HELIO FLEET

SUN-POWER SHIP BUILDER SCHOOL

Solara B1

Small-Size Solar Ship Assembly Manual

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KOTKA
2020

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Content:

About Project

The HELIO FLEET project is intended for those who is interested in practicing small-size vessel building skills and for acquitting any photovoltaic knowledge. This project exhibits the opportunity to use solar energy source to feed a power unit (propulsion system) of a small-size vessel.

This manual describes procedures for assembling small-size rigid-hull vessels with parts and materials mounted on by using the do-it-yourself method. The package contains a set of component parts packed up in wooden boxes.

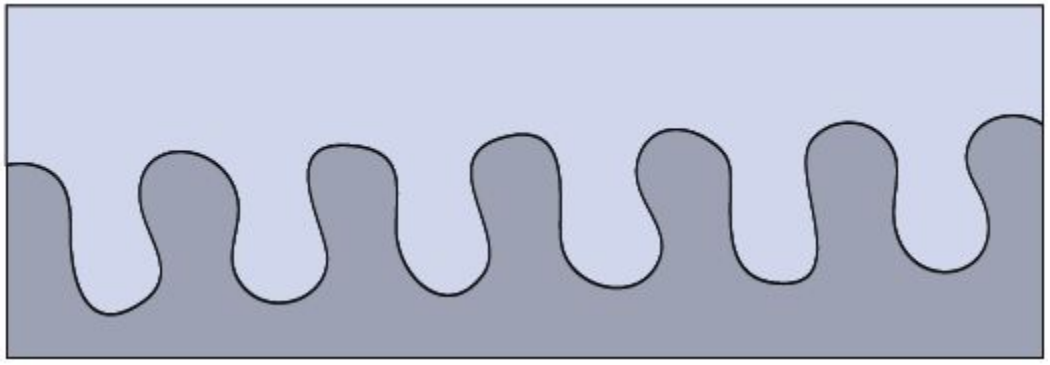
All package items are intended for using during assembly as vessel slipway elements or technological material. All the electrical equipment is unique. The power systems are designed to run from a 24V supply.

Vessel case-shaped part assembly

Solara B1

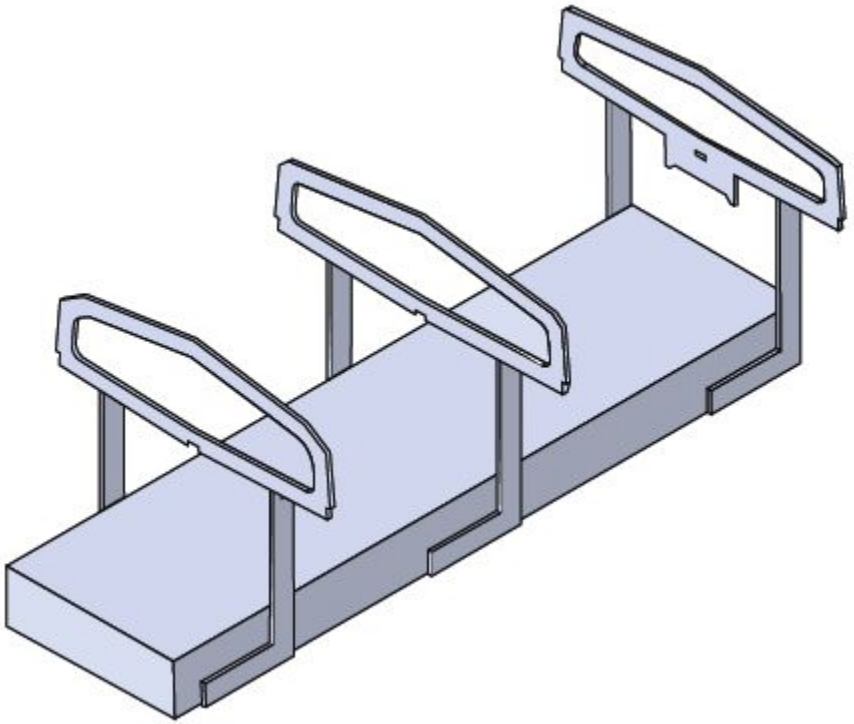
Project

❶



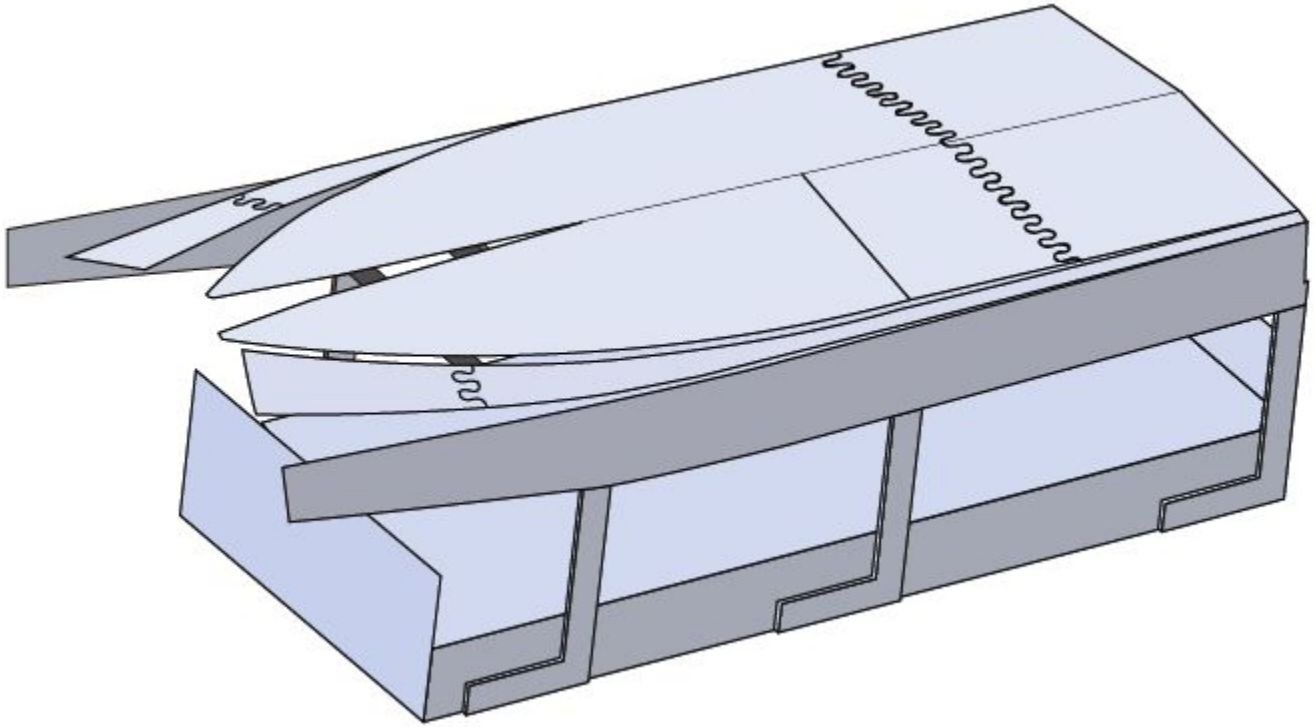
The vessel parts are made of moisture-resistant plywood and divided into several items with shaped grooves made for convenient coupling.
The hull parts are to be preliminary glued with mounting joints secured by glass cloth tape delivered in a mounting kit.

❷ Mounting slipway assembly



Slipway items are to be taken from the package box.
L-shaped and straight elements obtained after stripping package boxes can be used for assembling a mounting slipway.

❸ Hull assembly

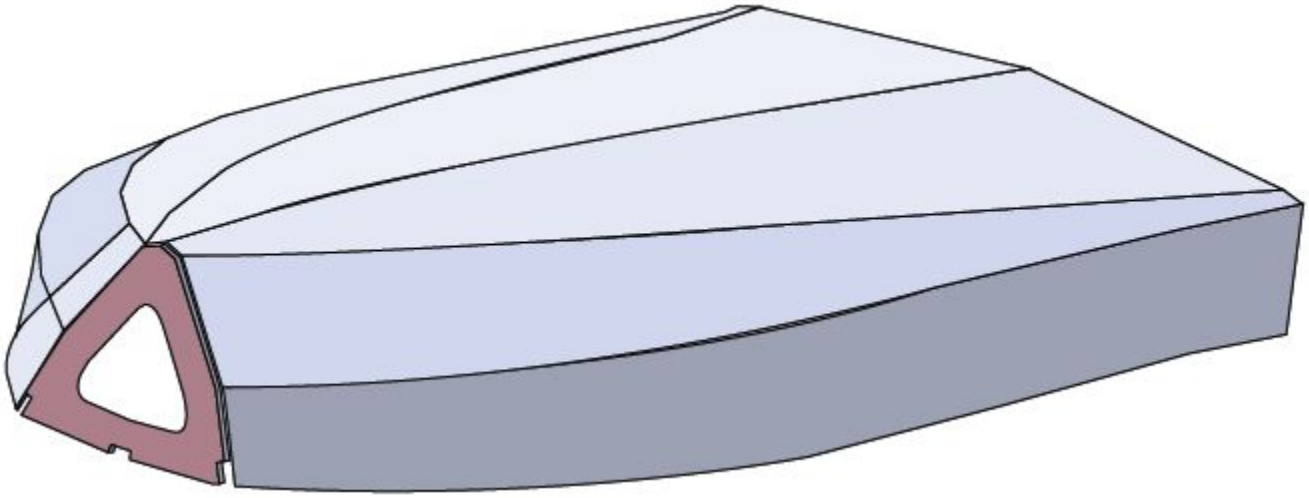


Assemble your vessel on a slipway with its bottom facing upward.

1. Install frame rings on the assembled slipway with beveled edges (notched slipway edges) prepared.
2. Install bottom plates, then a half-board and board securing them to the frame rings with 3x16 self-tapping screws. The plates shall be fixed beginning from the transom stem.

When assembling a vessel, you should achieve the best precision measurements; make sure that the vessel dimensions match those specified in the drawing.

❹ Forekeel installation



All boards, including the bottom and half-board should be assembled on a forekeel and secured with self-tapping screws.

❺ Forward and stern-part board installation

The forekeel and transom panels should be installed at the final vessel mounting stage.
Secure panels to the frame with self-tapping screws.

❻ Making leak-proof joints

All transom, forward, bottom, half-board, and board panels should be fixed with glue.

Install side stringers and secure them to the frame through vessel sides with self-tapping screws.

Apply glue on glass cloth tape with its strips overlapped.

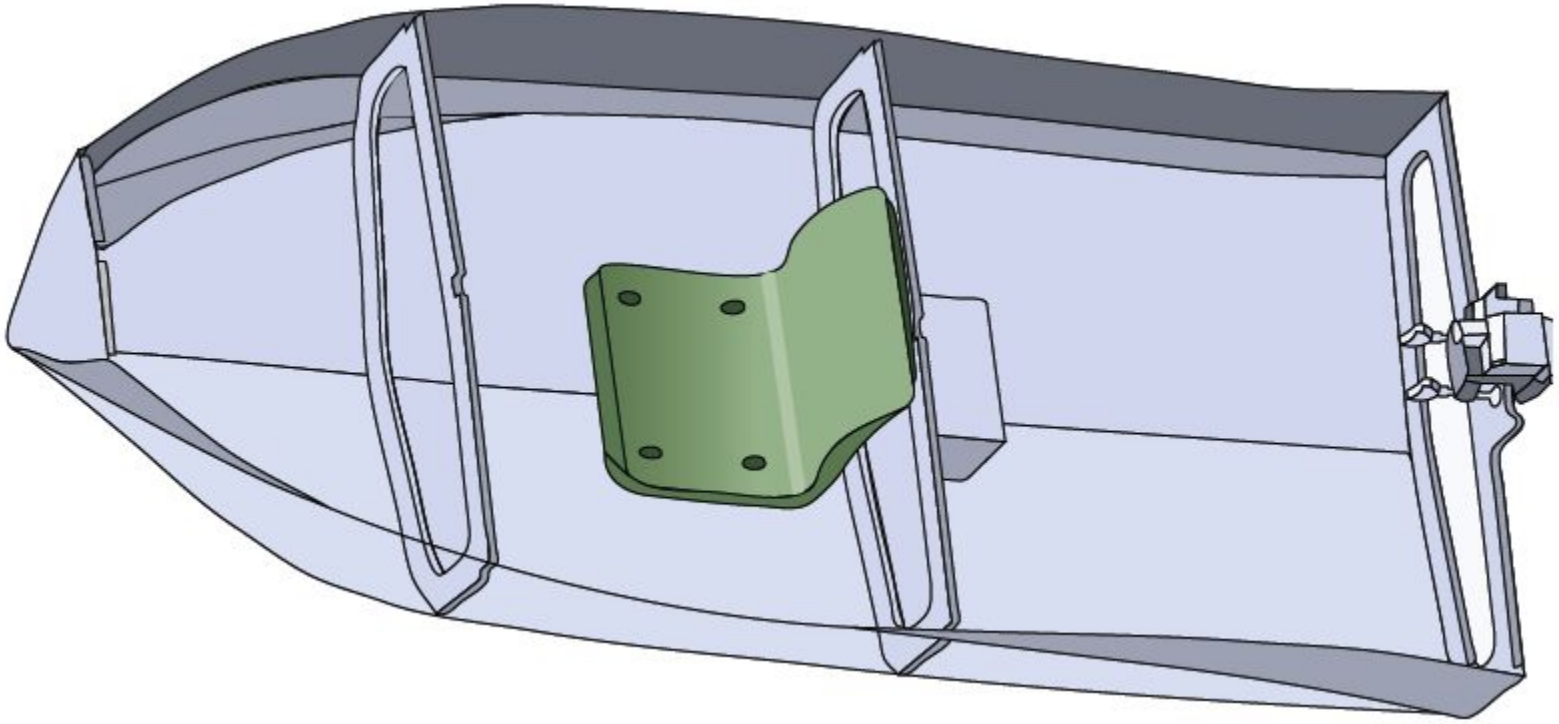
The surfaces glued should be preliminary coated with resin. Put a glass cloth tape (it is preferred to roll off the tape on-site) on joints along the full length. Then, impregnate joint taped surfaces with adhesive.

Use polyethylene film to cover joint surfaces in order to intensify a polymerization process.

In the areas where panels go apart producing gaps that exceed 2 mm it is necessary to clamp panels with plastic straps that must be removed after gluing.

❼ Installation a pilot seat in the vessel cockpit

Attach a seat to the vessel bottom through the preliminary bottom plates.



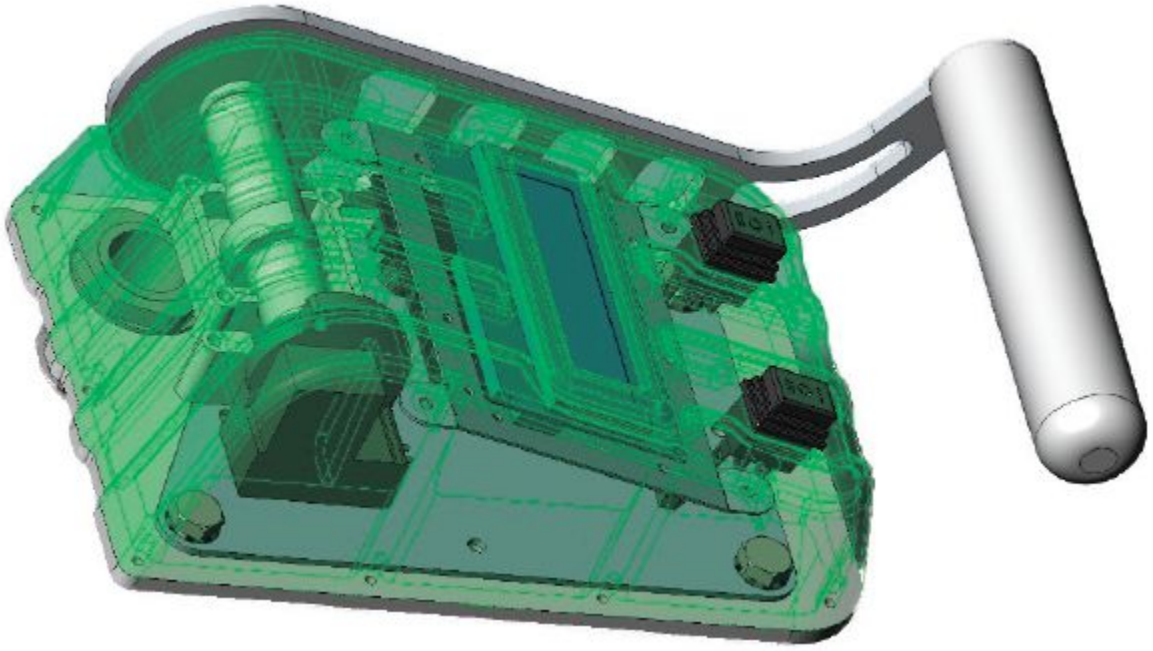
❽ Preparation of the vessel to a hydraulic test procedure

The hull should be completely decorated. External surfaces should be painted over with 3-4 layers of acrylic and internal surfaces should be painted with marine-grade varnish. The vessel should be tested in any water body or in a water reservoir to have 20 cm to 50 cm depth.

Such test procedure is to be carried out in order to check the vessel for its leak-proof performance.

On testing, put the vessel on the slipway-mount keel-blocks to proceed to further steps.

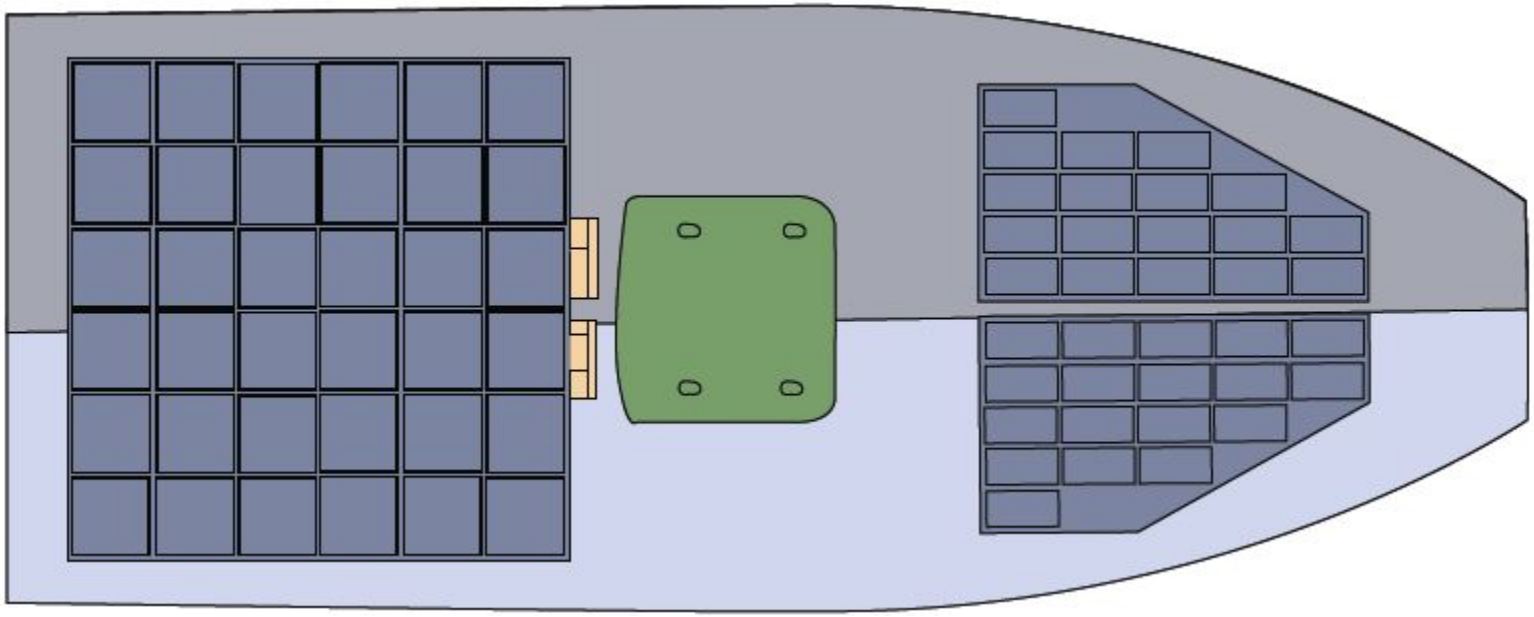
❾ Electrical equipment installation procedure



A wiring harness– i.e. bundled wiring with waterproof connectors – is supplied for assembly. This harness should be laid along the right-hand sideboard and clamped with plastic straps.

A storage battery should be installed behind the pilot seat in a plastic compartment to be attached to the second frame by a rubber band.
NOTE: a 50A fuse is installed inside a waterproof battery compartment.

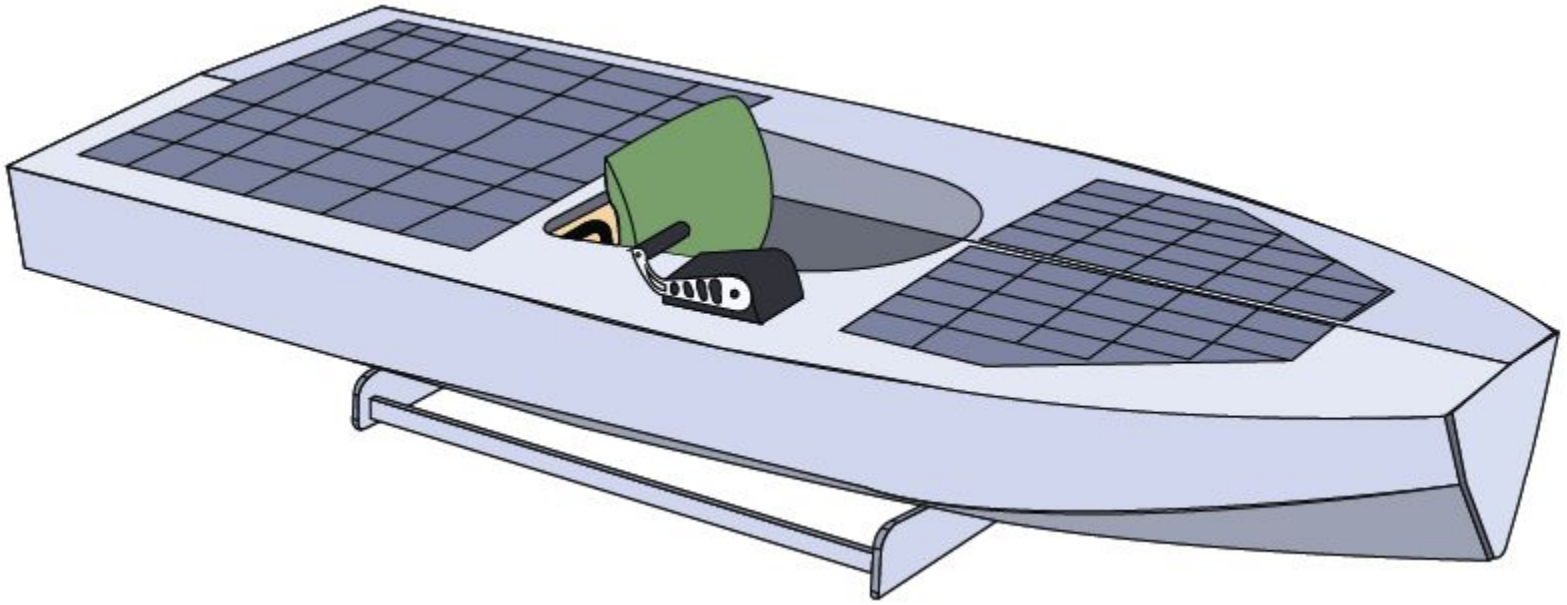
❿ Deck and solar cell panel assembly



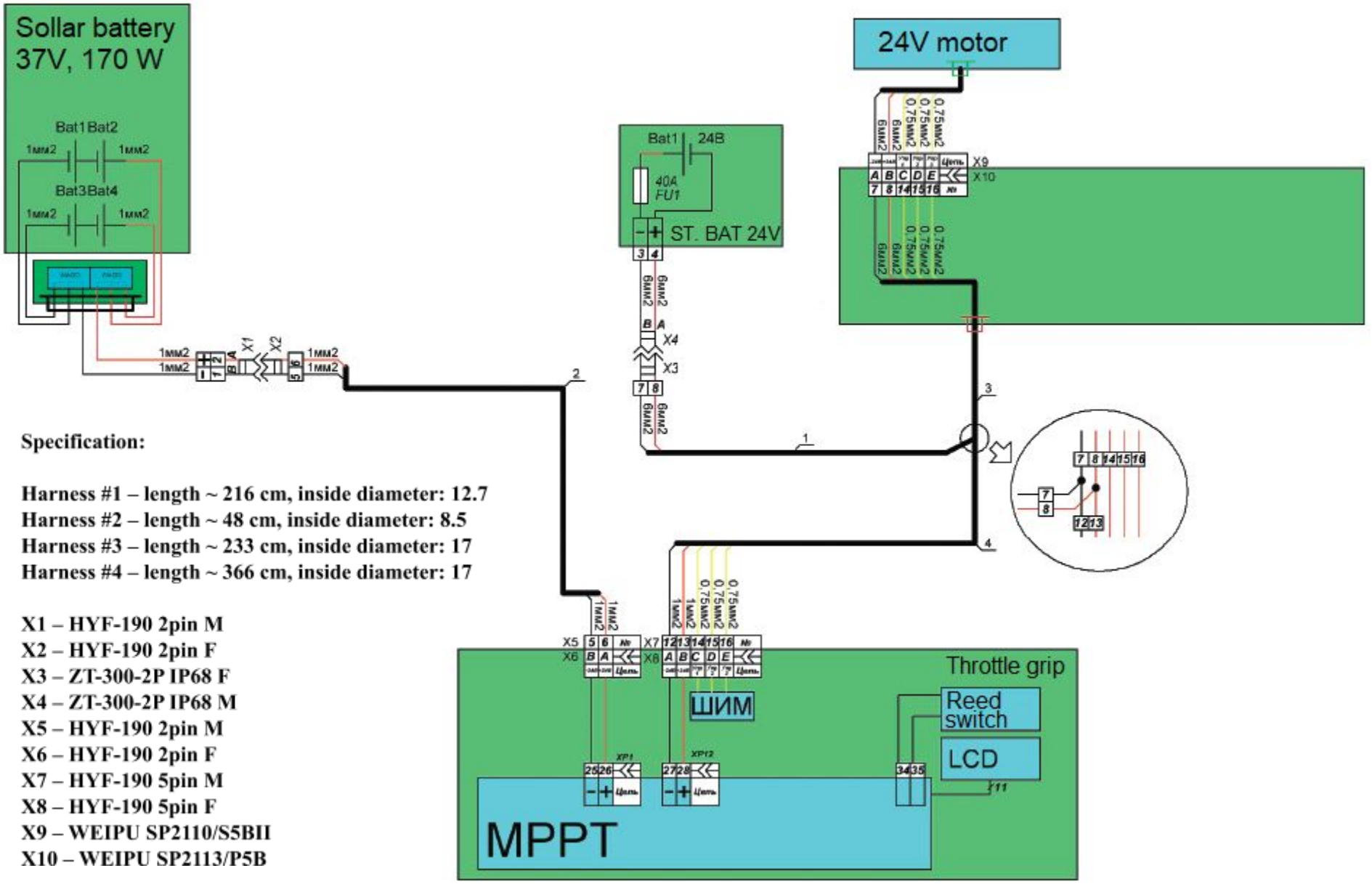
Mount a deck starting with a decorative-layer coated foredeck unit. Make sure that the lower hull and foredeck unit surfaces are properly aligned. The foredeck unit may be additionally glued to the hull for reinforcing the vessel and for improving its leak-proof performance. The read-end deck is to be used as a removable unit, thereby making it easier to install electrical equipment.
Mount an electric machine in such a way that it is reached by a pilot's right hand. Drill a 25 mm hole including those to be used for fixing the machine and drill an 8 mm hole for insetting fastening pins.

Assembly Sequence

All holes should be drilled using a TEMPLATE that is delivered along with drawings.



Drill a 44 mm hole in the aft deck for fixing connectors of the harness that runs to the boat submerged motor steering gear.
Mount a steering wheel on the mid-frame deck.
Proceed to as follows for mounting solar cell panels. There are the panels assembled from 4 units – two aft and two forward units. The panels should be connected in series: two aft and two forward units. Then, forward and aft units should be connected to the electric machine (vessel controller) in parallel via connectors X12 and X11. The panels may be glued to the deck with adhesive or secured with self-tapping screws.
All connectors should be assembled according to the wiring diagram. The storage battery is the last unit connected to the system.
Mount the boat submerged motor after the vessel is brought to kill-blocks or to water.
Make sure that connectors X8, X9, X7 and X6 are connected according to the wiring diagram.



Specification:

Harness #1 – length ~ 216 cm, inside diameter: 12.7
Harness #2 – length ~ 48 cm, inside diameter: 8.5
Harness #3 – length ~ 233 cm, inside diameter: 17
Harness #4 – length ~ 366 cm, inside diameter: 17

X1 – HYF-190 2pin M
X2 – HYF-190 2pin F
X3 – ZT-300-2P IP68 F
X4 – ZT-300-2P IP68 M
X5 – HYF-190 2pin M
X6 – HYF-190 2pin F
X7 – HYF-190 5pin M
X8 – HYF-190 5pin F
X9 – WEIPU SP2110/S5BII
X10 – WEIPU SP2113/P5B

Delivery Package

Solara B1 Project

Name	Quantity	Material
Box No. 1	1	Plywood, metal
Box No. 2	1	Plywood, metal
Hull parts	14	Waterproof plywood
Mounting kit No. 1	1	Resin, glass cloth tape, graduated glasses, gloves
Seats	1	Plastic + plugs
Storage battery	1	LiFePO4
Solar cell panels B1	4	Polycrystalline silicon on a flexible substrate
Electric wiring harness B1	1	IP 64
Electric machine	1	Vessel controller
Boat motor B1	1	Brushless
Steering wheel	1	Aluminum
Kevels	3	Plastic
Safety kit B1	1	Boat hook, buoy, life jacket, halyard

Use equipment, tools, accessories, electrical appliances for the primary purpose only.
Do not use defected equipment, tools, accessories, and electrical appliances.
Keep tools in a dustproof and dry place.
Carefully use any adhesive to prevent spillage; wear protective gloves.
For removing any sawdust collected after work use a brush and a scoop.
When using scissors, a knife, a blade or a file, make your moves away from your body.
Pass cutting tools to anybody away from your body.
Do not leave scissors in open areas; hand over scissors with its rings facing forward and with edges closed; do not swing them.

Contacts

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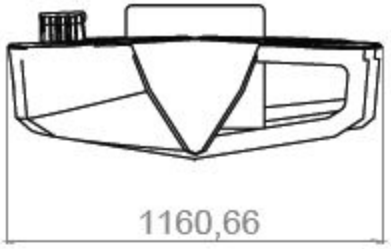
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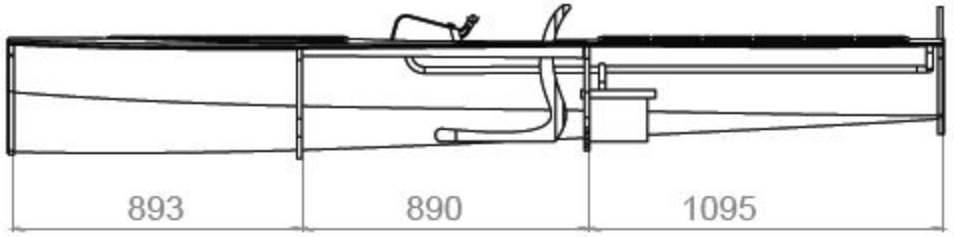
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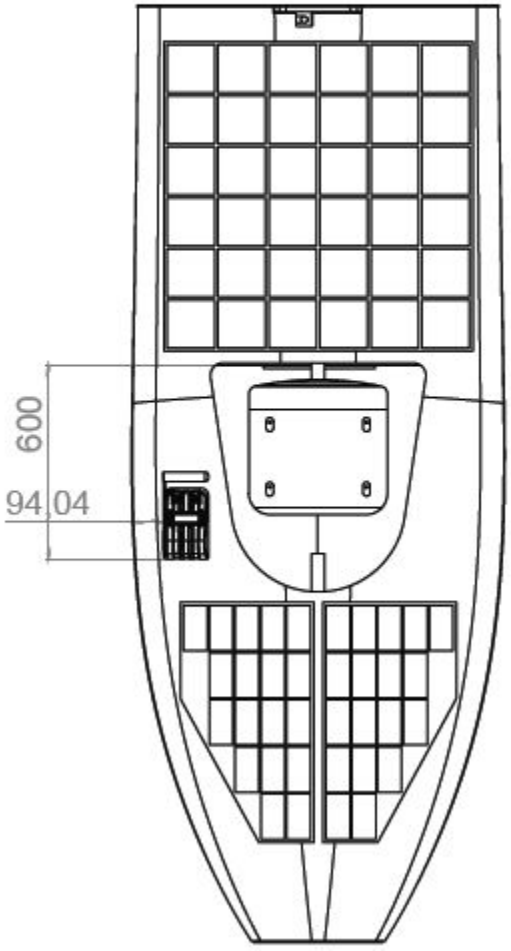
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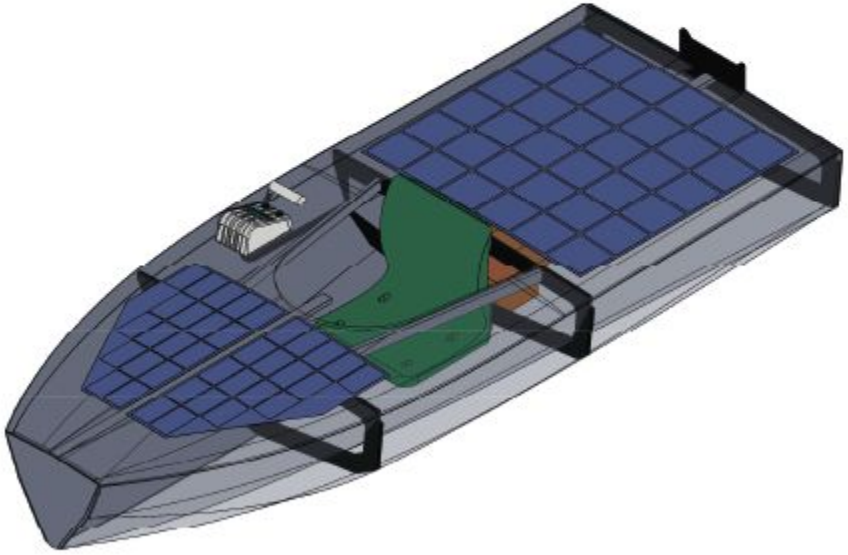


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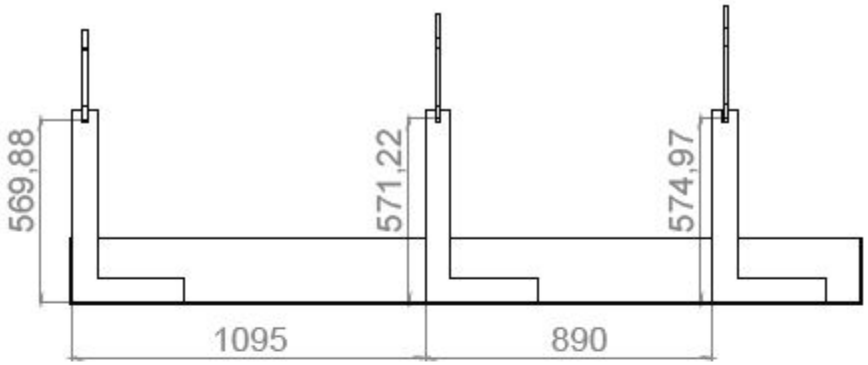
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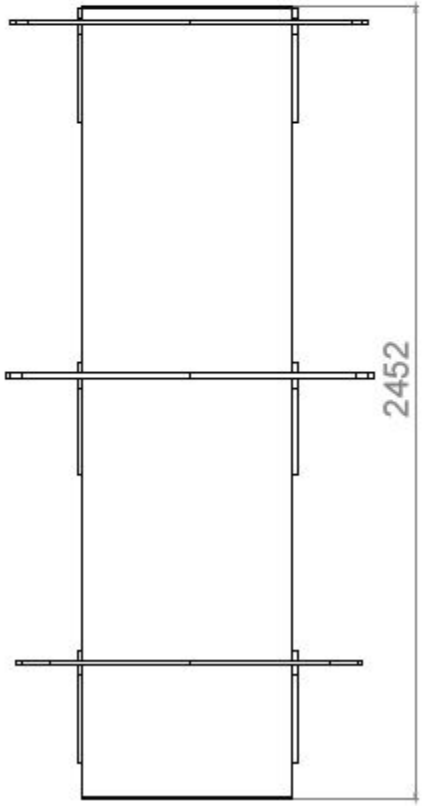
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