

## Building instructions for the 9 metre class sea rescue boat

### Introduction

The new 9-metre sea rescue boat with Delta hull is one of a series of seven new vessels which have been developed on the basis of previous SAR units. The design of this new boat type incorporates the knowledge and experience of the rescue teams in the Search and Rescue (SAR) service. Like all SAR units of the DGzRS (German Sea Rescue Service) this 9 m boat is of welded, seawater-resistant aluminium construction, exploiting the proven network bulkhead system. The main feature of this type of vessel is its outstanding seaworthiness. In shallow waters, with heavy seas and breakers, the boat remains stable, manoeuvres perfectly, survives serious grounding and is capable of running alongside other vessels even at fairly high speeds and in difficult conditions thanks to the shock-absorbing resilient fender system running all round the hull. The hull is sub-divided into a series of watertight compartments, greatly increasing the vessel's safety if a leak should occur. The hull form is specially designed to combine low drag with good stability and excellent sea-going qualities, especially when running before the wind. The far aft location of the hull's maximum beam and the 40° angled hull surfaces are features which were developed with the expertise of the DGzRS and the dockyard. Since the boats are designed to be used under the most difficult conditions possible, they include comprehensive safety measures. This new vessel is controlled exclusively from the fully enclosed upper command position, and is equipped with the latest navigation technology. The crew are provided with special high-security seats with a safety harness system.

The model is drawn to a scale of 1:20, and has been developed with the help of documents from the DGzRS and the Fr. Schweers shipyard.

All the parts which are difficult to make are supplied as ABS plastic mouldings: they include the hull, deck, superstructure and many other small parts. The hull, deck and superstructure are CNC-trimmed. Many injection-moulded plastic parts are also provided, including bollards, aerials, blue light, lanterns and other components, and these all help to shorten the building time. The boat can be run with a basic set of RC equipment, but there is space for additional working systems at the builder's discretion, including sound simulator, lighting system etc.

### Important safety notes

You have purchased a kit which can be assembled to produce a fully working RC model when fitted out with the appropriate accessories.

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

The following points are important and must be observed constantly:

- This model must NEVER be operated when persons or animals are in the water, otherwise there is a serious risk of causing injury.
- Do not work on the power system unless the battery is disconnected.
- Never run your model in protected sites, animal or plant sanctuaries or sites of special scientific interest (SSSIs).
- To lubricate the shaft system use a type of grease or oil which does not have a harmful effect on water (e.g. Order No. 570).
- Deploy all electrical cables as neatly as possible; don't cross them over each other.
- Don't be tempted to exceed the recommended power supply voltage. A higher voltage may cause the motor or speed controller to overheat, and the power cables can even melt. In the worst case the model could be ruined or even go up in flames.
- Read and observe the instructions and recommendations provided by the manufacturer of your radio control system and accessory components.
- Before you run the model check that all radio control functions are working perfectly.
- The batteries must be charged and the range of the radio control system must be checked before you run the model.
- Ensure that the channel you intend to use is not already in use. Never run your boat if you are not certain that your channel is free.
- If you wish to operate the model on moving water (e.g. a river) remember that it could be washed away downstream if the motor cuts or a malfunction occurs.

### Notes on building the model

No prior experience of model making is required to assemble the model successfully. Even if you are a beginner to modelling, you can still complete the model satisfactorily provided that you have a reasonable amount of manual skill, some technical understanding and plenty of patience. For best results it is important to follow the instructions very closely.

Young persons under 14 years should only be allowed to build this model under the supervision of an adult, as the use of various tools and materials, including knives and adhesives, involves risks which should not be under-estimated.

**IMPORTANT**

**Before building the model be sure to study these instructions in conjunction with the plan, the many stage photos and the parts list.**

This gives you the chance to assemble the model in your imagination, which helps to give you a clear understanding of its structure. It is important that you understand each stage of construction properly, and the effect each step has on subsequent processes. The plan does not show every single component (e.g. various screws etc. are omitted for clarity), but does provide a full-size overview of the model, together with various important detail features of the design.

**The sequence of operations in the instructions assumes that you have already checked the fit of the parts concerned.**

**Before gluing any joint permanently, be sure to check that subsequent parts and/or sub-assemblies can still be fitted, and actually fit correctly.**

It is a good idea to start by building the various sub-assemblies "dry", i.e. without glue, to check that everything fits properly. If you are still not sure, tack the parts together with a **few drops of glue** initially. This gives you the chance to separate them again without doing serious damage if you happen to make a mistake.

#### **Adhesives:**

We recommend the following adhesives for this model: Stabilit express (polyester two-pack resin), UHU plus acrylit (acrylic glue), and thick and thin "cyano" (high-viscosity and low-viscosity cyano-acrylate). We also recommend acetone solvent for pure ABS-ABS joints. For small wood-wood and wood-ABS joints you can also use UHU hart (cellulose cement). Acetone dissolves ABS very well, and effectively welds the two parts together. Acetone is best applied on a small paintbrush: press the parts together lightly and carefully, and the solvent will "wick" into the joint. A second application may be necessary. If you have not tried this technique before, experiment on some scrap plastic first. Thick cyano can be reluctant to "go off" (set), and we strongly recommend activator spray to encourage it to cure more quickly; however, please note that the spray may attack paint and cause local discoloration. Cyano glue and activator spray give off unpleasant fumes, so be sure to work in a well ventilated area when using these materials - especially for large-area joints. As a safety measure it is best to regard all adhesives, solvents and paints as potentially harmful, and to avoid fumes and skin contact with all of them. Acetone is also highly inflammable!

Please read and observe the notes supplied by the manufacturers regarding safety and the use of their products. Young persons under 14 years must not be allowed to use these materials unless supervised by an adult!

When working with the vacuum-moulded ABS parts, apply the glue or acetone **sparingly**, as any excess solvent will tend to deform or damage the material.

Where metal parts have to be glued, roughen the surfaces well (glasspaper) and de-grease them using acetone beforehand. The vacuum-moulded ABS parts may have traces of mould release agent on their inside, and this should be removed by wiping carefully with acetone at the joint areas.

Wipe off excess glue from joints immediately.

#### **Vacuum-moulded parts:**

The vacuum-moulded ABS components should be cut out using a small pair of curved scissors (e.g. Lexan shears, Order No. 26). Alternatively cut along the marked lines using a knife, keeping slightly outside the lines at all times. Caution - potential injury hazard! To finish off the ABS moulded parts, i.e. for final shaping and sanding the cut edges smooth, you will need to use a sanding block; this applies in particular to the various small parts on the model. We recommend that you make a set of sanding blocks yourself by gluing various grades of abrasive paper to different sizes of wood block. The only sure way to achieve accurate shapes, straight joint edges etc., is to use a sanding block - don't use sandpaper in your hand! Don't throw away the waste material from the vacuum mouldings immediately, as some of it is needed to make small parts and local reinforcements.

#### **Painting:**

The kit box illustration shows the scale colour scheme for the finished model. Before painting the surfaces it is best to rub them down with fine wet-and-dry paper (400- or 600-grit), and then **carefully** remove all traces of grease by wiping with acetone or white spirit. Don't hope that the paint will hide scratches and other surface imperfections: it doesn't work! Fill all flaws and joint lines with white polyester filler paste, and sand the surfaces back flush before painting. All plastic parts should be left to stand for about two hours before painting, as this allows any static charge in the material to diffuse away. We recommend a coat of universal primer on all the parts to be painted; allow the primer to dry, then rub down lightly before continuing.

**CAUTION: if you are using ACRYLFIX spray paint and Universal colour paint please note that the Universal paint must be applied first, followed by the spray paint. If you ignore this, and apply the ACRYLFIX first, you may have problems with paint incompatibility where the different types meet. If you are unsure, this is the rule: always check compatibility on scrap material before applying different types of paint!**

Paint should **never** be applied in thick coats, and this is especially true when you are dealing with ABS parts. Thick coats of paint just take ages to dry, and sometimes the paint never dries properly, i.e. it always stays soft and easily scratched. Without exception it is better to apply several thin coats of paint, and allow each one to dry thoroughly. Ideally you should let each coat harden completely, then sand lightly using 400- or 600-grit wet-and-dry paper, used wet. If the paint does not "flow" well, dilute it with the matching thinners. Use smooth-edged tape (e.g. Tesa film tape or plastic insulating tape) to mask out adjacent colours. If you have to apply tape to a painted surface, allow the first colour to dry for at least two days before applying the tape, otherwise there is a danger that you will lift the paint when removing the tape later. Another way to avoid this is to reduce the tape's adhesion by sticking it to a clean sheet of glass beforehand. We

recommend that you carefully peel off the masking tape very soon after applying the second colour. Don't allow the components to become warm before removing the masking tape! If the tape leaves traces of adhesive behind, carefully wipe them off with white spirit or similar, but only after giving the paint plenty of time to dry out thoroughly. Small detail fittings can be glued to painted surfaces, but please note that such joints will always be weak. Remove the paint first if the joint has to be strong.

If you have left-over paint or glue when you have finished the model, don't throw them in the household rubbish; take them to your local model shop or toxic waste collection point.

### Assembly instructions

1. The hull (1) is supplied machine-trimmed, with the holes for the stern tube and rudder pre-cut.
2. Cut along the marked lines of the boatstand (2) to remove the scrap material, and sand the cut edges smooth.
3. Position the bearing bracket / grease nipple (4) exactly over the lubricating hole in the stern tube and shaft (3) and screw the parts together. Fix the coupling housing (5) to the stern tube as shown in the drawing, using a drop of cyano.
- 3a. Assemble the articulated coupling (6) from the two hubs and one pin link. Locate the hub with the 2.3 mm Ø bore, slip it on the shaft of the electric motor (7) and secure it with an M3 x 3 grub screw. Attach the coupling housing to the electric motor using two M2.6 x 6 mm screws.
4. Solder the power leads to the motor terminals: red (positive) wire to red dot. The assembled power system can now be fitted in the model: glue the stern tube and bearing bracket to the hull using Stabilit express.
5. Fit the propeller (8) on the propeller shaft and slip it into the stern tube from the rear. Secure the front end in the hub of the articulated coupling (6).
6. The next step is to install the rudder system: fit the bush (10) in the hull with about 5 mm projecting on the underside, set it exactly vertical, and glue it in place with Stabilit express.
- 6a. Fit two O-rings (11) on the rudder shaft (9) to provide a watertight seal.
- 6b. Press a collet into the tiller (12); slip it on the rudder shaft and secure it with an M3 x 6 socket-head screw.
7. Separate the servo console (13) from the waste material by cutting along the marked lines, and trim it to follow the internal shape of the hull. Cut out the opening for the rudder servo and drill four 1.5 mm Ø holes for the retaining screws.
- 7a. Glue the servo console in the hull in line with the electric motor, as shown in the drawing, using Stabilit express or cyano.
8. Attach the pushrod connectors to the servo output lever and to the tiller, and retain them with the plastic M2 nuts.
- 8a. Bend the steering pushrod (15) to the shape shown in the drawing, cut it to length and fit it through the two pushrod connectors. Tighten the grub screws to retain the pushrod.
9. Bend the rudder guard (16) to the shape shown in the drawing using the 3 mm Ø aluminium rod supplied, and glue it in the hull using Stabilit express.
10. The vacuum-moulded deck shell (17) is supplied machine-trimmed. Round off the outermost edge of the bulged periphery using fine glasspaper.
11. Cut the hatch cover (18) from scrap ABS sheet, and install it over the stern opening using double-sided adhesive tape. This ensures that you have access to the rudder system at any time just by prising off the hatch cover.
12. Make up the salvage gate (19) from scrap ABS material and glue it to the model as shown in the drawing.
- 12a. Cut the rubbing strake (20) from square-section plastic, and install it directly below the salvage gate.
13. Bend the left and right railings (21) to shape from 3 mm Ø plastic rod as shown in the drawing, bending the material in your hands, or using round-nose pliers. File or sand the recesses at the front end of the railings. You will also need to drill a 1 mm Ø hole in the right-hand rail to accept the handrail (23), but this is best done later.  
**We recommend** that you do not position and install the railings until the bulwarks (22/24) have been made and attached, using the cabin superstructure (27) as a guide. Cut the bulwarks (22/24) from scrap ABS material as shown in the drawing. This is the procedure: place the cabin superstructure on the model, trim the bulwarks (22/24) to shape, and then glue them to the deck using acetone. Next stick the handrail (23) to the bulwark (22) using acetone, and only then glue the left-hand railing to the bulwark (24). The right-hand railing is left free-standing, supported only by the handrail (23) at the front.
14. Thread two handrail stanchions (26) onto the handrail (25), then attach it to the rear panel of the cockpit as shown in the drawing.
15. At this point the deck can be glued to the hull using the following procedure: lay the hull on the deck and run cyano glue all round the joint line between hull shell and deck shell. Check that the joint is completely watertight, and apply more glue if necessary.
16. The hull can now be painted. Above the waterline it should be white, and below the line it should be red oxide, RAL 3009.
17. The vacuum-moulded cabin superstructure (27) is supplied machine-trimmed.
18. Cut along the marked lines of the back panel (28) and the roof (29) using either a sharp knife or Lexan shears, as shown in the drawing. It is a good idea to run a felt-tip pen along the marked lines before cutting. If you find that the marked lines are not perfectly clear in some areas, e.g. the side openings in the back panel (28), please refer to the drawing for guidance.
- 18a. Drill 2 mm Ø holes in the back panel (28) for the handles (32, 33, 34).
- 18b. Clamp the back panel (28) to the cabin superstructure using clothes pegs, check alignment, then apply cyano to join the parts permanently.
19. Position the roof (29) on the superstructure exactly as shown in the drawing, and glue the parts together using cyano.
10. Bend the handrails (30) from 1 mm Ø ABS rod to the shape shown in the drawing, and attach them to the cabin superstructure using cyano. The rod can easily be formed in your hand.

21. The next step is to make the handrail (31) from 2 mm Ø brass rod. The drawing shows the correct shape of all the handrail components.  
Drill 2 mm Ø holes for the supports in the forward cabin roof. Drill further holes for the handrail stanchions (10) in the side walls.
- 21a. Assemble the handrail and handrail stanchions as follows: push the bottom end of the angled supports into the holes in the forward cabin roof, and solder the top end to the handrail. Bend the curved section (31a) of the handrail (31) to shape, and solder it to the other parts.
- 21b. Glue together two washers (4.5 / 2.2 mm Ø) and glue them on the deck as shown. Glue the front support of the curved section (31a) to the washers.  
The cabin superstructure and handrail must be removable in one unit, to provide access to the inside of the model.
22. Make up the handles (32, 33, 34) as shown in the drawing, and fix them to the handrail stanchions (10) on the back panel (28).
23. The decal sheet includes grey window masks. Cut them out and apply them to the window areas on the superstructure.  
The cabin superstructure can now be painted.  
Peel off the window masks after painting, and apply the self-adhesive window frames.
24. Separate the two halves of the radar antenna (35) from the waste material and join them with cyano. Paint the antenna and glue it to the roof.
25. Most of the remaining parts to be installed are ready-made detail fittings, which can simply be painted and glued to the model. The drawing shows the correct position of these parts.
26. The mounting base of the towing hook (65), the double bollards (66) and the bow flagstock support (68) have to be trimmed before fitting, as shown in the drawing.
27. The decals can now be applied to the model, following the arrangement shown in the kit box illustration. Cut out the individual decals using scissors or a sharp knife, and apply them to the painted model.
28. Install the receiver, the speed controller and the drive batteries in the hull using self-adhesive Velcro (hook-and-loop) tape. Connect the components of the radio control system. Connect the receiver aerial to the UHF aerial (61). Note that the overall length of the aerial must be no longer than the original length of the receiver aerial.
29. Lubricate the propeller shaft with water-neutral grease or oil if necessary.

#### Colour scheme

We recommend the following colours for this model:

Underwater hull - red oxide, RAL 3009

Exposed hull, superstructure, other parts - white

Superstructure sides, mast, other parts: bright red, RAL 3024

#### Maiden run

Charge up the batteries and check that all the model's functions work correctly; you are then ready for the boat's maiden voyage. Run the model at low speed initially until you are familiar with its handling and control response.

We hope you have many hours of fun building and running your sea rescue boat.

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#### Parts list

Part No.	Description	No. off	Material	Size in mm
1	Hull	1	ABS	Vac. moulded
2	Stand	1	ABS	Vac. moulded
3	Stern tube and shaft	1	Ready made	Order No. 416
4	Bracket / grease nipple	1	Ready made	Order No. 2997.4
5	Coupling housing	1	Ready made	Order No. 2333
6	Articulated coupling	1	Ready made	Order No. 355.3
7	Electric motor	1	Ready made	Order No. 1794
8	Propeller	1	Ready made	Order No. 2307.30
9	Rudder	1	Ready made	Order No. 430.35
10	Rudder bush	1	Brass	4/3 Ø x 30
11	Sealing ring	2	Rubber	4/2 Ø x 1
12	Tiller	1	Ready made	Order No. 2400
13	Servo console	1	ABS	Vac. moulded
14	Pushrod connector	2	Plated brass	Order No. 1182
15	Steering pushrod	1	Plated steel	350 x 2 Ø
16	Rudder guard	1	Aluminium rod	120 x 3 Ø, bend as plan
17	Deck	1	ABS	Vac. moulded
18	Hatch cover	1	ABS	50 x 30 x 1, cut from scrap
19	Salvage gate	1	ABS	67 x 20 x 1, cut from scrap
20	Rubbing strake	1	ABS	90 x 3 x 3
21	Railing	2	ABS	105 x 3 Ø, bend as plan
22	Bulwark	1	ABS	1, as plan, cut from scrap
23	Handrail	1	ABS	100 x 1 Ø
24	Bulwark	1	ABS	1, as plan, cut from scrap

25	Handrail	1	Plated steel	130 x 2 Ø, bend as plan
26	Handrail stanchion	10	Plastic	Order No. 466
27	Cabin superstructure	1	Smoked plastic	Vac. moulded
28	Back panel	1	Smoked plastic	Vac. moulded
29	Roof	1	Smoked plastic	Vac. moulded
30	Handrail	2	ABS	110 x 1 Ø, bend as plan
31	Handrail	10	Brass rod	840 x 2 Ø in total
31a	Curved rail	2	Brass rod	approx. 130 + 36 x 2 Ø
31b	Support washer	2	Plated brass	4.5/2.2 Ø x 0.5
32	Handle	1	Steel rod	50 x 2 Ø
33	Handle	1	Steel rod	40 x 2 Ø
34	Handle	1	Steel rod	30 x 2 Ø
35	Radar antenna	2-part	ABS	Vac. moulded
36	Mast	1	Plastic	Ready made
37	Upper yard, left / right	2-part	Plastic	Ready made
38	Blue light	1	Plastic	Ready made
39	Anchor light	1	Plastic	Ready made
40	Masthead light	1	Plastic	Ready made
41	Bow towing light	1	Plastic	Ready made
42	Stern towing light	1	Plastic	Ready made
43	Compass probe	1	Plastic	Ready made
44	Searchlight	1	Plastic	Ready made
45	GPS aerial	1	Plastic	Ready made
46	SAT aerial	1	Plastic	Ready made
47	Crewfinder	1	Plastic	Ready made
48	Rod	4	Brass rod	30 x 1 Ø, as plan
49	Typhoon	1	Plastic	Ready made
50	Holder	1	Plastic	Ready made
51	Radar reflector	1	Plastic	Ready made
52	Floodlight	3	Plastic	Ready made
53	Holder	3	Plastic	Ready made
54	Front screen	3	Smoked plastic	1, as plan, cut from scrap
55	Stern light	1	Plastic	Ready made
56	Platform	1	ABS	1, as plan, cut from scrap
57	Navigation lights	2	Plastic	Ready made
58	Holder, left / right	2	ABS	Vac. moulded
59	Rope loop	2	Brass rod	10 x 1 Ø, as plan
60	Flag halyard	1	Steel wire	200 x 0.3 Ø
61	UHF aerial	1	Brass rod	170 x 1 Ø
62	Holder	1	Brass tube	10 x 2/1 Ø
63	Rail	1	ABS	Vac. moulded
64	Cover	1	ABS	1, as plan, cut from scrap
65	Towing hook	1	Plastic	Ready made, trim as plan
66	Double bollard	8	Plastic	Ready made, trim as plan
67	Platform	1	ABS	Vac. moulded
68	Flagstock	2	Plastic	Ready made
69	Grappling hook	1	Steel rod	180 x 2 Ø, as plan
70	Holder	2	Brass rod	10 x 1 Ø

**You will also need the following times (included in the kit):**

1	Decal sheet		
1	Velcro tape		
4	M3 x 3 grubscREW	)	Pushrod connector
2	Plastic M2 nut	)	
2	M2.6 x 6 screw	)	Electric motor mounting
1	M3 x 6 socket-head screw	)	Tiller fixing
1	3/7 Ø x 4.5 collet	)	

**You will also need the following times (not included in the kit):**

1	Motor power leads, Order No. 3033
2	ECO-POWER 6-cell drive battery, Order No. 2496
1	SPEED PROFI 50 speed controller, Order No. 2864
1	G2 parallel lead, Order No. 3061
1	2-channel radio control system, 27 MHz or 40 MHz band

**[Drawing captions ]**

1	1 x mirror-image
2	Side view
3	Plan view

- 4 Bow view
- 5 Stern view (mast and small parts not shown)
- 6 Longitudinal cross-section
- 7 Plan view (deck not shown)
- 8 Drive battery
- 9 Speed controller
- 10 Rudder servo
- 11 Glue bearing bracket securely here
- 12 Receiver
- 13 Separate here
- 14 Red dot = +

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We reserve the right to introduce modifications. Liability for printing errors excluded.

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