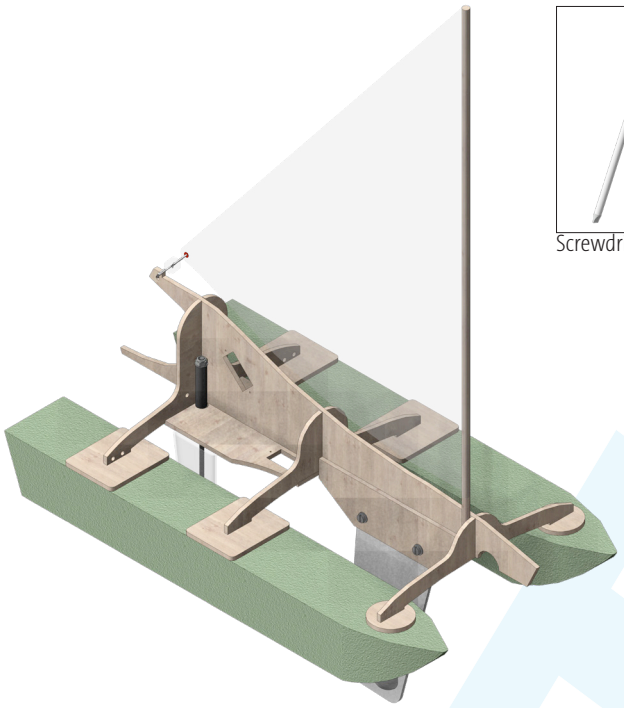
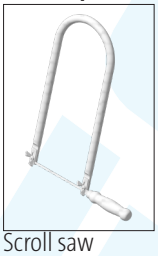
126308

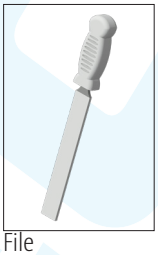
Motus sailboat

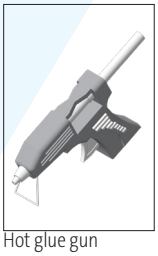


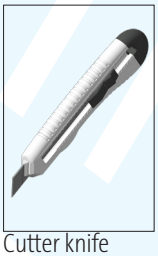
Tools required:

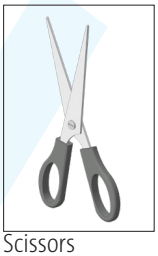

Screwdriver

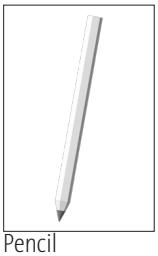

Scroll saw

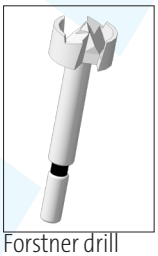

File


Hot glue gun


Cutter knife


Scissors


Pencil

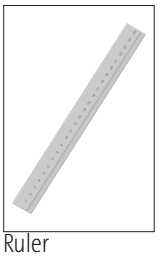

Forstner drill


Drill bit


Spanner


Wood glue


Pricker


Ruler

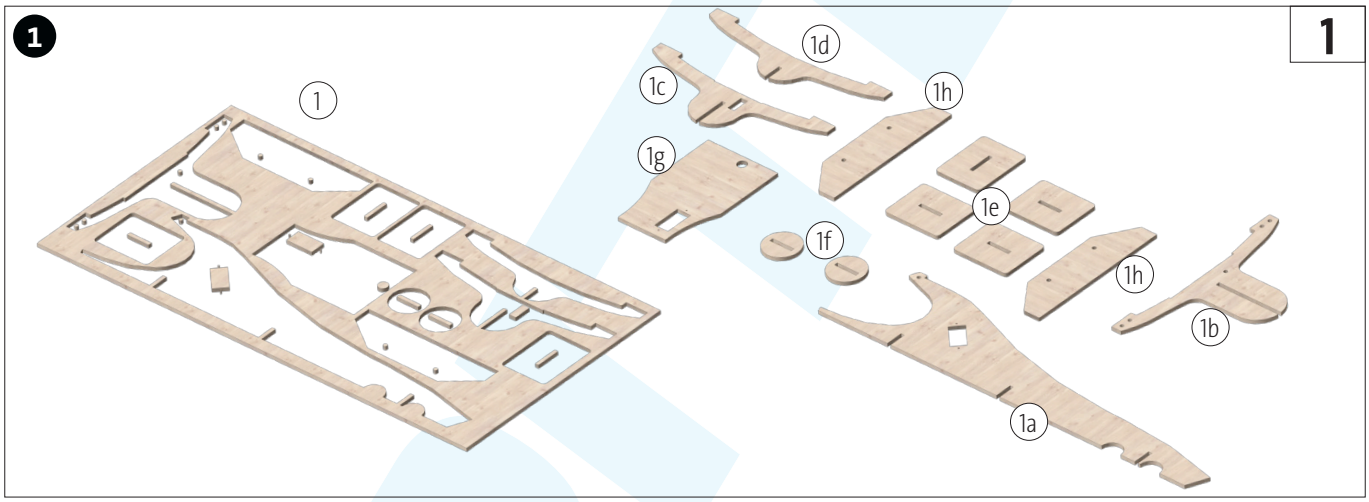
NOTICE:

Once completed, the OPITEC work kits are not articles with the character of toys of a generally commercially available type, but teaching and learning aids to support educational work. This kit may only be built and operated by children and young people under the guidance and supervision of a competent adult. Not suitable for children under 36 months. Choking hazard!

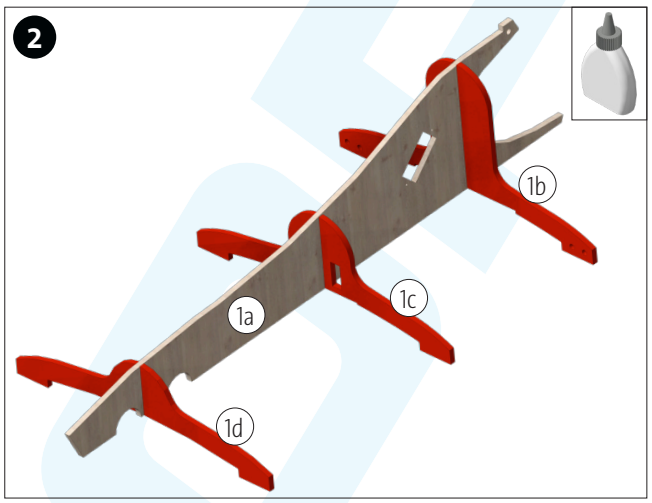
Bill of materials	Quantity	Dimensions (mm)	Description	Part no.
Laser-cut wooden parts	1	400x200	Body	1
Styrofoam	2	350x50x40	Floating body	2
Thermoforming sheet	1	120x120x0,5	Rudder	3
Laminating pouch	1	A3	Sail	4
Wooden round bar	1	ø5x500	Pole	5
Threaded rod	1	M3x100	Rudder bar	6
Gear wheel 50/10	1		Rudder bar	7
Spacer rollers	1	30	Rudder attachment	8
Steel ball	2	ø18	Ballast weight	9
Polystyrene	1	210x150x2	Keel fin	10
Pearl cord	1	ca. 160	Sail attachment	11

OPITEC

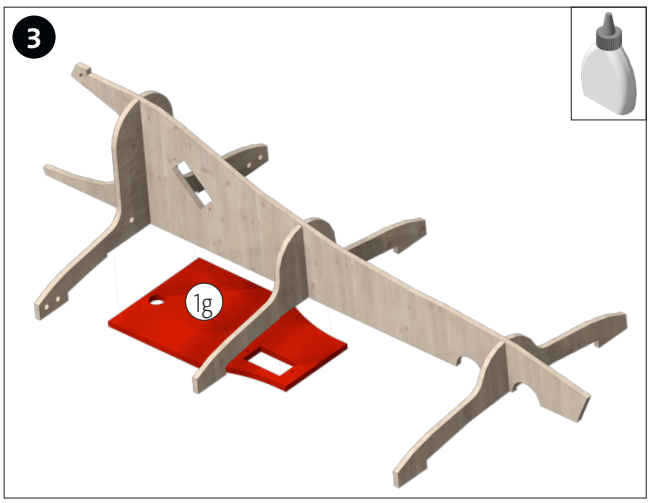
Bill of materials	Quantity	Dimensions (mm)	Description	Part no.
Cylinder head screw	2	M3x12	Fastening	12
Hexagon nut	4	M3	Fastening	13
Lock nut	1	M3	Fastening	14
Washer	7	7/3,2	Fastening	15



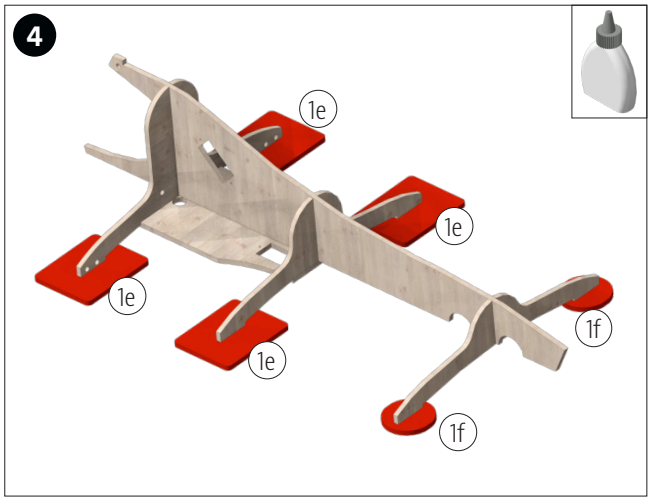
Cut out the individual wooden parts (1a-1h) from the laser-cut wooden base plate.



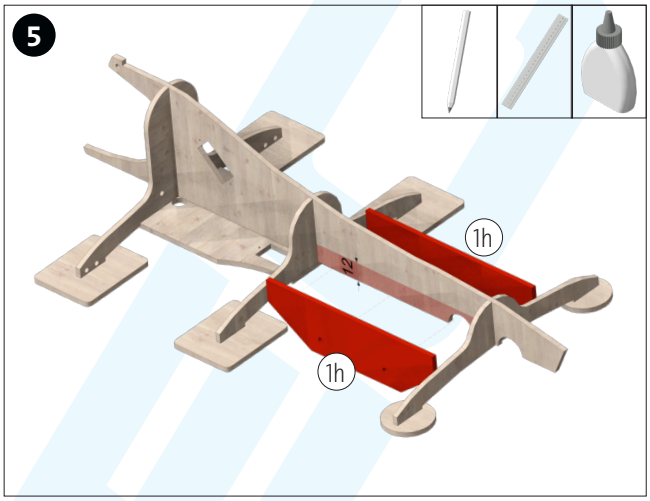
Fit the wooden parts (1a, 1b, 1c and 1d) together as shown and glue if necessary.



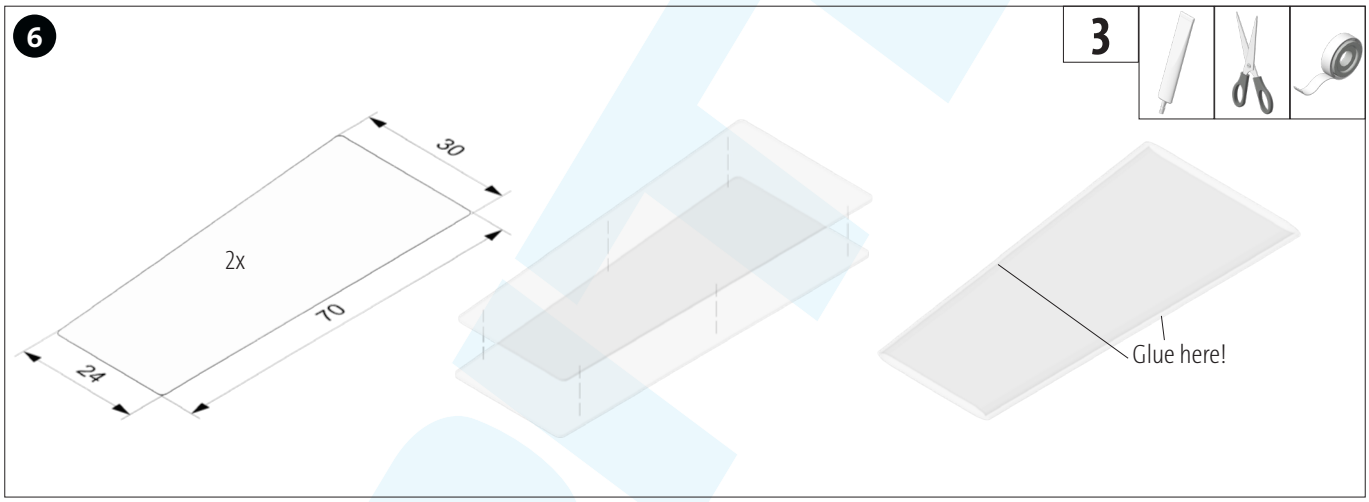
Glue the base plate in the intended position.



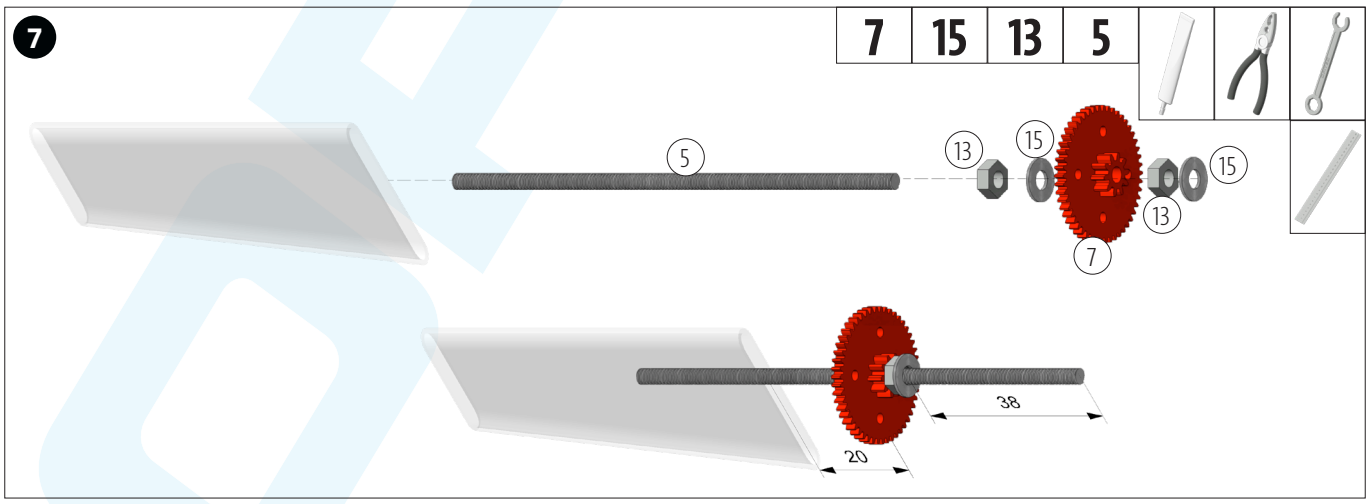
Attach the float connectors (1e, 1f) as shown and glue if necessary.



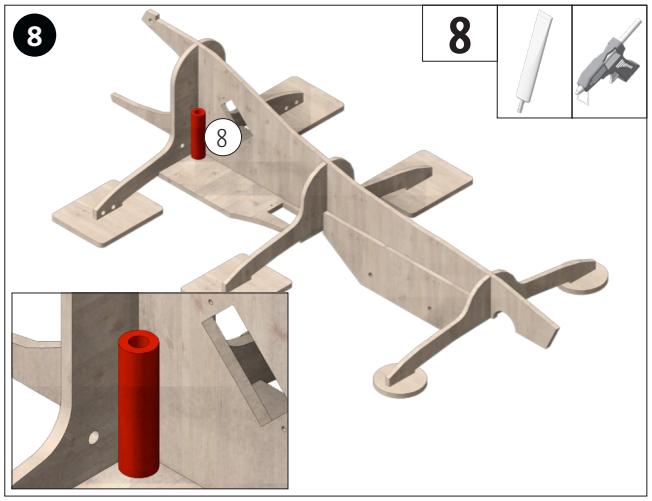
To attach the keel fin mounts (1h), measure approx. 12 mm from the bottom and glue both parts flush to the centre web (1c) as shown.



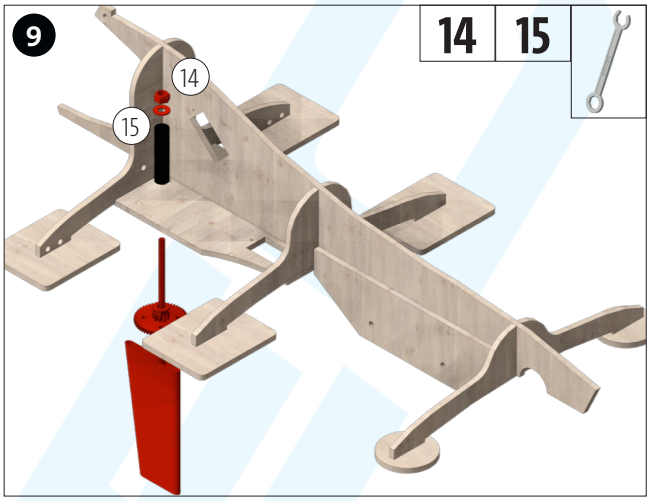
Transfer the A1 template for the rudder twice onto the thermoforming sheet and cut out. Then place one on top of the other and glue along the long sides. **Note:** Leftover thermoforming film will be needed later as sail reinforcement. Do not throw away!



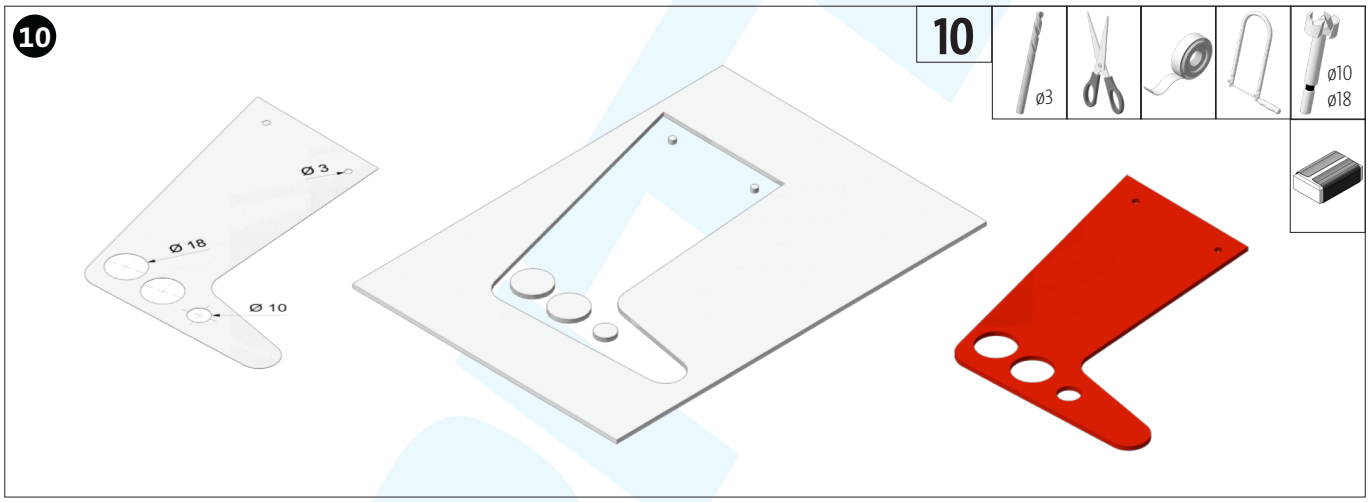
Measure the position for the gearwheel (7) on the threaded rod (5) and fix the gearwheel in place with 2 nuts (13) and washers (15). Then insert the threaded rod into the finished rudder (3) and glue it in place at a distance of 20 mm from the gearwheel.



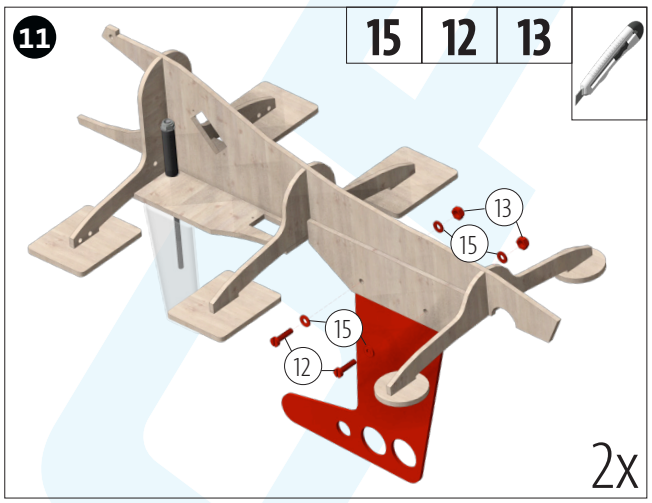
Glue the rudder blade holder (8) in the intended position (hole in the base plate) as shown. **Note:** Do not glue the drill hole!



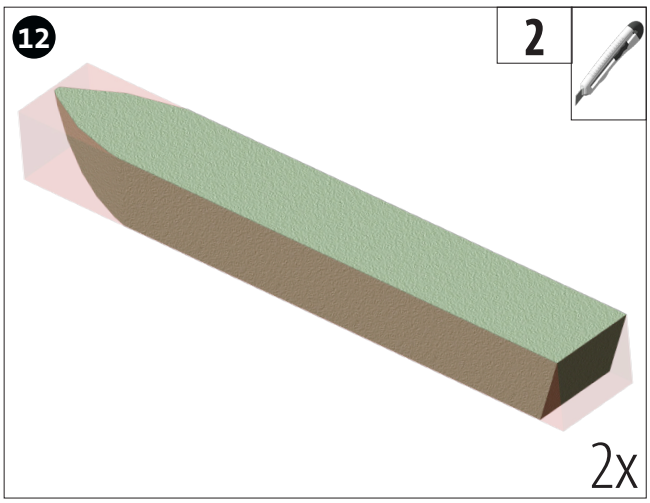
Guide the threaded rod with the rudder blade from below through the hole in the base plate through the rudder blade holder and fasten from above with a washer (15) and a lock nut (14).



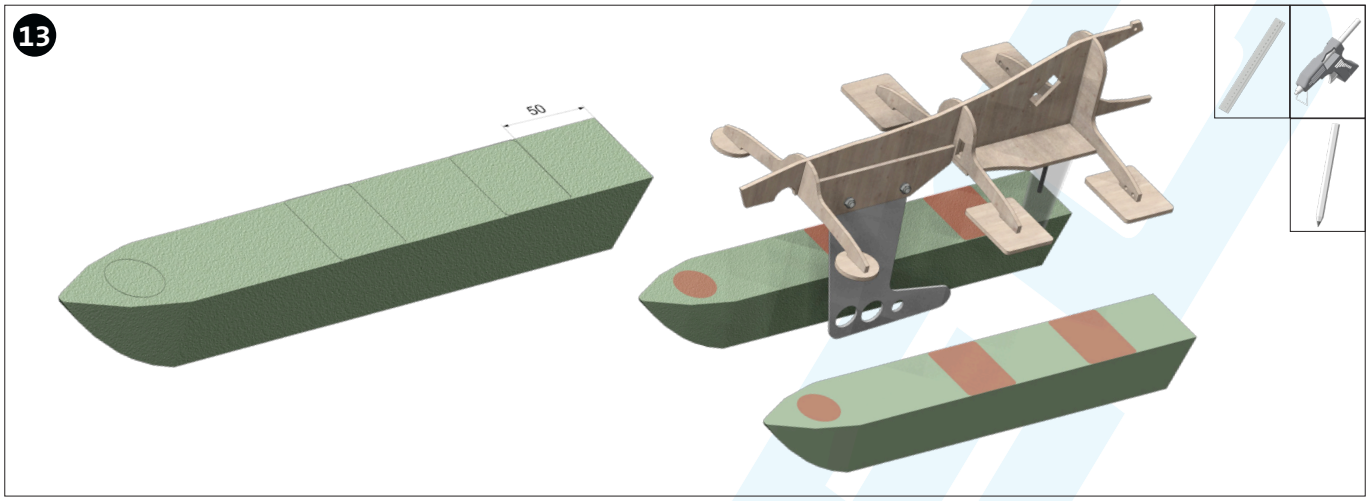
Transfer the A2 template for the keel fin to the polystyrene (10). Drill through the holes (ø3, ø10, ø18). Saw out the keel fin and clean the saw cuts.



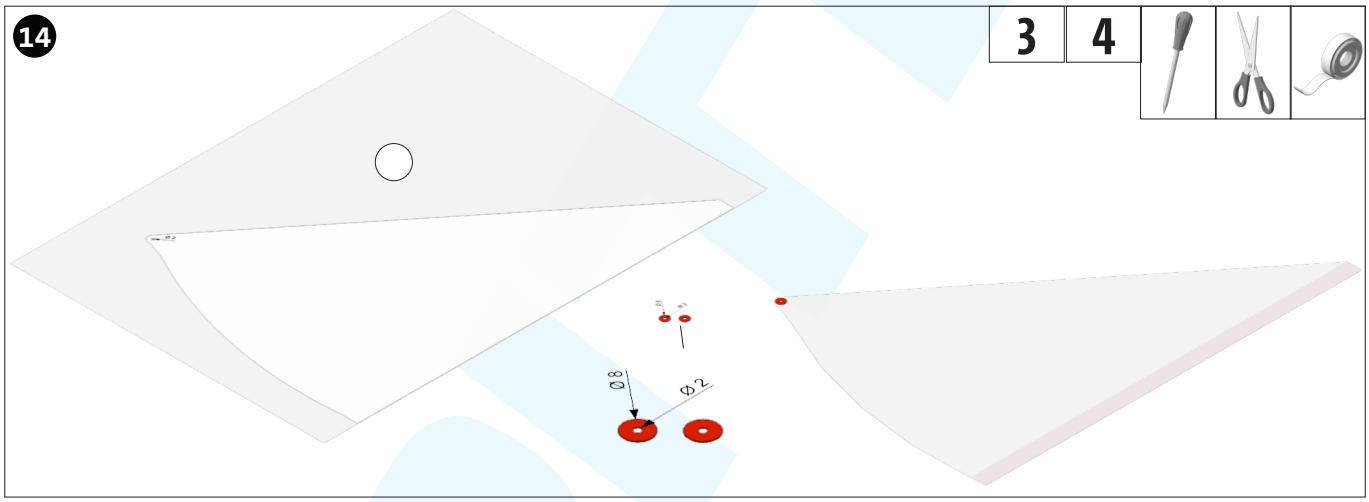
Fasten the keel fin (10) to the keel fin holder with 2 screws (12), 4 washers (15) and 2 nuts (13) as shown.



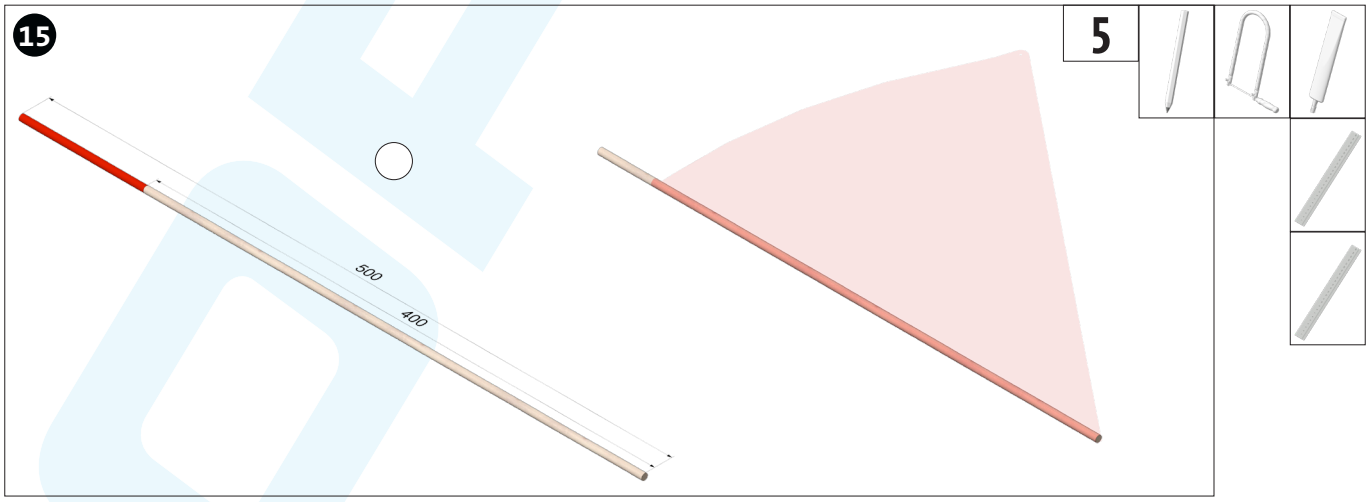
Transfer the template for the floats to the Styrofoam cuttings (2) and cut out using a cutter knife (or electric foam cutter).



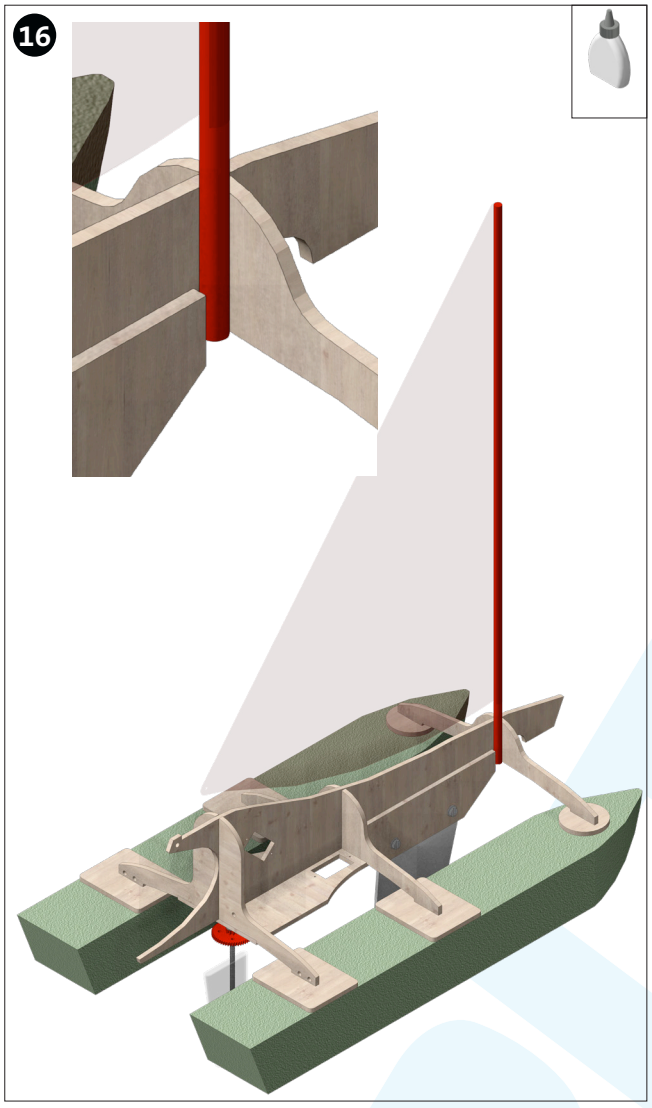
Measure and mark 50 mm on the rear edge of both floats. Then glue the body onto the marked area with hot glue as shown.



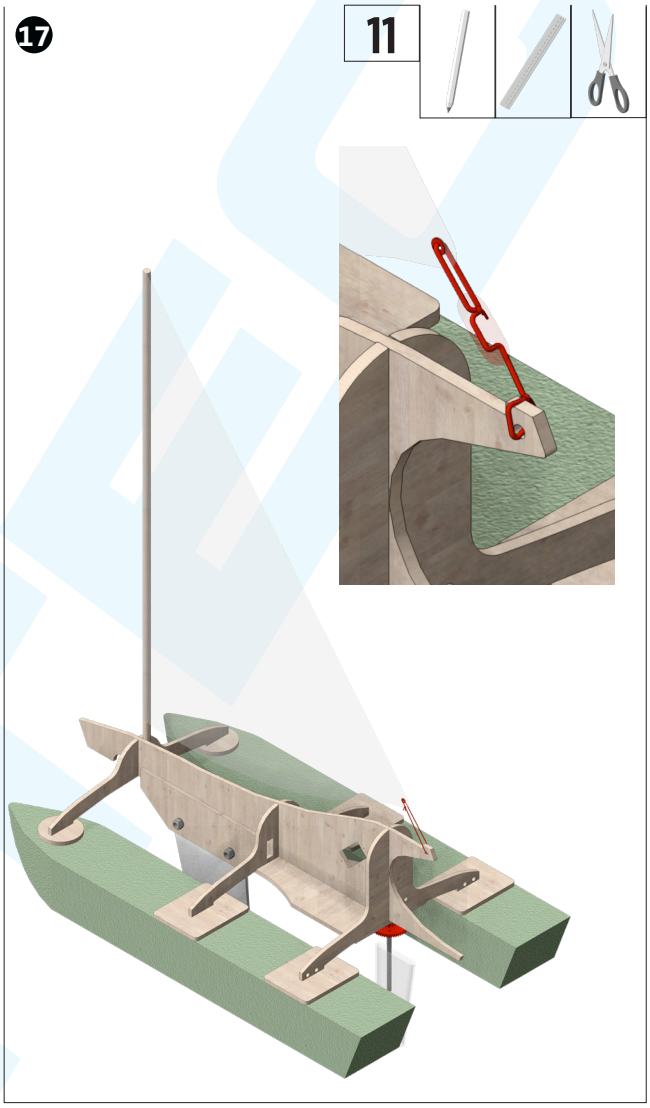
Transfer the template B for the sail to the laminating pocket (4) and cut it out. **Note:** Only one half of the laminating pocket is needed for the sail! Drill the ø2mm hole with the pilot drill. To reinforce the drill hole, cut out two approx. ø8mm circles from the rest of the thermoforming sheet (3) (see template A3), pierce another ø2mm hole in the centre and use this to reinforce the hole in the sail from both sides.



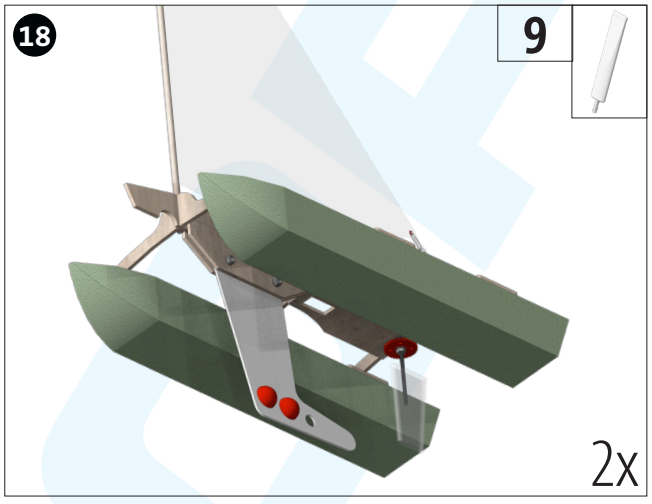
Shorten the round rod (5) to a length of 400 mm and clean the saw cut. Then glue on the finished sail as shown. Allow the glue to dry well.



Glue the finished sail into the body. Allow the glue to dry thoroughly.



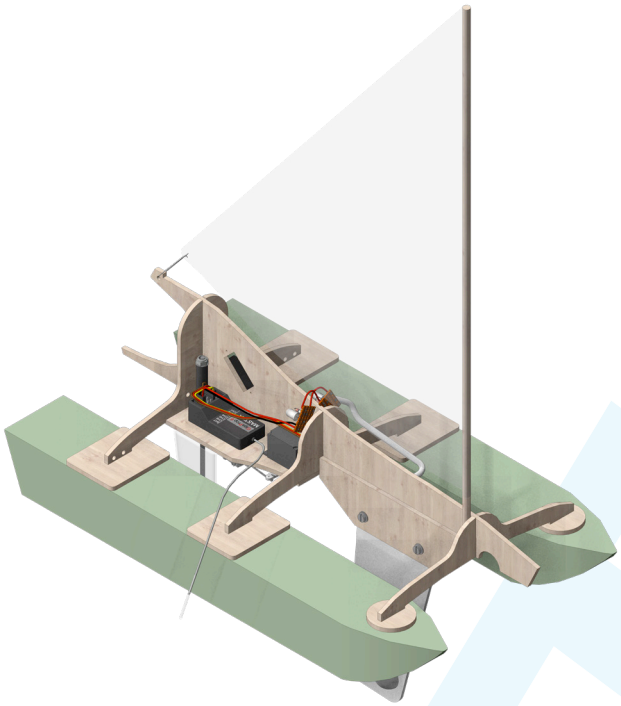
Loosely tie the sail to the hole provided in the body using a piece of beaded cord (11). Note: This can also be done adjustably using the drawstring (see template A4). See detailed view.



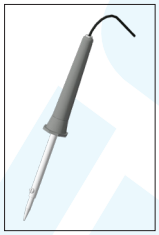
Place the boat in the water and glue in the two steel ball weights (9) if necessary.

126.308

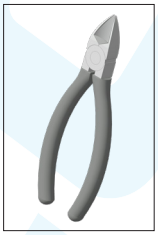
Extension with RC set 126.319



Additional tools required:



Soldering iron



Side cutters

Pointed pliers

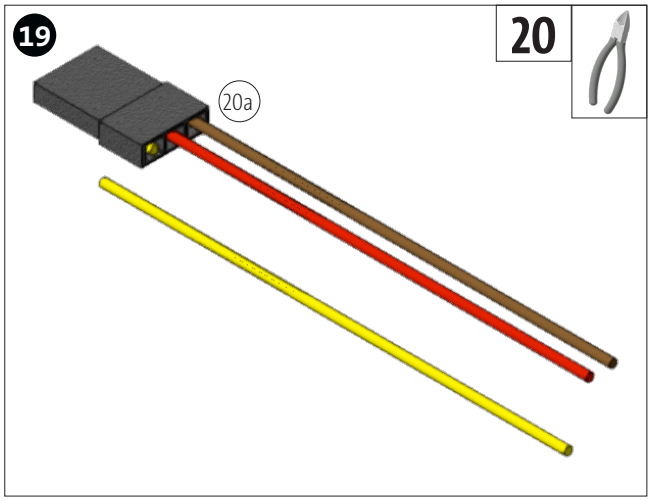
Additional material required:
RC remote control and receiver at least 2-channel (e.g. 217.650)Powerbank (210.441) or comparable voltage source with 4...5V

NOTICE:

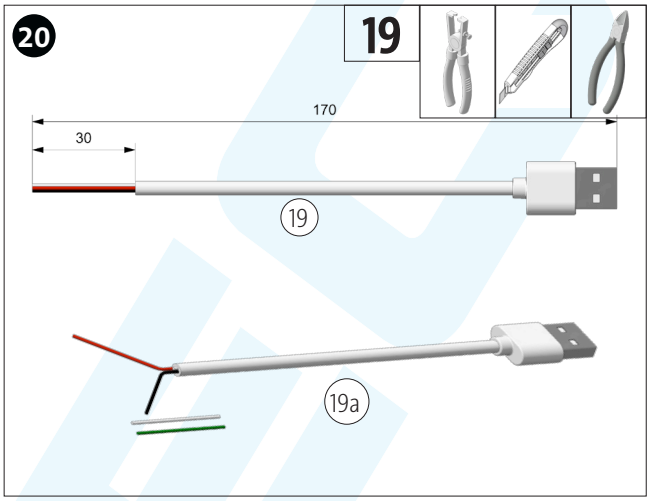
The following instructions are optimised for use with the Gigaprop4 Set radio remote control (217.650) and the power bank (210.441). Adaptations may be necessary if other components are used. Basic knowledge of RC modelling can be advantageous, but is not absolutely necessary. We recommend connecting the servos to the receiver before installing the control horns (do not forget the power supply) and moving them to the centre position using the remote control.

See also the note at the end of these instructions!

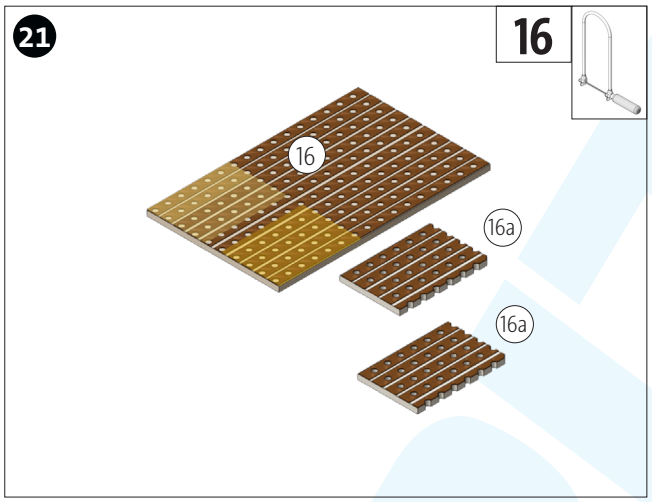
Bill of materials	Quantity	Dimensions (mm)	Description	Part no.
Strip grid circuit board	1	40x25x2,54	circuit board	16
Resistor	2	120 Ohm	Resistor	17
LED white	2		LED	18
Cable with USB-A plug	1	500	USB cable	19
Servo connection cable	1	50	Servo connection cable	20
Miniservo	2	35x30x12	Servo	21
Luster terminal insert	1	10x6x4	Luster terminal	22
Spring steel wire	1	Ø1x200	Spring steel wire	23
Cylinder head screw	2	M3x6	Luster terminal screw	24



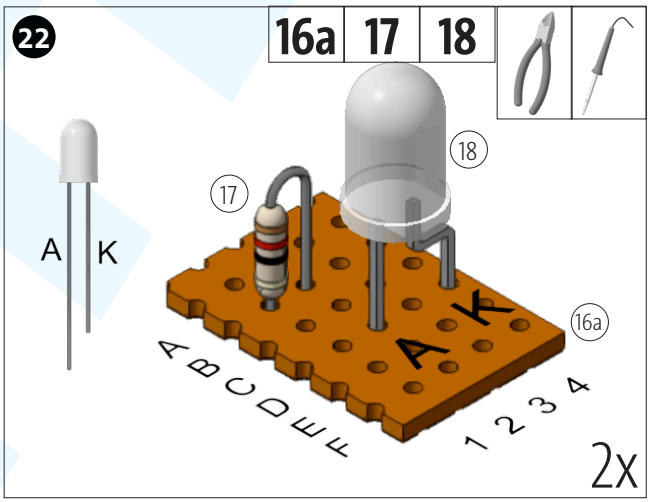
Manufacture the 'base load board' (some power banks switch off if the load current is too low). Remove the yellow wire of the servo connection cable (20).



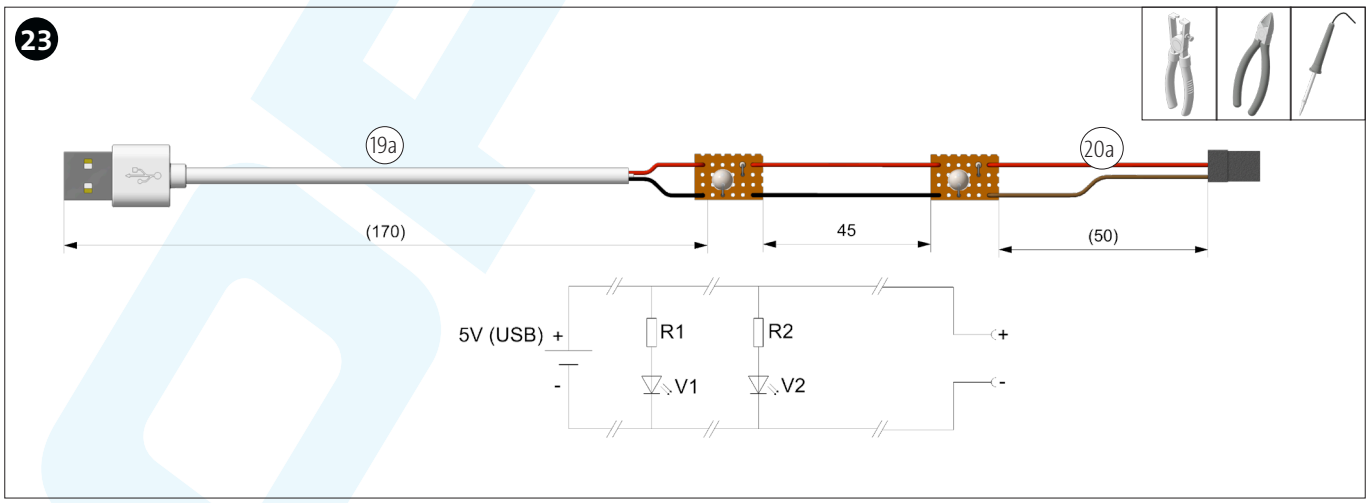
Shorten USB cable (19) to approx. 170mm (total length), remove outer sheath approx. 30mm, cut off white and green wires.



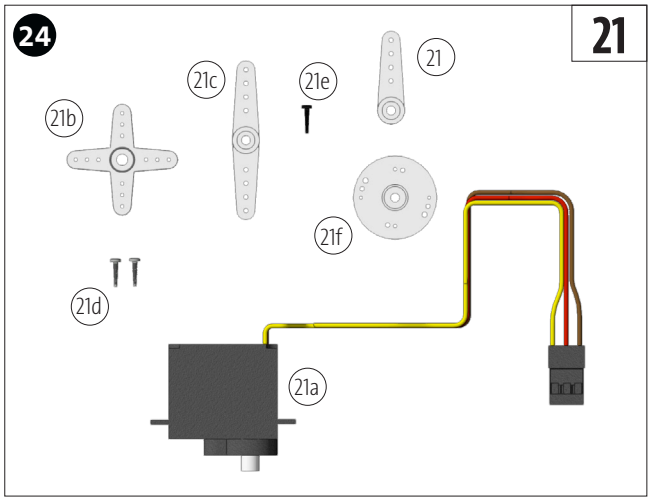
Saw out two small boards with a grid of 6x4 holes from the circuit board (16). Pay attention to the course of the copper tracks.



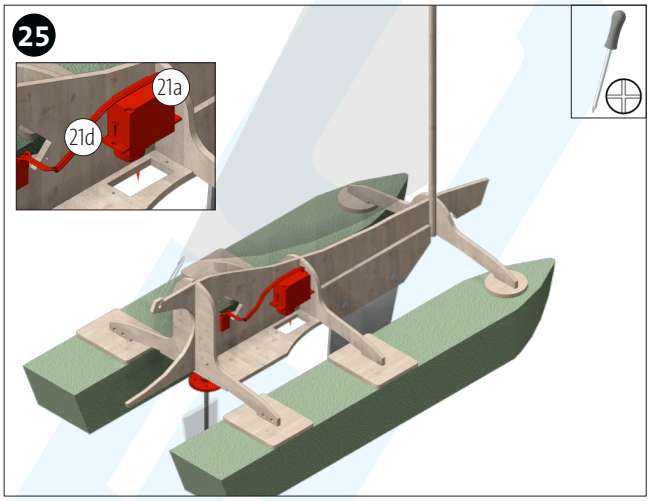
Fit the circuit board: Resistor (17) from B1 to B2; LED (20) anode (long leg) on D2, LED cathode (short leg) on D4.



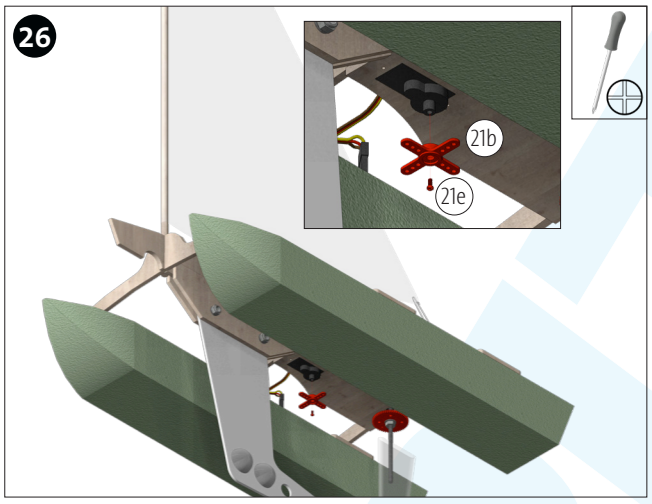
Solder the prepared cables (20a) to one circuit board each. Red cable (+) in column 4, black or brown cable (-) in column 1. Connect both circuit boards with a piece of stranded wire (approx. 45 mm long) (column 4 to column 4, column 1 to column 1). Test the circuit on the power bank: After plugging in, both LEDs should light up.



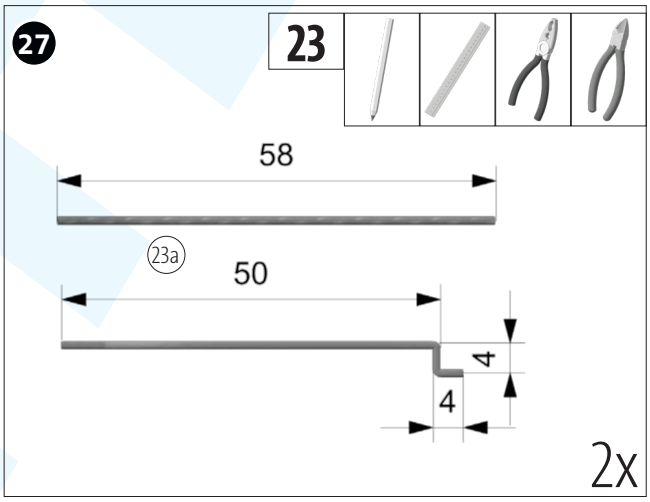
Scope of delivery mini servo: servo (21a); control horn 4-fold (21b); control horn 2-fold (21c); control horn 1-fold (21g); control horn round (21f); 2x fixing screw servo (21d); control horn screw black (21e)



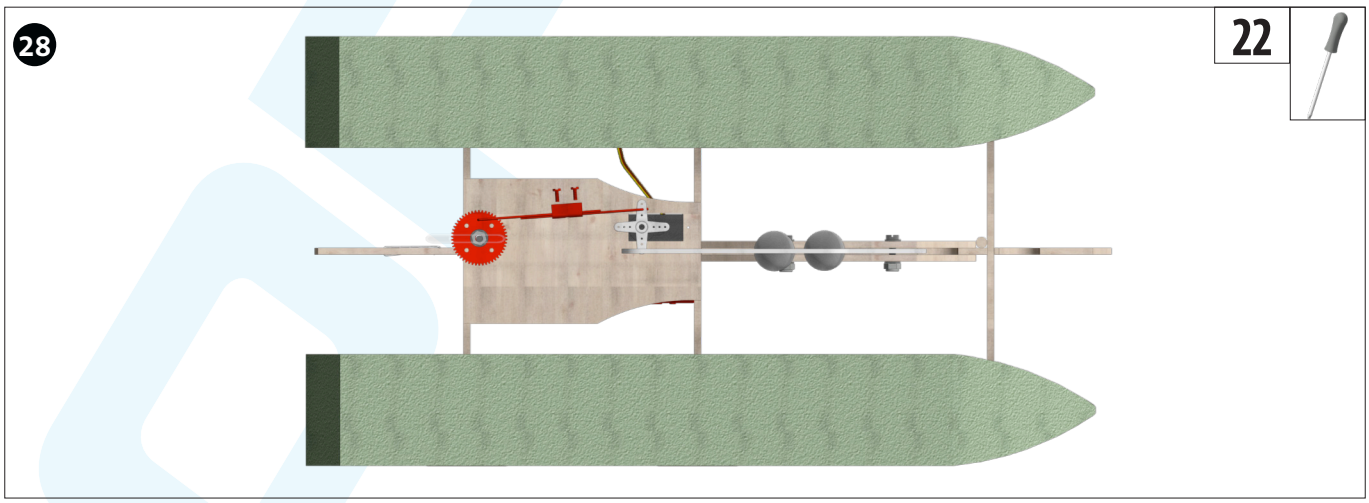
Insert the mini servo (21a) in the previous position and secure it with the two servo screws (1d).



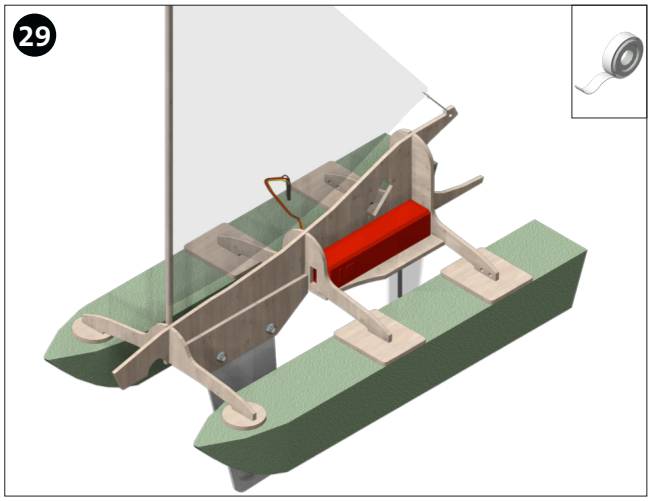
Attach the quadruple rudder horn (21b) to the servo shaft and secure it with the screw (21e).



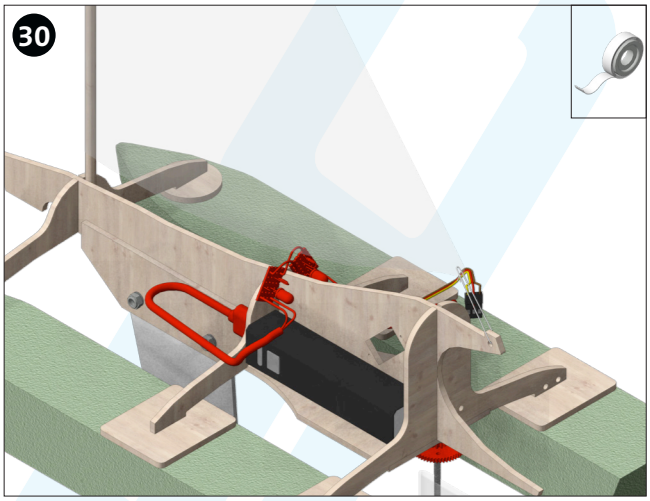
Cut 2 pieces of 58 mm from the spring steel wire (23) and bend as shown.



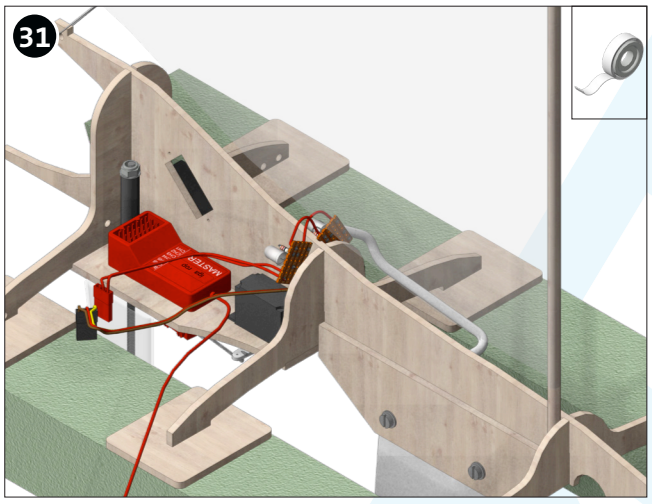
Insert one spring steel wire (23a) with the non-bent end into the lustre terminal insert as shown. Thread one bent end into the hole in the gearwheel. Insert the bent end of the second wire into a centre hole of the 4-fold rudder horn. Then fix in place with the lustre terminal strip screws.



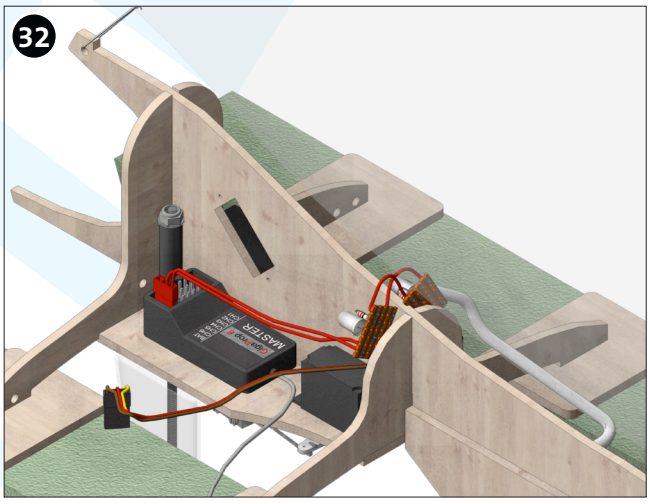
Place the required power bank so that the USB socket is positioned exactly in the recess provided in the body. Fix in place with double-sided adhesive tape.



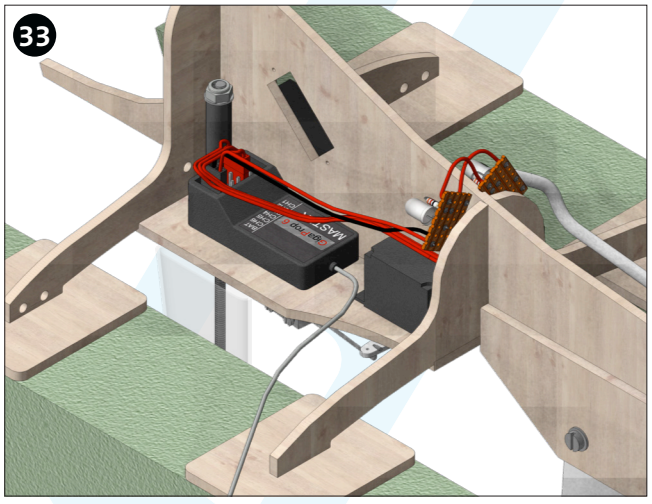
Plug the USB cable of the 'base load board' into the power bank. Position the two circuit boards as shown and glue them in place if necessary.



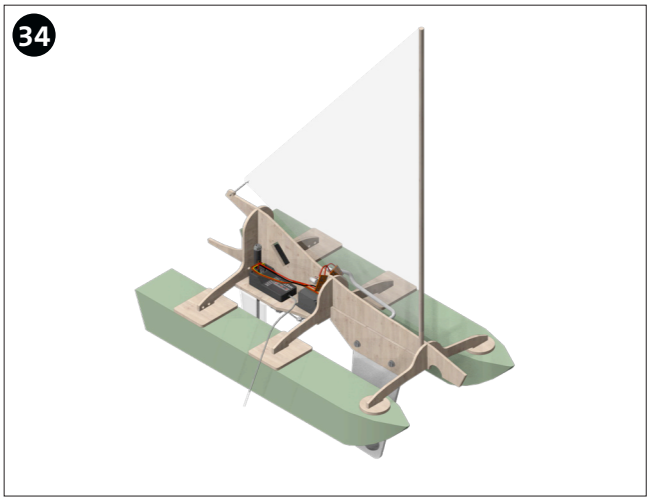
Place the receiver next to the servo with adhesive tape. See illustration!



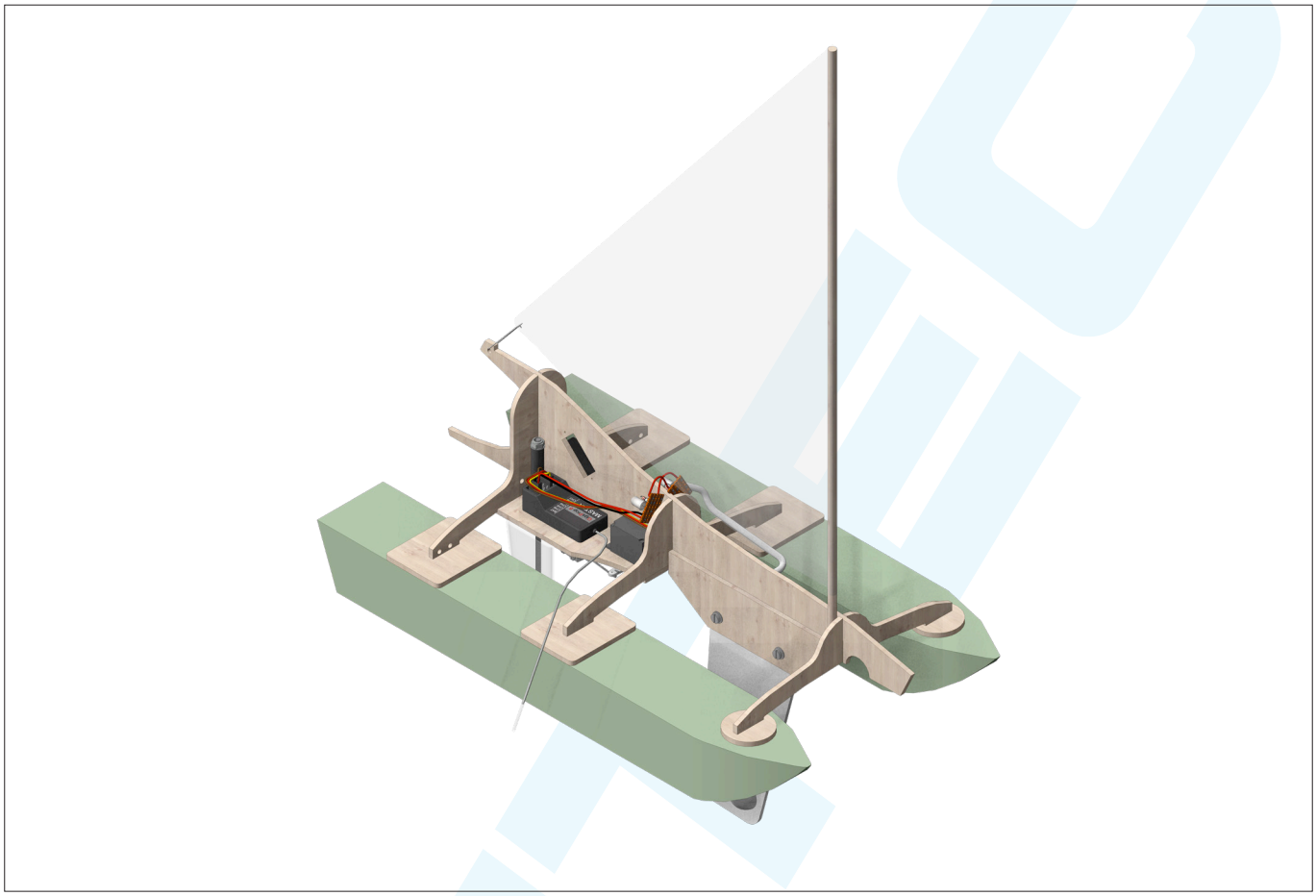
Plug the cable of the 'base load board' into the 'BAT' slot of the receiver.



Plug the cable of the mini servo into slot 'CH3' of the receiver.



Finished and ready to go!



Lay the aerial cable (last metal piece should be upright) so that it cannot get into the propeller. Connect the remote control to the receiver according to the instructions and check the functions. Done!

Important!

All the electronics in this kit are not waterproof! Due to its design, the catamaran cannot tip over by itself. Nevertheless, we recommend that you pack the electronics in waterproof packaging.

The recommended power bank (210.441) is clamped by inserting the USB plug, which is previously inserted through the recess in the cross plate 1c. If a different power bank is used, this type of fastening may not work securely. In this case, you must ensure proper fastening yourself (cable ties / Velcro tape / adhesive tape, not included in the scope of delivery). Furthermore, a different power bank may require a higher base load. Always fully charge the power bank before use. Of course, the kit can also be operated with a modelling battery. The base load board is then not required.
When using an electronic speed controller, however, a different motor is required (operating voltage!)

The base load board ensures that the power bank does not switch off automatically due to underload when it is connected to the receiver.

The Gigaprop 4 remote control (217.650) is already paired (bound) with the receiver ex works. This is not necessarily the case with other remote control sets. Proceed according to the respective operating instructions.

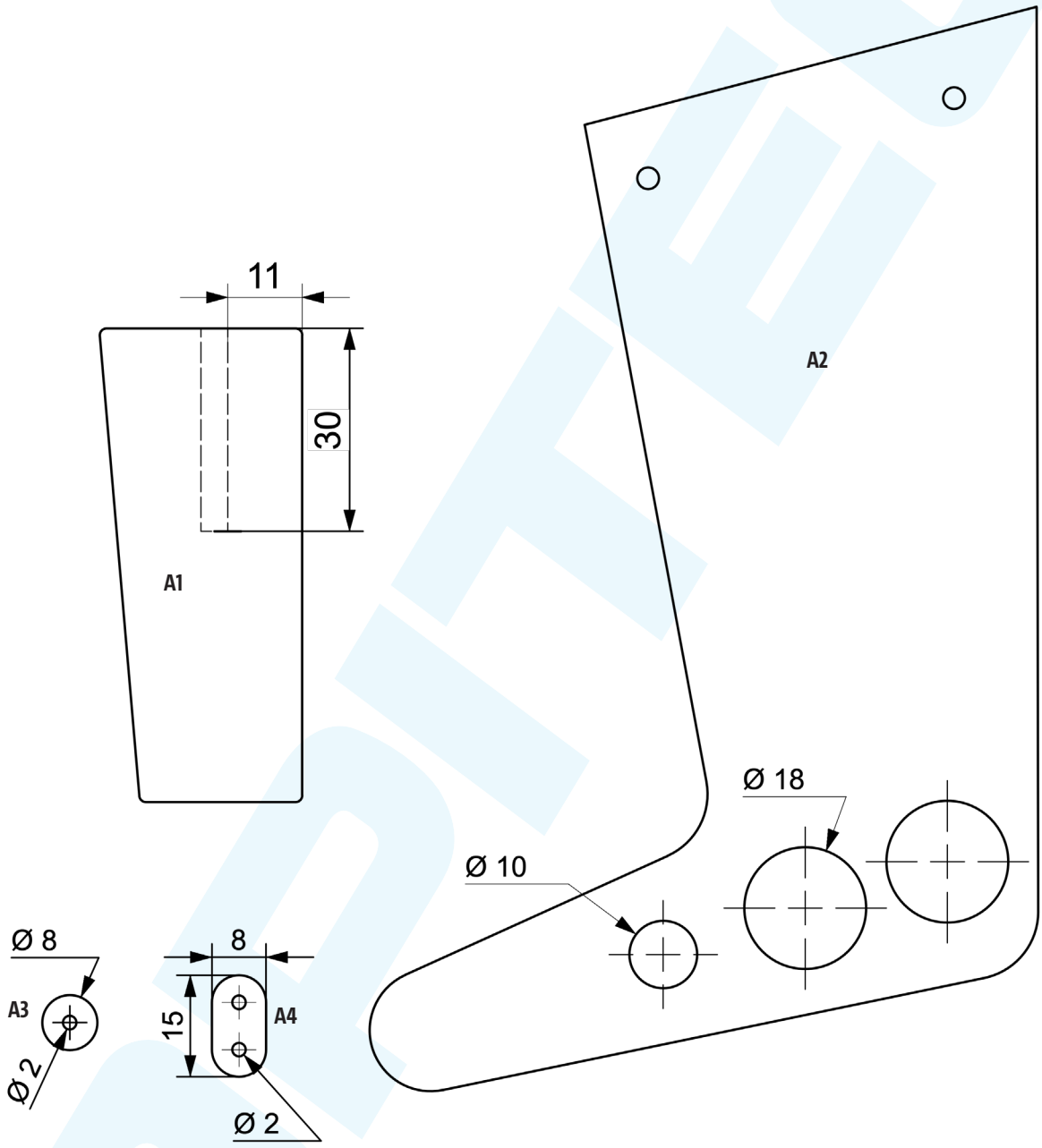
The direction of rotation of the servos can be inverted on the Gigaprop4 hand-held transmitter, so the polarity of the motor cable and the AA battery holder is not important during installation.

*Suitable waters: smaller, shallow, standing waters with good accessibility, as little vegetation as possible in which the rudder can get entangled.


OPITEC

Building instructions 126.308
Motus sailboat

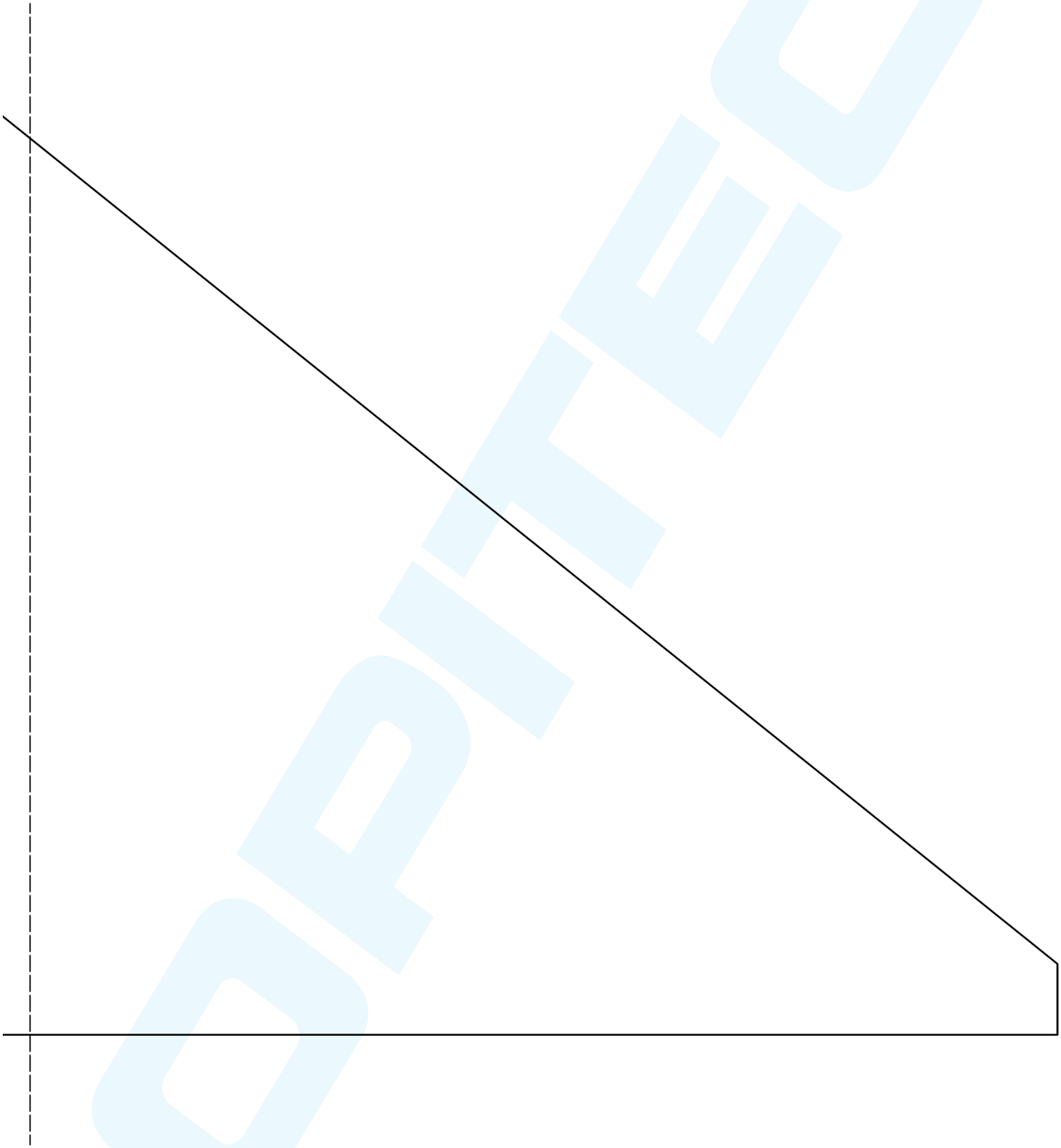
Template A
Rudder, keel fin,
Rudder reinforcement
M 1:1




OPITEC

Building instructions 126.308
Motus sailboat

Template B
Sail
M 1:1

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Building instructions 126.308
Motus sailboat

Template B
Sail
M 1:1