AVRii INTEGRA

Avrii INTEGRA Carport

PHOTOVOLTAIC CARPORT STRUCTURE

ASSEMBLY MANUAL

Version 1.0

CONTENTS LIST

Introduction

This manual was developed as a concise and user-friendly source of information on the safe installation in line with best practices. We encourage you to make use of our support in the form of this manual, both before assembly as well as during operation and inspections.

This document contains information concerning the construction, installation and safe use of the PV carport (referred to in the manual simply as the 'carport').

Adhere to all EU and domestic provisions concerning the erection and usage of the load-bearing structure as well as the electric equipment and systems.

Failure to adhere to the indications provided below can lead to death, bodily injury or property damage.

The installation specialist must read and understand the notes and information before installation. Any questions you may have should be sent to our sales or technical departments. Before assembly, installation specialists should acquaint themselves with the mechanical and electric requirements of the set.

The manual constitutes the fundamental source of information on rules concerning the handling, usage, execution of installation and operation as well as the shut-down and disassembly of the relevant technical resources in terms of cooperation with PV modules and electric vehicles.

Information provided in the manual is based on the following:

- norms and provisions of the law as well as good engineering practices,
- mechanical data and parameters of the components and devices,
- data and electrical parameters of the components making up the electrical system,
- knowledge of issues of PV structure robustness,
- conducted analyses and inspections.

In case of discrepancies between the assembly manual and the manual attached to the assembly system or other components of the PV system, immediately seek advice from Avrii specialists or entities authorised by Avrii to release opinions concerning the installation and usage of their products. Following consultations and the acquisition of a technical opinion from authorised entities, it is permitted to develop declarations concerning the modes of special use not covered by the present manual.

The present manual should be stored in a safe manner, to be used in the future (operation and maintenance) as well as in case of disassembly and resale.

We continuously work to improve our products and their documentation. For this reason, we recommend to always use the latest version of the manual.

CONTACT DETAILS

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Safety resources

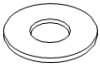
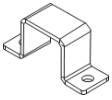
The adherence to general safety provisions at all times during installation and maintenance work as well as during inspections guarantees the maintenance of system efficiency and reduces the risk of injuries and trauma.

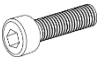
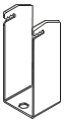
Installation specialists should adhere to OHS provisions and the relevant

- Perform your work so as not to introduce greater risks than those that stem from the object of the work for yourself or any potential bystanders.
- Make use of assembly manuals attached to the relevant components.
- Protect the construction/ installation area in a clearly visible manner, and mark it at a distance that is safe for bystanders.
- Use tools dedicated for the installation of PV systems by authorised manufacturers.
- Have your delegation document to conduct work that you received from your superior at hand.
- Have at their disposal the specific scope of competences related to your knowledge and qualifications.
- Stay informed of the hazards that may be found at your work place.
- At no time should unauthorised personnel be allowed to enter the construction/ installation area; by good practices, technical culture and by law, it is absolutely forbidden to endanger bystanders, those not taking part in the assembly
- Adhere to recommendations of you supervisors or assembly inspectors as they are decision-makers in terms of technical solutions, for immediate introduction of potential improvements and changes with an indication of causes and documentation of the reasons for changes
- Keep at the construction site all certificates and documents confirming your licences as well as the operating capacity of your equipment (helmets, safety harnesses, ladders, etc.) in order to show them during a possible inspection by authorised supervisory bodies.
- Avoid disadvantageous weather conditions, such as strong winds or precipitation
- Do not work in snowfall or in the presence of ice.

This manual does not list all the precautions necessary for safe operation.

1. List of components – Avrii INTEGRA Carport Structure-2

No.	Name	Technical drawning	Pcs.
1.	Structural support leg (vertical support post)		2
2.	End cap (steel)		2
3.	Hex screw		8
4.	Acorn nut		16
5.	Round spacer		16
6.	Profile B, 100 x 40 x 2, length 6000 mm or shorter, suitable for the modules used		10
7.	Profile A, 160 x 80 x 5, length 5382 mm		2
8.	End cap 100x40 mm		20
9.	End cap 160x80 mm		4
10.	Threaded rod A2 M10X110		6
11.	Acorn nut A2 M10		12
12.	Round spacer A2 10,5 (M10)		12
13.	Bracket KAB_inox_3 mm		20

14.	Hex screw M8X25 A2		**40**
15.	Clamp KPV_inox_1,5 mm		**60**
16.	Push screw M6X16 A2		**60**
17.	Seal 20x15 mm		**36 m**

1.1. List of components - Avrii INTEGRA Carport Structure 4-10

No.	Name	Structure -4	Structure -6	Structure -8	Structure -10
1.	Number of spots	4	6	8	10
2.	Structural support leg	3	4	5	6
3.	Steel profile A 160x80x5x5382mm	3	4	5	6
4.	Steel profile B 100x40x2x6000mm	20	30	40	50
5.	Clamp KPV_inox_1,5mm	120	180	240	300
6.	End cap (steel)	3	4	5	6
7.	Hex screw M6x12 A2 (for end cap)	12	16	20	24
8.	Acorn nut A2 M20	24	32	40	48
9.	Round spacer A2 21 M20	24	32	40	48
10.	End cap 100x40mm	40	60	80	100
11.	End cap 160x80mm	6	8	10	12
12.	Threaded rod A2 M10X110	9	12	15	18
13.	Acorn nut A2 M10	18	24	30	36

14.	Round spacer A2 10,5 (M10)	18	24	30	36
15.	Bracket KAB_inox_3 mm	30	40	50	60
16.	Hex screw M8X25	60	80	100	120
17.	Push screw M6X16 A2	120	180	240	300
18.	Seal 20x15 mm – 2 m x 18 pcs.	72	108	144	180
19.	B-profile connector	10	20	30	40

2. List of tools necessary for assembly

No.	Name	Pcs.
1.	Wrench 30 mm	1
2.	Wrench 17 mm	2
3.	8 m tape measure	1
4.	Rubber hammer	1
5.	Articulated ladder – height: 3 m	2
6.	Hex key, 3, 4, 6 mm	2
7.	Transport belt/sling	1
8.	PPE	2

3. Preparation for assembly

In order to assess the location of erection of the system outside of geometric components, and for spatial orientation, analyse this list of additional components influencing the ultimate assessment, such as:

- Inclination Azimuth
- Presence of trees, pillars and other tall objects
- Distance to other buildings
- Distance to hazard and danger zones

3.1. Preparation of assembly location

The place of installation should be even, it may have a slight inclination of up to 5% against ground level. All concrete components should be level so as not to cause shifts against the soil and ensure structure stability.

4. Selecting the mode of fixing to the ground

4.1. Poured foundation

At the selected spot, following precise measurements and an inspection of diagonals, prepare an excavation and fit your formwork. The foundation slab should be made of at least B25 concrete with steel rebar of ribbed rods, min. diameter 10 mm. Crosswise reinforcement of rods, at least 6 mm.

The rebar should be installed horizontally. To the upper rebar portion, tie (using tie wire) or weld the anchor and rebar components of the car port (threaded rods).

The horizontal heights of both foundation pieces and their distribution against each other should be the same so that the vertical support posts are placed symmetrically against each other. The upper portion of the foundation should be levelled precisely.

As an alternative, use ready steel patterns or drill openings in the concrete and use chemical anchors.

We are attaching a diagram of the ordered carport, as dimensions may vary due to the utilised PV modules and the width of the available parking spot.

5. Installing the vertical pillars

All work should be carried out by at least two people

The vertical posts are fixed to the threaded M20 rods protruding from the foundation. The posts should be directed towards the entry direction (see fig. 1), and the caps should be found on the inner side of the carport.

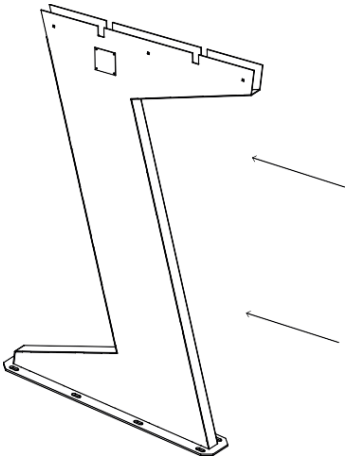


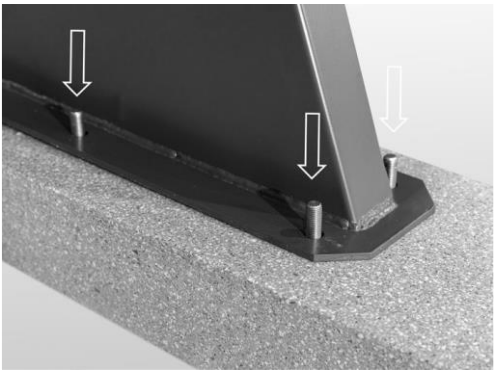
Fig. 1. Mode of installation of the vertical support posts.

First of all, remove all contaminants from the upper portion of the foundation and the threaded rods. Put the support post onto a foundation prepared in this manner, and fix it with acorn nuts with M20 spacers.

The tightening moment of the screws should be ca. 30-50 Nm.

1.

The transport, set-up and installation of the vertical support posts on the foundation should be performed with the aid of a forklift truck.



2.

Fix the mounting screws precisely in the fixing openings of the vertical support post.

3.

Using the M20 acorn nuts with spacers, fix the post to the foundation base.
The bolt tightening moment should be ca. 100 Nm.

6. Fixing of the load-bearing structure for the PV modules

Before commencing with the assembly, check the spacing of the support posts against each other, and confirm that the support posts are fixed in a vertical position.

In case of divergences from the vertical, perform the necessary corrections using spacers for the fixing bolts.

Then insert the steel profile A (160 x 80 x 5) into the recess in the support post and fix with three M10 x 110 fixing screws and acorn nuts, using spacers on both sides.

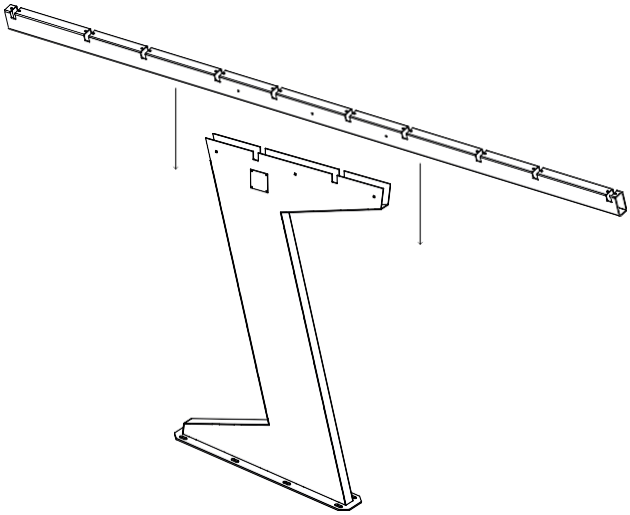
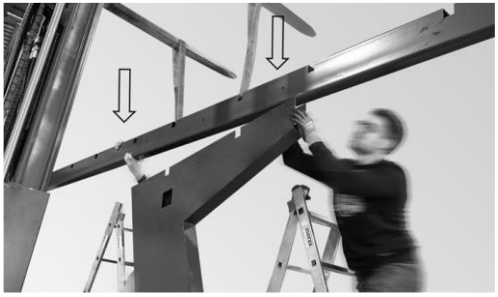


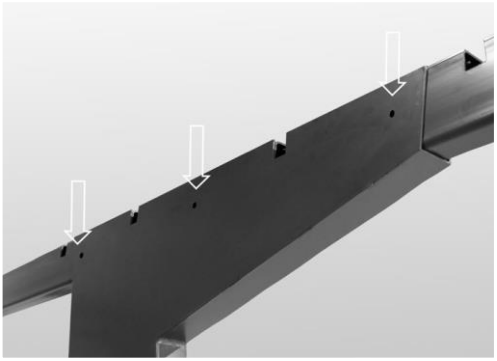
Fig. 2. Mode of fixing of profile A to the support post.

The profiles must be arranged in such a way so that the assembly openings overlay with the assembly openings of the support posts.



4.

In order to avoid cracks on the surfaces of the components to be joined, protective film can be used.

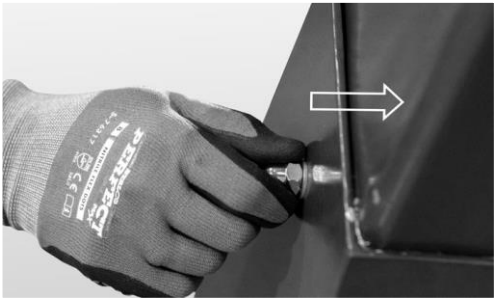


5.

Prepare the joining location of the two components in such a way so that the assembly openings overlay with the assembly openings of the support post.

6.

Put the M10 spacer on the M10 threaded rod, affix the nut.

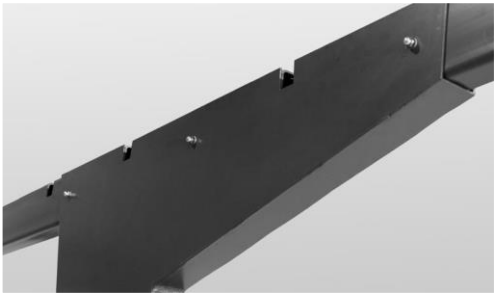


7.

Pull the rod through the openings. Then attach the spacer and tighten the bolt using the wrench.

7a.

Tighten the bolts with a mean moment of 20-30 Nm.



7b.

Correctly executed mounting of profile A with the support post.

7. Fixing the cross battens

Special fixing units allow quick fastening of B profiles (100 x 40 x 2 mm) to A profiles (160 x 80 x 5 mm).

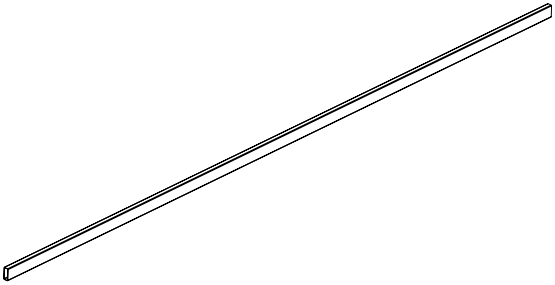


Fig. 3. Profile B (100 x 40 x 2 mm)

Profile B is fixed directly to profile A using stainless steel grips and M8x25 hex screws.

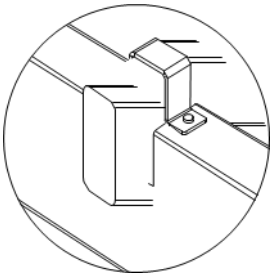
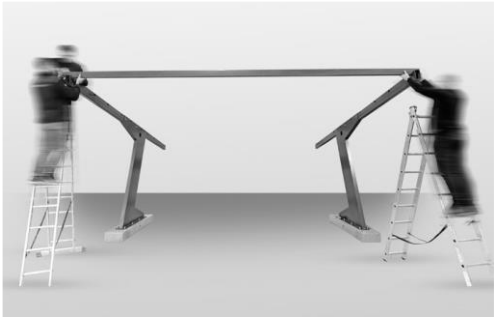
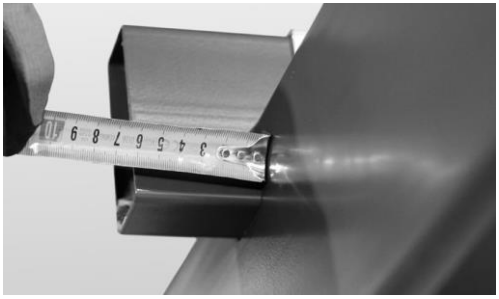


Fig. 4. Mode of fixing of profile B to profile A



8.

Profile B is fixed at recesses in profile A.



9.

Profile B is fixed symmetrically against vertical support posts.

10.

Then, fix the B profiles to the A profiles using the grips and M8 bolts included with the delivery.

10a.

Check the required support points for the utilised modules in the assembly manual of the PV module manufacturer.

The attached profiles shall form the structural matrix, to which the modules will be fixed.

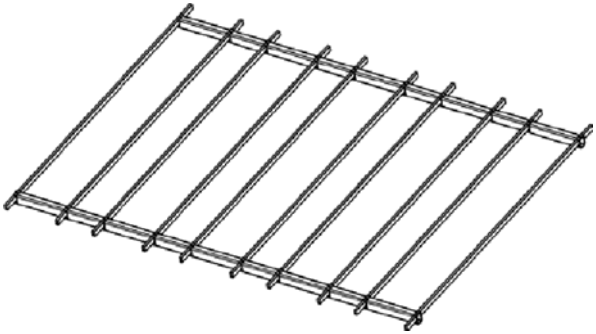


Fig. 5. Structural matrix made of A and B profiles.

11.

Then fix the end caps on the profiles.

12.

A structure prepared in this manner is ready for the installation of PV modules and other components.

13.

Correctly installed Structure-2 of the Avrii INTEGRA carport.

8. Installation of the PV modules

The structure is designed for wind zone one and Snow Zone II - profile B 100x40x2x5382mm, Snow Zone III - profile B 100x40x4x5382 mm.

Should the paint coat be damaged during installation, each set is provided with a can of paint of the same colour as the applied coat in order to mask or paint over the damaged surfaces.

Fixing the PV modules

The modules are fixed by way of specially-designed clamps. The fixing entails gripping the base of the module frame and the B profile 100 x 40 x 2 mm using the clamp, and then tightening the M6x16 A2 screw. The torque should be 15 to 20 Nm.

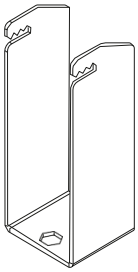
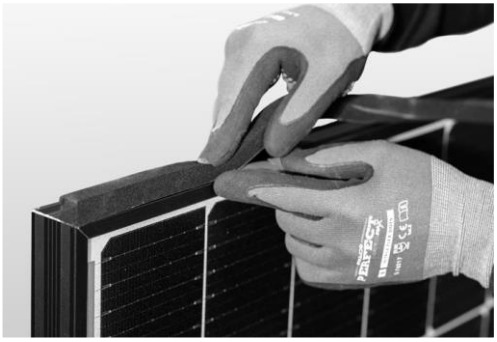
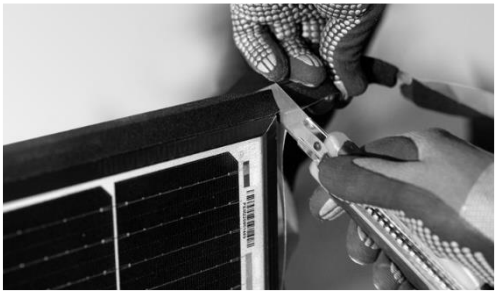


Fig. 6. Clamp KPV_inox_1.5 mm



14.

Installing the seal. Before we commence attaching the modules, fix the seal to the longer side of the car port, designed to ensure water tightness.



15.

Trim the seal so that it protrudes 2-3 mm outside of the module frame on both sides.

16.

After fixing the first row of modules, fix the seal along their shorter sides, along the entire length, so that the joints of the seal do not overlap with the spaces between modules.

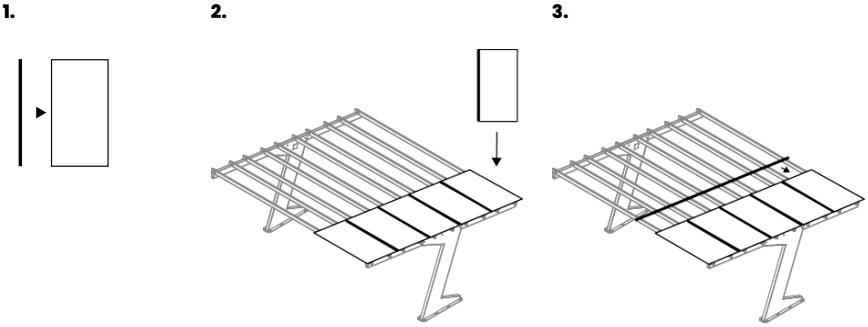
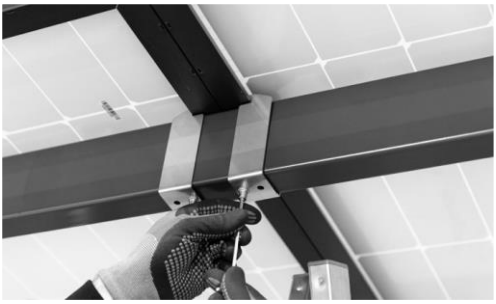


Fig. 7. Mode of correct installation of seals on the PV modules.

1 – fixing the seal to the longer module side

2 – fixing the modules with seals to the structure

3 – fixing the seal across the entire length, along the shorter sides of the modules.

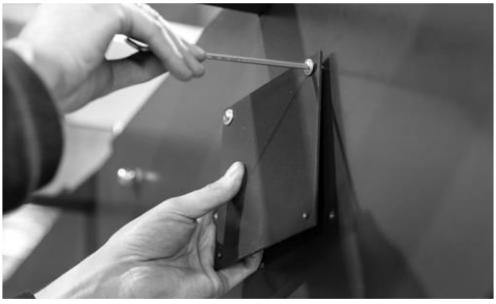


17.

The grips fixing modules to the profiles should be mounted from the underside, shifting the cut-out in the grip on the frame base. Then tighten the bolt. The torque should be ca. 15-20 Nm.

17a.

A structure prepared in this manner is ready for the installation of PV modules and other components.



18.

Establish electrical connections between the modules, and then cover the openings with the steep end cap included in the set

9. Expansion of the Structure 4-10

It is possible to expand the Avrii INTEGRA Carport Structure-2 by additional parking spots using expansion systems. Expansion systems require the selection of B profile length according to the utilised PV modules and the width of the parking spots. The joints between B profiles will use joint components attached to every Avrii INTEGRA Carport Structure-2 expansion order.

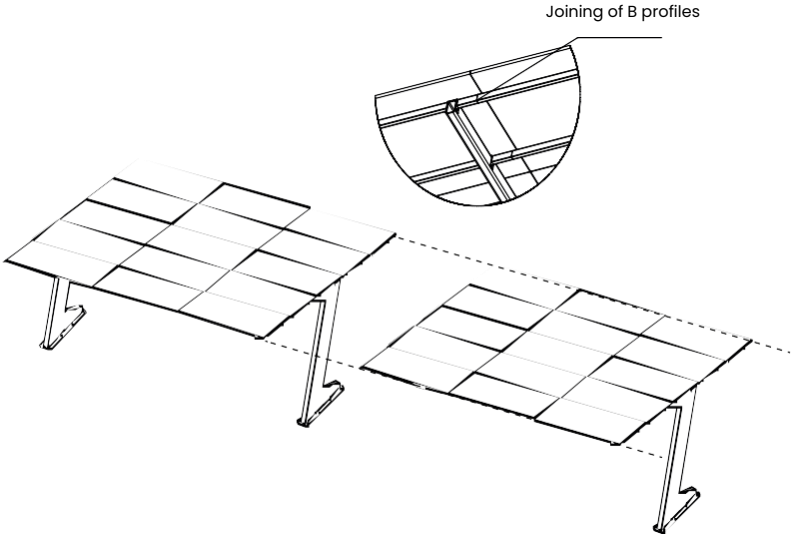


Fig. 8. Mode of joining of B profiles to expand the carport structure

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