 V, they are particularly easy to wire: They connect all lamps that are to burn together in parallel. See electrical circuit diagram.

The two lamps in the mast are already described as follows; now follow the red (port side) and green (starboard side) position light as well as the stern light. Later, the bow light is connected to this circuit. Insert and wire the bulb (162). After painting stick the position lamps (165) on the lamp shelves (192).

This completes the cabin. The electrical connections of the special functions will be discussed later.

Boat Crane



The entire "boat crane" assembly is mounted on the crane hatch 39. This makes it very easy to remove and maintain the entire mechanism. Assemble the crane in the order of BK numbers. Please note the following. The cover BK2 is removed from the laser board, fitted into outrigger BK1 and drilled through with \varnothing 2 mm. For the BK7 rivet eyelet, a 3 mm \varnothing hole must be drilled. Drill a 1 mm \varnothing hole for the locking pin BK11 - make sure that enough space remains for the roller BK9.

Place the flange BK14 and the base BK13 on the crane column BK12 and carefully glue the parts BK13 and the flanges BK14 on the outside with a little superglue. Then pull out the column and stick it in place. To

ensure sufficient ease of movement between crane column and base with flange, the bonded parts $\varnothing 7.1$ mm can be redrilled. Glue BK14 to plate 246 and hatch 39, then reassemble the crane on the unit.

The drives for swivelling the boom and lifting and lowering the hook are mounted on the underside of the hatch. Assemble the holding frame (245a + 245b + 245c) on plate 246 as shown and glue it together. The miniature geared motor (239) (1000:1) is interference suppressed and fitted with cables and inserted into (245c) from below and screwed together with the 1.6 x 5 mm screws.

Now manufacture the belt pulley from the adjusting ring (241) and the two pulleys (241a). This is mounted with the M 3 x 3 grub screw (101) on the flattened gear shaft.

Glue the $\varnothing 24$ mm belt pulley (242 + 242a) together and screw it to the BK12 crane column using an M 3 x 3 grub screw (101). Then carefully pull on the rubber ring (243) and place it twice over the unit so that the tension is strong enough. Then attach the $\varnothing 8$ x 8 mm tubular rivet (118) and lead the cord (238) for the crane hook (see exploded drawing). The 400:1 reduction gear motor (244) is interference suppressed.

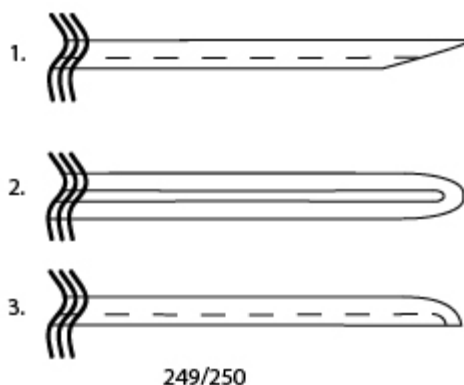
Tighten the motor to the frame using the M 1.6 screws. The cable drum is connected from the inner adjusting ring (248), the outer adjusting ring (247b) with grub screw (117) and the pulleys (247a) are mounted together. Drill a 1 mm \varnothing hole on the side. Tighten the grub screw (117) (M 3 x 6), which passes through the two adjusting rings on the flattened shaft of the motor (244).

Now knot the line (238) with crane hook (BK15) and rope drum. Check the functions of the boat crane. Fix the finished assembly to the deck with $\varnothing 2.2$ x 6.5 mm self-tapping screws 110.

Rubbing strakes

The skirting boards (249) and (250) are attached to the finished painted fuselage. The slat for the transom is fitted and glued in place. First cut the strips to length according to the plan and cut to mitre (Fig. 1). The open end is rounded off (Fig. 2). Glue onto auxiliary rubbing strake (3) with superglue (Fig. 3). If there are sharp edges on the transom, the rubber strip may have to be slightly cut in.

The rubbing strake (250) around the bow is 1 m long and should be glued evenly to the right and left starting at the bow. Processed and glued in the same way.



Deck Details

The prepared base (221) with the bow lantern is inserted and the bulb is connected. The handrails (251) on the forebody are made as described earlier. The connecting height results from the height of the handrail (146) on the cabin. Make the supports (252) from $\varnothing 2$ mm brass pipe and fix the handrail with $\varnothing 1$ x 16 mm split pins (141).

Place the 12 mm C-pipes (253) on the pipe supports (254). For the covers, first glue the larger cover (255a) and then the smaller one (255b) to the end of the pipe.

For the 10 spray heads of the self-protection sprinkling system, the spray tubes (257) are bent from $\varnothing 2$ mm brass wire, attached to the $\varnothing 6$ mm nozzle heads (258) and glued. Bend the protective hoops (259) made of $\varnothing 1.5$ mm brass wire according to the plan. Glue in the parts after drilling the holes. Bend the cable deflector (260) made of $\varnothing 2$ mm brass wire and the supports (261) made of $\varnothing 2$ mm brass pipe. Solder the parts with 2 split pins (141) and glue them in place according to plan. Construction of the railing on the main deck will begin with drilling the holes for the railing supports (262). Set up the supports. The lower rail (263) made of $\varnothing 0.8$ mm brass wire is drawn in continuously and inserted into the deck bulkhead (45).

Proceed in the same way with the upper tension (264) ($\varnothing 1$ mm brass wire).

Then solder the trains and the supports. In front of the double door (67) the lower tension between the supports is removed. The upper train is cut. From the resulting ends, bend very small hooks and hang in the chains (265); with the chain rail (266) on the transom, proceed accordingly. Secure the chain additionally to the supports (261) with very thin copper wire.

With the gluing in of the base (221) for the rear flag pole and the fixing of the bollards (267) the decks are finished.

Rowboat

The hull (286) is trimmed according to contour. Glue the keel bar (269) and the wedge (270) made of 1.5 mm ABS waste on the outside. Paint the inside and outside of the fuselage accordingly. Glue the floor gratings (271) made of 1.5 x 5 mm lime strips and prime well. Shorten the 3 pins (272) to 5 mm, fit each with a 50 mm carrying chain (273) and glue them into the grating. Glue in the painted benches (274) and (275). Then glue the gratings into the fuselage. The oarlocks (277) bent from splints are inserted into the rudder bench (276), provided with a \varnothing 2.0 x 3 mm sleeve (147) and finished bent. Then glue in the rudder bench. Bend the chain ring out of \varnothing 0.8 mm brass-wire and hang the carrying chains in such a way that the boat hangs horizontally. Also, the chain ring should be very short above the rowing bench. Sand down the oars (279) and glue on the blades (280). If the boat is to be launched, the installation of polystyrene floats under the benches (274) and (275) is recommended.

Finally, glue the two boat clamps (281) to the boat hatch and fasten them with \varnothing 2.2 x 6.5 mm self-tapping screws (110).

Lettering / Stickers

The letters are laser-cut from weatherproof adhesive foil. The brown border on the letters is normal and later no longer visible. First cut out the respective word and carefully remove the remains of the sticker around the letters from the carrier material. To keep the letters at the same distance when removing the backing material, first stick a strip of painter's masking tape over the letters from above. The letters do not have to be completely covered. It makes sense to leave the upper or lower edge free for exact positioning of the letters. Then carefully pull off the carrier material from below. Now you can apply the lettering to the intended position on the model. Finally, carefully remove the masking tape.

The fire-fighting boat "DÜSSELDORF" is now externally finished.

RC installation for driving operation

The placement of the individual RC parts may vary depending on the components used. The instructions of the individual devices must be strictly observed.

Two 6 V batteries (282) are required to power the traction motors. You can choose between different sizes. Two 6 V / 7 Ah batteries can be used as the smallest driving battery.

To achieve longer driving times we recommend the use of two 6V / 12 Ah batteries. The two 6V batteries are connected in series according to the circuit diagram so that the motors and the pump are operated with 12V. This equipment is shown on the map (282). A speed controller (283) with at least 40 A power is required for motor control. Our recommendation is the speed controller WP860 Dual. With this speed controller two motors can be connected at once ex works and additionally a BEC system with 5V / 2Ah for the power supply of rudder servo and receiver is integrated in the WP860. When operating the Düsseldorf without special functions, this power is sufficient and no extra receiver battery is required.

For the connection of the steering gear (26) and controller (283) to the receiver (284), as well as the connection of the receiver battery (285) and the switch cable (286) if necessary, refer to the operating manual of your remote control. The wiring of motors (18f), suppression filter (21) and controller (283) is shown in the circuit diagram and operating instructions. Wire the motors so that they rotate in opposite directions. The arrangement of the batteries and RC parts on the RC plate in the fuselage is optional. Ensure that all installation parts are reliably secured against slipping. The RC mounting plate consisting of parts 287a to 290 allows a wide range of possibilities.

RC intallation with all special functions

The instructions of the individual devices must be strictly observed. All functions are shown schematically in the enclosed circuit diagram.

For the fire-fighting boat "DÜSSELDORF" a Futaba F-14 8-channel system with multiswitch system is recommended. If all proposed special functions are installed, almost all possibilities of this remote control are used. Due to the many special functions, the installation of a separate receiver battery is recommended. First assemble the plywood housing for the RC system and batteries for the special functions. Glue the side panels (288) to the base plate (287a) so that the two lead batteries (289) (6 V / 1.3 Ah) can be easily inserted without slipping. Then place the RC plate 290 and glue it on. Select a suitable location for the speed controller and receiver and secure with double-sided adhesive tape. Optionally, mount a frame (291) made of pine strips 5 x 5 mm. Glue the tray (292) for the receiver battery (285) into the corresponding recess.

The following special functions are planned for Düsseldorf.

Special function	Required accessories
Turn extinguishing monitor A:	servo
Raise extinguishing monitor A:	Servo + transmitter extension channel 5 Prop. Module Slider
Lift extinguishing monitor B+C:	Servo
Turn extinguishing monitor B+C:	Servo + transmitter extension channel 6 Prop. Module Slider
Pump on/off:	Relay module ro8442 via decoder
Turn radar on/off:	Multiswitch Decoder ro8369 direct
Raising/lowering crane:	Transistor pole reversing module ro8249 via decoder
Turning the crane r/l:	Transistor pole reversing module ro8249 via decoder
Armature lift/lower:	Transistor pole reversal module ro8249 via decoder
Turn the headlights:	Multiswitch Decoder ro8369 direct
Position light r/l/m/v/h on/off:	Multiswitch Decoder ro8369 direct
Headlights on/off:	Multiswitch Decoder ro8369 direct
Anchor light on/off:	Multiswitch Decoder ro8369 direct
Drag light on/off:	Multiswitch Decoder ro8369 direct
Blue light flashes:	RC module flash + transmitter extension channel 8 3-position switching channel

The layout of the individual channels of an 8 channel receiver is as follows.

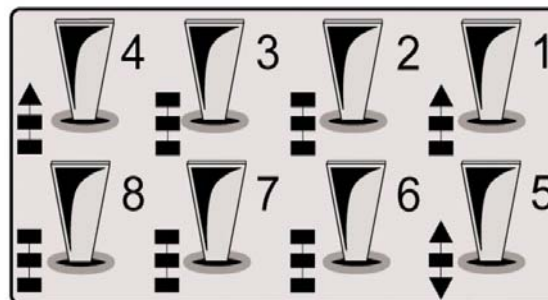
CH 1	Steering servo
CH 2	Speed controller
CH 3	Servo erase monitor A lift
CH 4	Servo extinguishing monitor B+C lifting + towing hook release
CH 5	Turn servo extinguishing monitor A
CH 6	Rotate servo extinguishing monitor B+C
CH 7	Multi Switch Decoder
CH 8/B	Flash module blue light
	Powerpack 4,8V/6V Receiver power supply 285 and switch cable 286 (V cable 79014 may be required.)

The assignment of the Multiswitch Decoder 16 Memory with the corresponding switches of the Multiswitch Module for the transmitter

Multiswitch Decoder 16 Memory ro8369
(Attention: Deactivate memory function)

Bat	6V power supply
K1	Pump (button) /free
K2	Lifting/lowering crane
K3	Turn crane right/left
K4	Turn headlight (button) / free
K5	Raise/lower anchor
K6	Radar rotate / free
K7	Position lights / Anchor light
K8	headlight / drag light

Multiswitch Modul for transmitter ro8084



All information on recommended accessories is based on the technical status as of summer 2018.

For mounting the relay module on the RC plate, 5 x 8 mm plywood strips (295) are glued on so that the relay can be fastened with 2 2.2 x 6.5 mm self-tapping screws (129).

The Multi-Switch Decoder (296) is attached with adhesive tape so that the plug strip remains freely accessible. The transistor pole reversing modules are fixed with double-sided adhesive tape. Wiring must be carried out in such a way that all cables of the modules installed in the cabin structure can be separated from the RC plate by reverse polarity protected plug connections. It is also recommended that the plugs for the receiver and the sockets for the decoders are provided with small flags and labeled with the insertion position.

Before inserting the RC unit into the boat, glue in the frame parts (302) and (303) for holding the drive batteries. If you use the proposed two batteries (282) 6 V / 12 Ah, take the installation dimensions directly from the plan. If you use other batteries, move them in such a way that the water position of the boat is maintained. Adapt the transverse strip (302) to the fuselage cross-section and glue it in place with acrylic glue so that the battery is close to the motors. Adjust and glue in the longitudinal strips (303) so that the batteries are to the right and left of the keel. The sockets for connecting the cables are facing each other. (Remove the drive batteries). Insert the complete RC unit into the boat and glue it together.

Now the final lengths of all cable connections can be determined and the corresponding connectors for connection to multiswitch decoders (servo cables) or transistor pole reversal modules (BEC socket) can be soldered. Do not dimension the cables too tightly, so that there is always some room for manoeuvre. This applies in particular to the cable connections to the cabin. They must be long enough to allow the cabin to be removed. All cable connections must be easily detachable when the cabin is removed. The servo connections for monitors B and C must be disconnected directly at the receiver. Appropriate extension cables for the servos must be provided.

An installation option for the receiver switch (286) including an extension for actuation when the cabin is mounted is shown in the plan.

The sleeve (72) is pushed onto the operating lever (308) (Ø 2mm brass wire). Bend wire according to plan and hang it in the hole of the receiver switch. Glue the sleeve to the deck. A corresponding recess in the cabin must be provided for the operating lever. This means that the RC system can be switched on and off without having to remove the cabin.

The antenna line of the receiver must be laid according to the respective description of the receiver.

Connecting the pump

Pull the sealing plug (24) out of the suction pipe (23). The Ø 8 mm suction hose (309) is pushed onto the suction connection "B" of the pump. The length must be dimensioned so that it can be guided to the suction pipe without kinks. Slide the hose at least 15 mm over the suction tube to prevent it from slipping off later. Sliding on is easier if the connection is slightly moistened beforehand. Now push the pressure hose (310) onto the pump connection "D". Cut the hose to approx. 600 mm. Connect the pressure hose (310) and hose (Mo15) of the monitor "A" using the adapter (311). (If necessary, the hose Mo15 can be pushed off the intermediate piece).

Connect the hoses Ø 5.5 mm of the monitors "B" and "C" to the Y-piece (312). The T-piece (313) is inserted into the cut pressure hose (310) at a suitable position. Insert the connecting hose (314) between the T-piece and the Y-piece. The length of the hose (314) must be such that the cabin can be removed perfectly. The T-piece must be fixed below the deck with double-sided adhesive tape in such a way that all hoses (when the cabin is attached) are free of kinks.

To avoid unintentional slipping of the hoses during operation, it is recommended to wrap them with rigging yarn at each connection. The ends of the tensioned yarn are knotted. The work on the model is finished with the flags (315) and (316) and the self-adhesive lettering (317).

Functional checks

For the final inspection before the maiden voyage, all charged batteries must be inserted and connected. The fully equipped boat is placed in the bathtub. Check that the boat dives to the waterline and does not warp. Necessary corrections are to be made by moving the batteries or by adding lead.

Observe after some time (approx. 1/2 h) whether water penetrates into the boat at any place. Any leaks must be eliminated. In turn, check each function of your model with the remote control on.

Attention:

Hold the boat firmly in the tub before slowly starting up the traction motors.

If the motors turn upside down, the motor cables must be reconnected directly to the controller. The fire pump should not be tested in the home. Now nothing more stands between the maiden voyage of your fire-fighting boat "DÜSSELDORF". Romarin wishes you a pleasant sailing

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
A	Stand side panel	plywood	5	2	laser plate 1
B, C	Stands (support bracing)	plywood	5	each 1	laser plate
1	hull	ABS	3 vacuum-moulded part	1	
2	Deck support bar (main deck)	ABS	4 x 4 according to plan	3	cut to length
3	auxiliary rubbing strake	ABS	2 x 2 according to plan	3	cut to length
4	supporting block	plywood	5 x 8 x 40	2	laser plate 1
5	rudder support board	plywood	3	1	laser plate 2
6	retaining plate	plywood	3	4	laser plate 2
7	rudder tube	brass	Ø 6 x Ø 4 x 40	4	rivet
8	rudder	Plastic/brass	prefab	4	
9	washer	metal	Ø 6 x Ø 3,2	8	
10	sealing ring	Gummi	Ø 6 x Ø 3	4	
11	rudder lever	plastic	injection-moulded part	4	
12	Collar 7/3	metal	Prefab	4	
13	socket head screw	metal	M 3 x 10	4	
14	crossbar	brass	Ø 2 x 145	1	
15	Collar 7/2	metal	Prefab	4	
16	screw	steel	M 3 x 6	4	
17a	motor bulkhead	plywood	3	1	laser plate 2
17b	motor bulkhead support	plywood	3	2	laser plate 2
18a	stern tube	brass	Ø 6 x 175	2	with bush
18b	shaft	stainless steel	Ø 4 x 223	2	with thread M4
18c	Collar	metal	7/4	2	
18d	grub screw	metal	M3 x 3	2	
18e	coupling	metal		2	not contained
18f	propulsion motor	prefab		2	not contained
19	locking nut	brass	M4	2	
20	Propeller 3-blade	plastic	Ø 40 prefab	je 1	right/left
21	suppression filter		prefab	2	not contained
22	cables		prefab	1-2 Satz	not contained
23	suction tube	brass	Ø 7 x Ø 6 x 100	1	
24	sealing plug	plastic	beliebig	1	not contained
25	pump plate	plywood	3	1	laser plate 2
26	steering servo		prefab	1	not contained
27a - c	servo mount	plywood	3	1	laser plate 6
28	self-tapping screw	metal	Ø 2,9 x 6,5	8	
29	extinguishing pump		prefab	1	not contained
30	self-tapping screw	metal	Ø 2,9 x 9,5	4	
31	suppression filter f. pump		prefab	1	not contained
32	steering linkage	metal	Ø 1,5 x 180	1	
33	Gabelkopf	metal	M 2 prefab	2	
34	nut	metal	M2	1	
35	threaded link	metal	M 2 prefab	1	
36	main deck	ABS	1,5	1	laser plate 3
37	coaming	ABS	1,5	2	laser plate 3
38	cross-coaming	ABS	1,5	1	laser plate 3
39	crane hatch	ABS	1,5	1	laser plate 3
40	boat hatch	ABS	1,5	1	laser plate 3
41	cross beam, rear	plywood	5 x 8 x 210	1	laser plate 2
42	deck beam, longitudinal	plywood	5 x 8 x 750	2	laser plate 2
43	hatch support	plywood	5 x 8 x 200	1	laser plate 2
44a - e	hatch support	ABS	1,5 x 10 according to plan	7	laser plate 3
45	deck bulkhead	ABS	1,5	1	laser plate 3
46	main deck support	plywood	5 x 8 x 40	2	laser plate 2
47	front deck support	plywood	5 x 8 x 250	1	laser plate 2
48	deck support strip	ABS	4 x 4 x 300	2	
49	triangular strip	balsa	8 x 8 according to plan	1	
50	auxiliary rubbing strake (front)	ABS	2 x 2 x 1000	1	
51	front deck	ABS	1,5	1	laser plate 4
52	cover	ABS	1,5	1	laser plate 4
53	support ring	ABS	1	1	laser plate 5
54	deck beam	plywood	5 x 8 according to plan	each 1	laser plate 2
55	anchor tube	brass	Ø 7 x Ø 6 x 60	2	

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
56	cabin	plastic transp.	1,5 vac forming part	1	
57	valve housing	ABS	1 vac forming part	2	
58	cabin frame	plywood	5 x 8 according to plan	6	laser plate 2
59	frame arch	plywood	3	1	laser plate 3
60	retaining block	plywood	5 x 8 x 25	1	laser plate 2
61	support strip	plywood	5 x 8 according to plan	4	laser plate 2
62	cross support	plywood	5 x 8 x 140	2	laser plate 2
63	door	ABS	1	1	laser plate 5
64	door	ABS	1	2	laser plate 5
65	hatch	ABS	1	1	laser plate 5
66	sliding hatch	ABS	1	1	laser plate 5
67	double door	ABS	1	2	laser plate 5
68	panel	ABS	1	2	laser plate 5
69	cabin roof	ABS	1 vac forming part	1	
70	winch housing	plywood	3	3	three-part
71	crank axle	brass	Ø 2 x Ø 1,6 x 37	1	
72	bush	brass	Ø 2,5 x Ø 2,1 x 8	3	BS
73	base panel	ABS	1	1	laser plate 5
74	crank	brass	Ø 1 x 30	3	
75	handle	brass	Ø 2 x Ø 1,6 x 8	7	BS
76	crank axle	brass	Ø 2 x Ø 1,2 x 20	1	
77	chain wheel	Alu	Ø 15	1	BS
78	shaft	brass	Ø 2 x 28	1	
79	shaft washer	metal	Ø 5 x Ø 2,1	2	
80	capstan head	Alu	Ø 12	1	BS
81	control button	brass	Ø 1 x 9	1	(nail) BS
82	tubular rivet	brass	Ø 6.5 x 5,5	3	BS (hawse pipe) (spacer)
83	chain stopper	plastic	Prefab	2	BS
84	crank	brass	Ø 1 x 30	2	
85	base	ABS	4 x 4 x 15	2	cut to length
86	Anker	metal	Prefab	2	BS
87	chain	brass	100 lang	1	BS
88	base plate	ABS	1,5	1	laser plate 4
89	lower frame	ABS	1,5	1	laser plate 4
90	upper frame	ABS	1,5	1	laser plate 4
91	base plate	ABS	1,5	1	laser plate 4
92	bearing block	ABS	1,5	1	laser plate 4
93	reinforcement strip	ABS	4 x 4 x 30	2	profile
94	engine mount	ABS	1,5	1	laser plate 4
95	microgeared motor 6 V		1000:1	1	not contained
95a	coupling hose	rubber	Ø 5 x Ø 1,5 x 15	1	SFS
96	disk	ABS	1,5	2	laser plate 4
97	disk	ABS	1,5	2	laser plate 4
98	driving disk	ABS	1,5	1	laser plate 4
99	tube	plastic	Ø 14 x Ø 12 x 20	1	SFS
100	split pin	brass	Ø 1,5 x 1,5 x 15	3	BS
101	grub screw	metal	M 3 x 3	5	SFS
102	shaft	brass	Ø 2 x 37	1	
103	collar 7/3	metal	Prefab	1	SFS
104	sash lock	ABS	1,5	1	laser plate 4
105	self-tapping screw	metal	Ø 2,2 x 6,5	3	SFS
106	grating frame A	ABS	1	1	laser plate 5
107	grating frame B	ABS	1	1	laser plate 5
108	grating frame C	ABS	1	1	laser plate 5
109	grating strips	Linde	1,5 x 5 nach Plan	ca. 70	
110	self-tapping screw	metal	Ø 2,2 x 6,5	20	
Mo1	bearing bush	plastic	injection-moulded part	3	
Mo2	foot	plastic	injection-moulded part	3	
Mo3	housing	plastic	injection-moulded part	3	
111	screw	brass	M 2 x 10	9	
112	nut	brass	M 2	24	

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
Mo4	monitor shaft A	brass	Ø 7 x Ø 6 x 120	1	
	monitor shaft B	brass	Ø 7 x Ø 6 x 175	1	
	monitor shaft C	brass	Ø 7 x Ø 6 x 125	1	
Mo5	guiding tube A	brass	Ø 1 x Ø 0,6 x 125	1	
	guiding tube B	brass	Ø 1 x Ø 0,6 x 180	1	
	guiding tube C	brass	Ø 1 x Ø 0,6 x 130	1	
Mo6	turning head	plastic	injection-moulded part	3	
Mo7	pipe bracket	plastic	injection-moulded part	3 pair	left / right
Mo8	foam pipe	Alu	Ø 5 x Ø 4,2 x 55	3	
Mo9	extinguishing pipe	Alu	Ø 4 x Ø 3,4 x 38	3	
Mo10	nozzle	plastic	injection-moulded part	3	
Mo11	pipe turn	plastic	injection-moulded part	3 pair	
Mo12	cantilever	plastic	injection-moulded part	6	
Mo13	aligning lever	plastic	injection-moulded part	3	
Mo14	coil spring	metal	Ø 3,2 x 60	3	
Mo15	tube A, B, C	Silikon	Ø 5,5 x Ø 3,5	3	
Mo16	screw	brass	M 2 x 4	6	
Mo17	cross bearing	brass	Ø 2,5 x Ø 2,1 x 8	3	rivet
Mo18	adjusting lever	brass	Ø 1 x 90	3	wire
Mo19	tube	brass	Ø 2 x 25	3	
Mo20	tension spring	metal	Ø 2 x 2,5	3	
Mo21	handwheel	plastic	Ø 7 injection-moulded part	3	
Mo22	nylon thread		Ø 0,25	3	
Mo23	handwheel	plastic	Ø 20 injection-mould. part	3	
Mo24	valve handle	brass	Ø 1 x 10	3	wire
113	servo board	plywood	3	1	laser plate 2
114	servo board	plywood	3	1	laser plate 2
115	spacer board	plywood	3	2	laser plate 2
116	pulley	Alu	Ø 28	3	SFS
117	grub screw	metal	M 3 x 6	10	SFS
118	tubular rivet	brass	Ø 8 x 8	4	SFS
119	pulley	plastic	Ø 68	2	SFS
120a - c	servo mount left	plywood	3	1	laser pl. SFS
121	swivel servo	---	prefab	1	not contained
122	self-tapping screw	steel	Ø 2,9 x 6,5	20	SFS
123	thread	yarn	Ø 1 anpassen	2	SFS
124	tensioning spring	steel	Ø 4,5 x 20 prefab	2	SFS
125a - c	servo mount right	plywood	3	1	laser plate SFS
126	lift servo		prefab	1	not contained
127	lifting lever for A	ABS	1,5	1	laser plate 4
128	screw	brass	M2 x 10	4	SFS
129	clamping bolt	metal	Ø 2,2 x 6,5	24	SFS
130	washer	brass	Ø 5 x Ø 2,2	5	SFS
131	disk	ABS	1	1	laser plate 5
132	servo plate	plywood	3	1	
133	distance block	plywood	5 x 8 x 30	2	laser plate 2
134	lift servo for B and C	---	prefab	1	not contained
135	self-tapping screw	metal	Ø 2,2 x 9,5	10	SFS
136	collar 15/7	brass	prefab	2	SFS
137	Swivel servo for B and C	---	prefab	1	not contained
138	Lifting lever for B and C	ABS	1,5	1	laser plate 4
139	stanchion	brass	Ø 2 x Ø 1,6 x 65	15	
140	hand rail	brass	Ø 1,5 according to plan	2	
141	split pin	brass	Ø 1 x 16	65	BS
142	hand rail	brass	Ø 1,5 x 300	1	
143	stanchion	brass	Prefab	8	BS
144	Rail wire, below	brass	Ø 0,8 x 200	2	
145	Rail wire, up	brass	Ø 1,5 x 300	2	
146	hand rail	brass	Ø 1,5 x 200	1	
147	spacer tube	brass	Ø 2 x Ø 1,6 x 3	40	BS
148	hand rail	brass	Ø 1,5 x 180	2	left / right
149	hand rail	brass	Ø 1,5 x 180	2	left / right

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
150	hand rail	brass	Ø 1,5 x 70	2	
151	Handle/Hook	brass	Ø 1 x 20	13	
152	foot bar	brass	Ø 1 x 40	12	
153	handhold	brass	Ø 1 x 30	6	
154	handle bar	brass	Ø 1 x 50	2	
155	mast half	plywood	3	2	laser plate 2
156	mast base frame	ABS	1	1	laser plate 5
157	lamp board, small	ABS	1	1	laser plate 5
158	lamp board, large	ABS	1	1	laser plate 5
159	antenna holder	ABS	1	1	laser plate 5
160	antenna bar	brass	Ø 1,5 x 150	1	
161	blue light base	Aluminum	turning part	1	BS
162	miniature bulbs 6 V	---	7x white, 1x red, 1x green	9	SFS
163	twin wire	---	prefab	1	not contained
164	blue light	plastic	injection-moulded part	1	BS
165	navigation light	brass	Prefab	4	BS
166	blink or flash electronics	---		1	not contained
167	FM antenna	brass	Ø 2 x 25	1	(tub. rivet) BS
168	horn	plastic	injection-moulded part	1	BS
169	base	plywood	5 x 8 x 10	1	laser plate 2
170	headlight housing	plastic	injection-moulded part	1	BS
171	Speaker mount	metal	Ø 8 x 18	1	(solder lug) BS
172	self-tapping screw	metal	Ø 2,2 x 6,5	1	BS
173	Speaker	plastic	injection-moulded part	1	BS
174	head-lamp bracket	plastic	injection-moulded part	1	BS
175	pivot axis	brass	Ø 3 x Ø 2,2 x 30	1	BS
176	eccentric lever	plastic	injection-moulded part	1	SFS
177	collar 7/3	metal	prefab	1	SFS
178	microgeared motor 6 V	---	1000:1	1	not contained
179	motor plate	ABS	1,5	1	laser plate 4
180	pedestal	Kiefer	5 x 15 x 20	2	SFS
181	eccentric rod	brass	Ø 3 x Ø 2,1 x 40	1	SFS
182	eyebolt	brass	M 2 x 20	3	SFS
183	collar 7/3	metal	prefab	1	SFS
184	device shaft	brass	Ø 8 x Ø 7 x 50	1	
185	microgeared motor 6 V	---	400:1	1	not contained
186	motor plate	ABS	1,5	1	laser plate 4
187	bracket	plywood	5 x 8 x 35	4	laser plate 2
188	coupling tube	rubber	Ø 5 x Ø 1,5 x 20	1	SFS
189	radar shaft	brass	Ø 2 x 60	1	
190	radarhead housing	plastic	Ø 10 x Ø 8 x 8	1	
190a - c	radarhead disks	ABS	1	4	laser plate 5
191	radar reflector	plywood	5 x 8 x 60	1	laser plate 2
192a - c	lamp board	ABS	1	1 pair	laser plate 5
193	stern light	brass	turning part	1	BS
194	holder	metal	Ø 8 x 18	2	(solder lug) BS
195	bow light	brass	turning part	1	BS
196	anchor light	plastic	injection-moulded part	1	BS
197	lamp holders	brass	Ø 4 x Ø 3,2 x 40	1	BS
198	ventilator	plastic	Prefab	2	BS
199	disk ventilator	Alu	turning part	2	BS
200	ventilator shaft	wood	Ø 12 x 30	2	BS
201	ball ventilator	plastic	injection-moulded part	1	BS
202	vent pipe	brass	Ø 8 x Ø 7 x 85	1	BS
203a - c	mushroom ventilator	ABS	1	4	laser plate 5
203d	vent pipe	plastic	Ø 8 x Ø 6 x 20	1	
204	extractor fan	plastic	injection-moulded part	2	BS
205	tube	plastic	Ø 7 x 5 x 45	2	BS
206	spring	steelwire	Ø 0,8 x 40	1	BS
207	latch	ABS	Laserteil	1	BS
208	pivot arm	plastic	injection-moulded part	1	BS
209	hook	ABS	Laserteil	1	BS
210	pivot bolt	brass	Prefab	1	BS

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
211	washer	metal	Ø 6,3 x Ø 2,6	1	BS
212	nut	metal	M 2,5	1	BS
213	screws	metal	M 2 x 6	7	2xBS / 5xSFS
214	whip antenna	steel wire	Ø 0,8 x 130	1	
215	foot	brass	Ø 2 x 12	1	(rivet) BS
216	ship's bell	brass	Prefab	1	BS
217	Holder	brass	Ø 1 x 15	1	
218	flag staff	Holz	Ø 3 x 110	3	
219	block	brass	Ø 1 x 16	3	(split pin) BS
220	cleat	brass	Ø 1 x 16	3	(split pin) BS
221	base	brass	Ø 4 x Ø 3,2 x 30	3	
222	stuffing	wood	Ø 3 x 5	3	
223	triangle piece	Sperrh	3	1	laser plate 2
224	valve body	plastic	Ø 6 x 7	10	BS
225	handwheel	plastic	Ø 7 injection-moulded part	12	BS
226	hose connector	plastic ring	Ø 10 x Ø 8 x 3	10	
226a	hose conn. outer ring	ABS	1	10	laser plate 5
227	C-hose connector	plastic ring	Ø 12 x Ø 10 x 3	2	
227a	C-hose conn. outer ring	ABS	1	2	laser plate 5
228	door hinge	brass	Ø 1,5 x 8	15	BS
229	life ring	plastic	injection-moulded part	6	BS
230	hatch, foreship	plywood	3	1	laser plate 2
231	hatch, monitor B	plywood	3	2	laser plate 2
232	hatch, monitor C	plywood	3	3	laser plate 2
233	hatch, rear	plywood	3	1	laser plate 2
234	lid, foreship	ABS	1	1	laser plate 5
235	lid, monitor B	ABS	1	1	laser plate 5
236	lid, monitor C	ABS	1	1	laser plate 5
237	lid, rear	ABS	1	1	laser plate 5
BK1	crane boom	plastic	injection-moulded part	1	
BK2	lid	ABS	1	1	laser plate 5
BK3	shaft	brass	Ø 2 x 12	1	tubular rivet
BK4	rope drum	aluminum	Ø 10 x 6	1	
BK5	crank	brass	1 x 30	1	
BK6	handle	brass	Ø 2 x Ø 1,6 x 8	1	
BK7	loop	brass	Ø 4,5 x Ø 3 x 1,5	1	rivet
BK8	screw	metal	M 2 x 6	1	
BK9	rope drum	metal	Ø 6 x 2	1	
BK10	nut	metal	M 2	1	
BK11	locking pin	brass	Ø 1 x 6	1	
BK12	crane post	brass	Ø 7 x Ø 6 x 125	1	tube
BK13	pedestal	plastic	injection-moulded part	1	
BK14	flange	ABS	1,5	1	laser plate 4
BK15	crane hook	metal	Ø 1,5 Prefab	1	
238	rope	Takelgarn	Ø 0,3 x 500	1	
239	microgeared motor 6 V	---	1000:1	1	not contained
240	---				not applicable
241	collar	metal	Ø 7/3	1	SFS
241a	disk	ABS	Ø 12 x 1,5	2	laser plate 4
242	collar	metal	Ø 15/7	1	SFS
242a	disk	ABS	Ø 24 x 1,5	2	laser plate 4
243	rubber ring	plastic		1	SFS
244	microgeared motor 6 V	---	500:1	1	not contained
245a - d	engine bracket	ABS	1,5	6	laser plate 4
246	---				not applicable
247a	rope drum disk	ABS	Ø 28 x 1,5	2	laser plate 4
247b	collar	metal	Ø 15/7	1	SFS
248	collar	metal	Ø 7/3	1	SFS
249	rubbing strake	Gummi	8 x 5 nach Plan	2	
250	rubbing strake	Gummi	8 x 5 x 1000	1	
251	handrail, foreship	brass	Ø 1,5 x 300	2	
252	stanchion	brass	Ø 2 x Ø 1,2 x 40	11	

Part-No.	Description	Material	Dimensions in mm	Pcs.	Remarks
253	C-tube	plastic	Ø 12 x Ø 11 x 220	2	
254	pipe supports	ABS	1	10	laser plate 5
255a	cover plate	ABS	1	4	laser plate 5
255b	cover plate	ABS	1,5	4	laser plate 4
256	companionway	KU	injection-moulded part	5	BS
257	spray pipe	brass	Ø 2 x 25	10	wire
258	nozzle head	ABS	Ø 6 x 1,5	10	laser plate 4
259	guard rail	brass	Ø 1.5 x 50	10	wire
260	rope deflector	brass	Ø 2 x 300	1	wire
261	stanchion	brass	Ø 2 x Ø 1,6 x 75	2	tube
262	railing support	brass	turning part	24	BS
263	rail, bottom	brass	Ø 0,8 anpassen	2	
264	rail, top	brass	Ø 1 anpassen	2	
265	chain entry	metal	50 lg.	2	BS
266	chain railing	metal	200 lg.	1	BS
267	bit	plastic	injection-moulded part	9	BS
268	boat hull	ABS	1 vacuum formed part	1	
269	keel strip	ABS	2 x 2 x 150	1	Profil
270	gore	ABS	1,5 fit	1	from waste
271	floor grating	lime	1,5 x 5 nach Plan	1	
272	split pin	brass	Ø 1 x 16	3	BS
273	carrying chain	metal	50 lg.	3	BS
274	rear bench	ABS	1	1	laser plate 5
275	bow bench	ABS	1	1	laser plate 5
276	rowing bench	ABS	1	il	laser plate 5
277	oarlocks	brass	Ø 1,5 x Ø 4 x 20	2	(split pin) BS
278	chain ring	brass	Ø 0,8 nach Plan	1	
279	oars	lime	Ø 2 x 100	2	
280	blade	ABS	1	2	laser plate 5
281	boat supports	ABS	1	2	laser plate 5
282	drive battery 6 V	---	prefab	2	not contained
283	speed control	---	prefab	1	not contained
284	receiver	---	prefab	1	not contained
285	powerpack	---	prefab	1	not contained
286	switch cable	---	prefab	1	not contained
287a	base plate	plywood	3	1	laser plate 2
287b	bulkhead base plate	plywood	3	1	laser plate 2
288	retaining frame	plywood	3	2	laser plate 2
288a	retaining frame	plywood	3	1	laser plate 2
289	6 V- 1,3 Ah battery	---		2	not contained
290	RC-plate	plywood	3	1	laser plate 2
308	control lever	brass	Ø 2 according to plan	1	
309	suction tube	silicon	Ø 8 anpassen	1	SFS
310	pressure tube	silicon	Ø 5,5 x 600	1	SFS
311	connecting piece	plastic	injection-moulded part	1	SFS
312	Y-piece	plastic	injection-moulded part	1	SFS
313	T- piece	plastic	injection-moulded part	1	SFS
314	connecting tube	silicon	Ø 5,5 anpassen	1	SFS
315	signal flag	cloth	25 x 40	1	(blue) BS
316	national flag	cloth	25 x 40	1	BS
317	Self-adhesive lettering	plastic	Prefab	1 sheet	

The abbreviation BS shown in the parts list stands for fitting set, SFS for special function set.



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