

VAN DER VALK



Installation manual



ValkPro+ L15° East-West

Version: v1.4.0
Date: 6-7-2022

Disclaimer

This installation manual needs to be stored for future use. For project specific guidelines and recommendation it is required to use this document in conjunction with the “Project report” generated by the ValkPVplanner. The instructions provided in this Project Report must be strictly observed at all times.

The content of this installation manual has been carefully compiled. Van der Valk Solar Systems does not accept any liability for the correct use of this document. Van der Valk Solar Systems hold the right to update the content of this document without further notice. Please check the website of Van der Valk Solar Systems (www.valksolarsystems.com) for the most recent version of this document.

For the warranty conditions of your installation, please contact your supplier. Further we refer to our General Terms and Conditions, that are available upon request.

General installation guidelines

General

- During installation of the solar mounting system, the instructions and safety precautions presented in this installation manual must be followed carefully. As also stated in the General terms and Conditions of sale and delivery of Van der Valk Solar Systems B.V., non-compliance with the installation guidelines in this document means that the customer can no longer invoke any warranty and Van der Valk is no longer liable for any form of damage.
- The information, comments and advice in this document are binding. Van der Valk Solar Systems reserves the right to update this document without further notice.

Safety

- The installation of the mounting system must be carried out by qualified technical personnel.
- Omitting parts may negatively affect performance and is therefore not allowed.
- Avoid carrying out installation work during bad weather conditions, especially in case of strong winds and a wet (slippery) roof surface.
- During installation work on the roof, always use fall protection and, if necessary, work with safety nets and roof edge protection.
- Always wear appropriate protective clothing and gloves when carrying out the installation work.
- Follow the guidelines in the publication “Health & safety in roof work”.

Environmental factors

- High neighbouring buildings or objects, such as windmills, can affect the wind pressure. In these cases, advice should always be obtained from Van der Valk Solar Systems before installation can take place.
- If during the installation it is determined that the project data and/or environmental factors do not fully correspond to the project report, the project must always be re-calculated first.
- In coastal areas, the system should be placed at least 500 meters from open water to prevent accelerated corrosion by the action of salt water. When buildings are present between the open water and the roof, a minimum distance of 250 meters from open water may be maintained.

Standards and regulations

- For correct and safe installation and use of the solar mounting system, always observe the applicable standards and regulations:
 - EN 1990: Basis of structural design
 - EN 1991-1-3: General actions: snow loads
 - EN 1991-1-4: General actions: wind loads
 - IEC 60364: Electrical Installations for Buildings
 - IEC 62305: Protection against lightnings
 - EN 50110: Operation of electrical installations
 - Working Conditions Act and Safe Working Conditions Regulation

VAN DER VALK



Stability and condition of the roof and roof covering

- The roof pitch should be less than 5 degrees for flat roof systems and between 5 degrees to 75 degrees for pitched roof systems.
- The condition of the roof must be checked upfront for sufficient strength to bear the weight of the mounting system including PV panels ballast and wind and snow loads. Make sure that the load reserve of the roof is not exceeded anywhere.
- Check the stability of the roof and adjust the roof/construction where necessary.
- Check prior to installation whether the roof covering and/or insulation is suitable for the pressure and thermal expansion of the solar mounting system. The maximum pressure is shown in the project report of the ValkPVplanner or can be requested at Van der Valk Solar Systems.
- Bulging of the roof membrane should be prevented. This can lift the solar mounting system and can cause displacement of the mounting system or ballast. It is the installer's responsibility to prevent the roof membrane from bulging.
- Factors such as overhead cranes, seismic activity and others that affect the stability of the roof and/or building can affect the installed solar mounting system. Van der Valk Solar Systems does not take these factors into account, unless confirmed in writing.
- The roof surface on which the solar mounting system is to be installed must be clean, dry and flat.
- The roof height may not exceed 25 meters in case the project has been calculated in the ValkPVplanner must be corresponding to the roof height in the project report. For installations on roofs higher than 25 meters, Van der Valk Solar Systems should always be contacted in advance.

Roof zones

- When installing the solar mounting system, always take the applicable roof zones according to EN1991-1-4 into account. Placing solar panels in the edge zone of the roof (the distance measured from the roof edge, which is equal to 1/5 of the building height) is only possible if this has been explicitly taken into account in the calculation.
- It is possible to position panels in the edge zone of the roof in the ValkPVplanner (calculation software), on the basis of which the required additional ballast or fixation points are automatically calculated. This can only be done using "Satellite" or "White Map" design mode. The edge zone is automatically calculated by the ValkPVplanner, based on the roof height and building circumference, in accordance with the applicable regulations. In case the design mode "Simple mode" is used, the calculation always assumes that the solar panels are in the middle zone of the roof only.
- In case solar panels on the ValkPro+ system are fully or partially placed in the edge zone of the roof, it is mandatory to use side plates.
- ValkKITS (ValkBox3, ValkDouble, ValkTriple, ValkQuattro) can only be placed in the middle zone of the roof. Placing these systems in the edge zone of the roof is not allowed.

Dilatations

- The maximum allowed dimensions of a coupled mounting system is a 30 meters in the aluminium direction and 60 meters in the steel direction. The maximum dimensions are based on the thermal expansion in case of a maximum temperature difference (Delta T) of 70 degrees Celsius.
- The coupled mounting system must not be placed over a gutter or ridge. In the mounting system is place over a gutter or ridge, the system must be split (dilatation).
- When using the extra wide panel support feet for ValkPro+ with ballast, different dilatation rules apply: in such installations the coupled system may be a maximum of 30 meters in the steel/roof carrier direction and 15 meters in the aluminium direction.

Solar panels

- It is the responsibility of the installer to determine in advance whether the selected solar panel is suitable for the mounting system in terms of dimensions and pressure loads. The calculated loads on the solar panel are shown in the project report of the ValkPVplanner or are available on request at Van der Valk Solar Systems.

Cable management

- In order to create a sound and durable electrical connection between the solar panels, it must be ensured that the cables from the junction box have sufficient length and thus do not cause any mechanical stress on the cable glands. Take into account thermal expansion and contraction of cables and the mounting system.
- Cables and connectors must be kept away from sharp and/or abrasive parts and the roof surface by using sufficient and appropriate cable clamps and cable baskets.

Disassembly and Removal

- Components of the solar mounting system can be easily and completely disassembled at the end of their service life and separated for recycling. The systems only contain nut and bolt, screw and click connections, so nothing is glued or welded. All materials are fully recyclable. Disposal of the components always in accordance with the locally applicable laws and regulations.

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Placement conditions

In order to ensure a safe installation and use of the The ValkPro+ system, the following conditions must be respected:

- The inclination of the roof must be less than 5°.
- The roof can have a maximum height of 25 meters, in case the project has been calculated using the ValkPVplanner and is corresponding with the roof height in the project report. For installations on roofs higher than 25 meters, please contact Van der Valk Solar Systems.
- Check prior to installation if the roof membrane and/or insulation is suitable for the loads and thermal expansion of the PV-system. For example: make sure the maximum point loads of the system as shown in the ValkPVplanner project report are compatible.
- In case the mounting system is to be placed on a roof with mechanically fixed roof membrane, the risk of the membrane bulging due to wind suction needs to be mitigated. The bulging can cause unwanted lifting of the mounting system or disposition of the ballast under extreme wind suction situations. It is the responsibility of the installer to prevent bulging of the roof membrane. This can be done by adding fixation points or placing additional weight (for example tiles) on the membrane in the edge zones of the roof and around the PV-system.
- After the ValkPro+ mounting system has been placed, it is of greatest importance to check if the ballast has been placed according to the ballast plan in the project report. Ballast tiles need to be neatly stacked in order to ensure the weight is properly supported by the tile carriers, mass carriers and/or ballast wings.
- The coupled ValkPro+ system shall not be placed over a ridge or gutter. In these positions a diltation is mandatory.
- Side plates are mandatory when the system is placed in the edge / corner zones of the roof.
- In coastal areas the mounting system must be placed at a distance of at least 500 meters from open water, to prevent corrosion due to salt water spray. In case there is a building in between the open water and the roof, a distance of 250 meters can be applied.

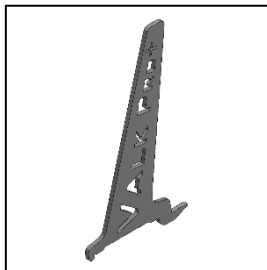
Suitable panel dimensions:

- | | | |
|----------------|----------------|----------------------------|
| • Length | 1520 - 2320 mm | |
| • Width | 977 - 1048 mm | suitable for pitch 2150 mm |
| | 977 - 1090 mm | suitable for pitch 2300 mm |
| | 1091 - 1143 mm | suitable for pitch 2400 mm |
| | 1144 – 1194 mm | suitable for pitch 2500 mm |
| • Frame height | 28 - 50 mm | |

Required tools for installing ValkPro+



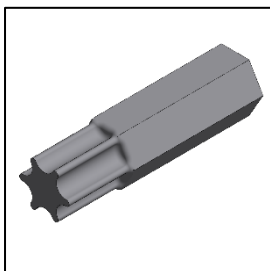
Cordless drill



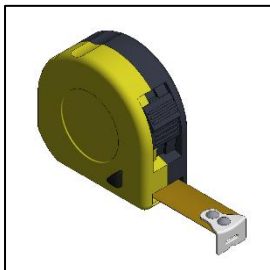
Adjustable alignment set for
roof carriers
743220



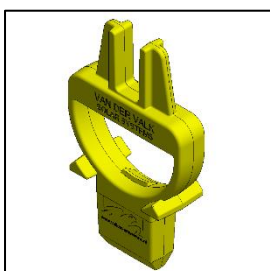
Socket 13 mm
Wrench 13 mm



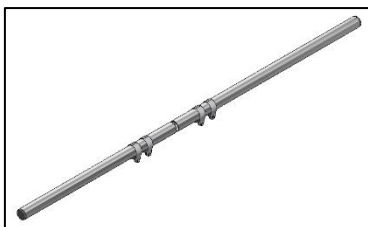
Torx bit T-30
(789530)



Measuring tape

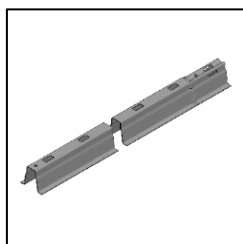


Alignment key for roof carriers
739010

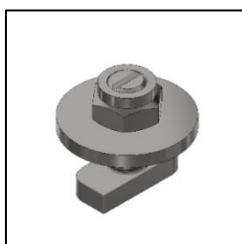


Disassembly key for feet
743000

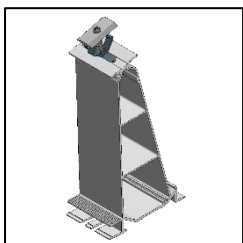
Basic materials for installing ValkPro+ L10 [East-West]



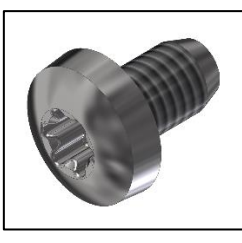
Roof carrier profile
741802300
741802400
741802500



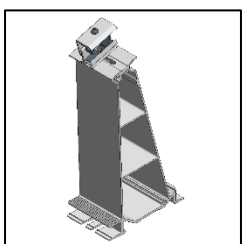
Coupling set
774221



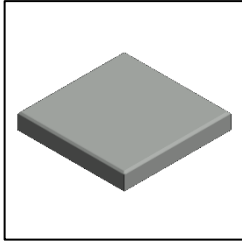
Back foot middle
724680



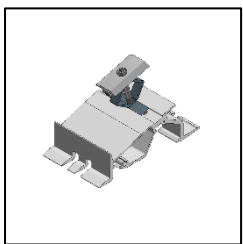
Thread forming bolt M6x10
mm for fixation of side and
back plates
773310



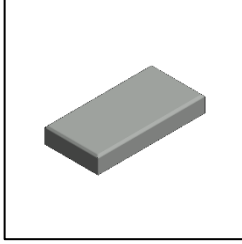
Back foot side
724681



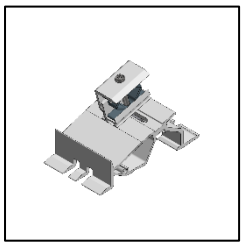
Concrete tile 9 kg (300 x 300 x
45 mm)
7506303045



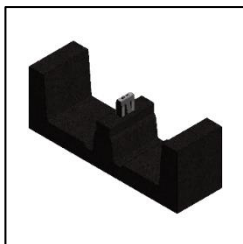
Front foot middle
724690



Concrete tile 4,5 kg (300 x 150
x 45 mm)
7506301545



Front foot side
724691



Tile carrier
729622 - for bitumen / TPO / EPDM
roof
729623 - for PVC roof

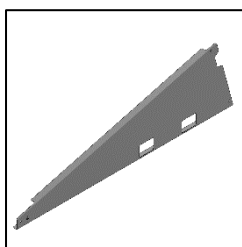
For the 'optional' materials, see next page.

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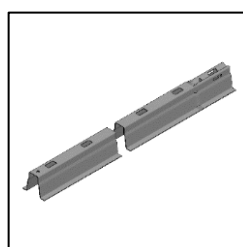


Optional materials:

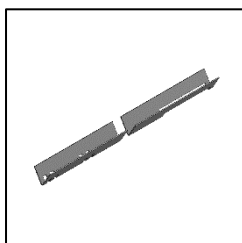
The optional materials can be used to optimize the system to specific situations and wishes.



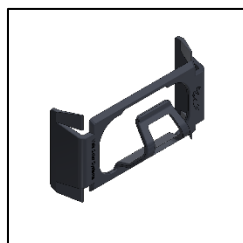
Side plate
742534 - Left
742535 - Right



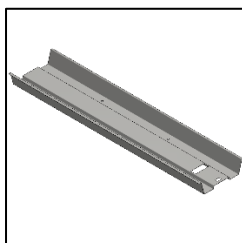
Roof carrier for half-peak
(741801200)



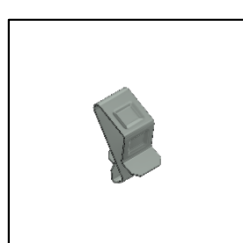
Mass carrier
742550 - [for panel length 1520-1720 mm]
742553 - [for panel length 1720-1920 mm]
742555 - [for panel length 1920-2120 mm]
742556 - [for panel length 2120-2320 mm]



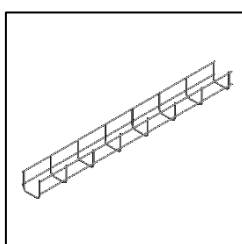
Cable clamp for feet
732011



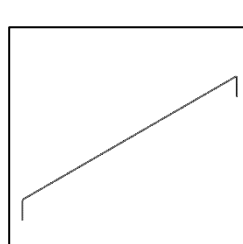
Ballast tray
742610 [for panel length 1520-1720 mm]
742612 [for panel length 1720-1920 mm]
742615 [for panel length 1920-2120 mm]
742618 [for panel length 2120-2320 mm]



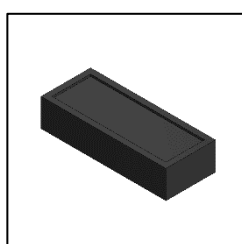
Cable clamp for fixation to panel frame
732001



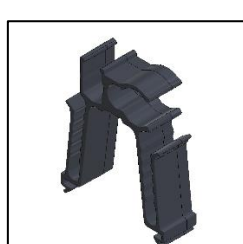
Cable basket 50 x 60 mm,
length 3000 mm
(76010050603000)



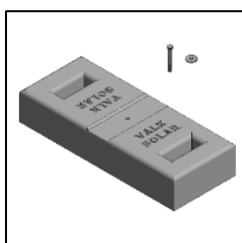
Dilatation wire
732020



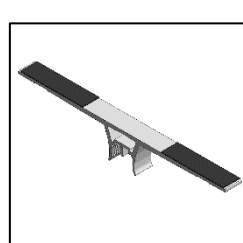
Elevation block for gravel
roofs
729627



Multi-wire / connector clip for
roof carrier
732012



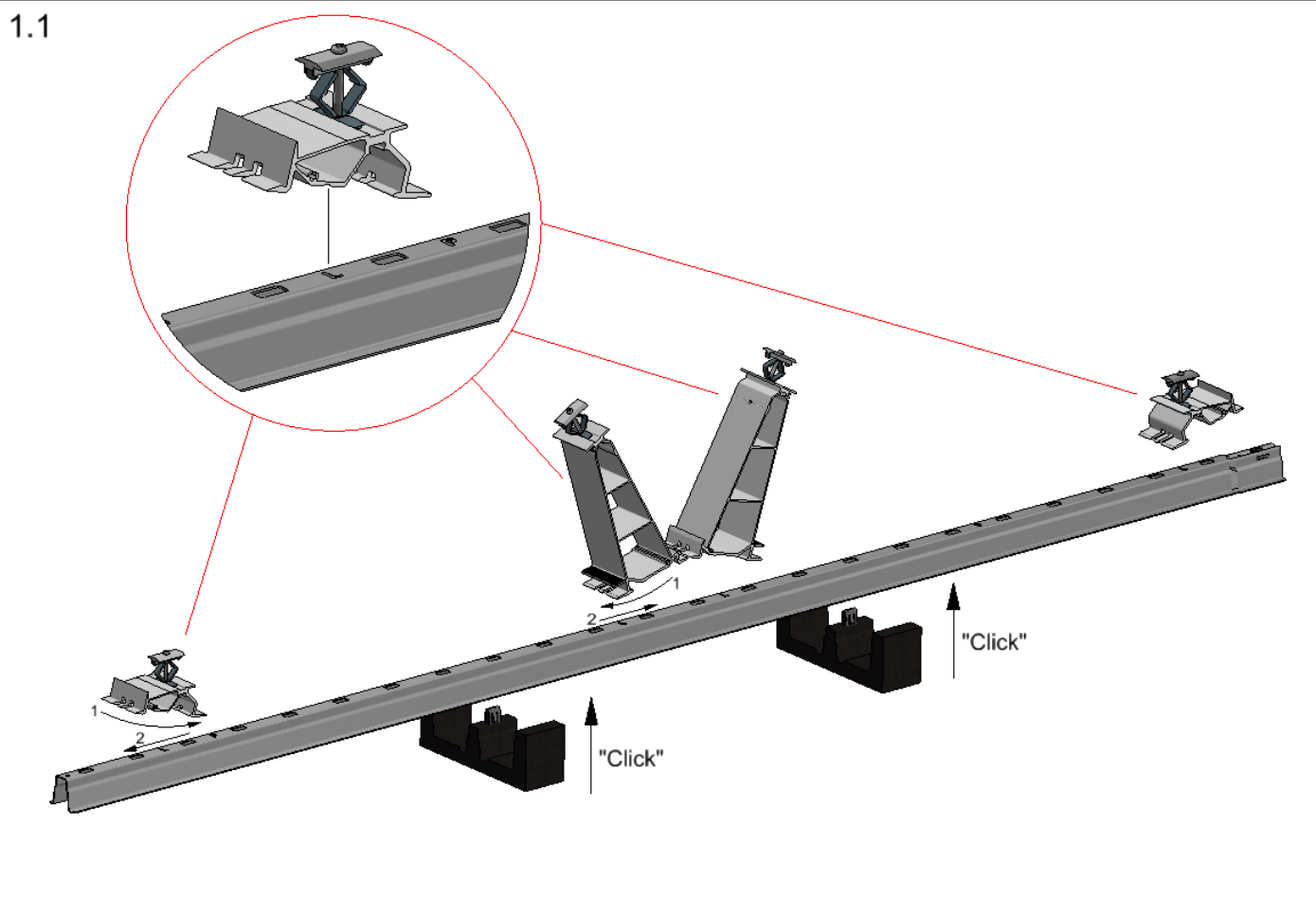
Mass block (750520)
+
Stainless steel bolt M8 x 65
mm (774065)
+
Stainless steel washer M8



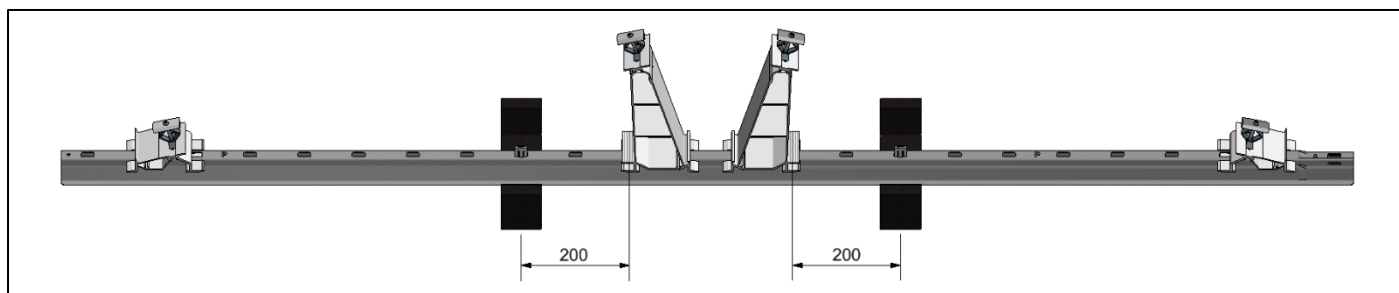
Ballast wing
725150

Pre-assembly of roof carriers sets

A fast and convenient way of working can be best achieved by mounting the feet and tile carriers on the roof carriers prior to placing them on the roof. This method can save a lot of time. The aluminium feet should be placed in the position where the letter "L" is visible on top of the roof carrier. The rubber tile carriers are placed in the second rectangular hole in front of the aluminium back foot.



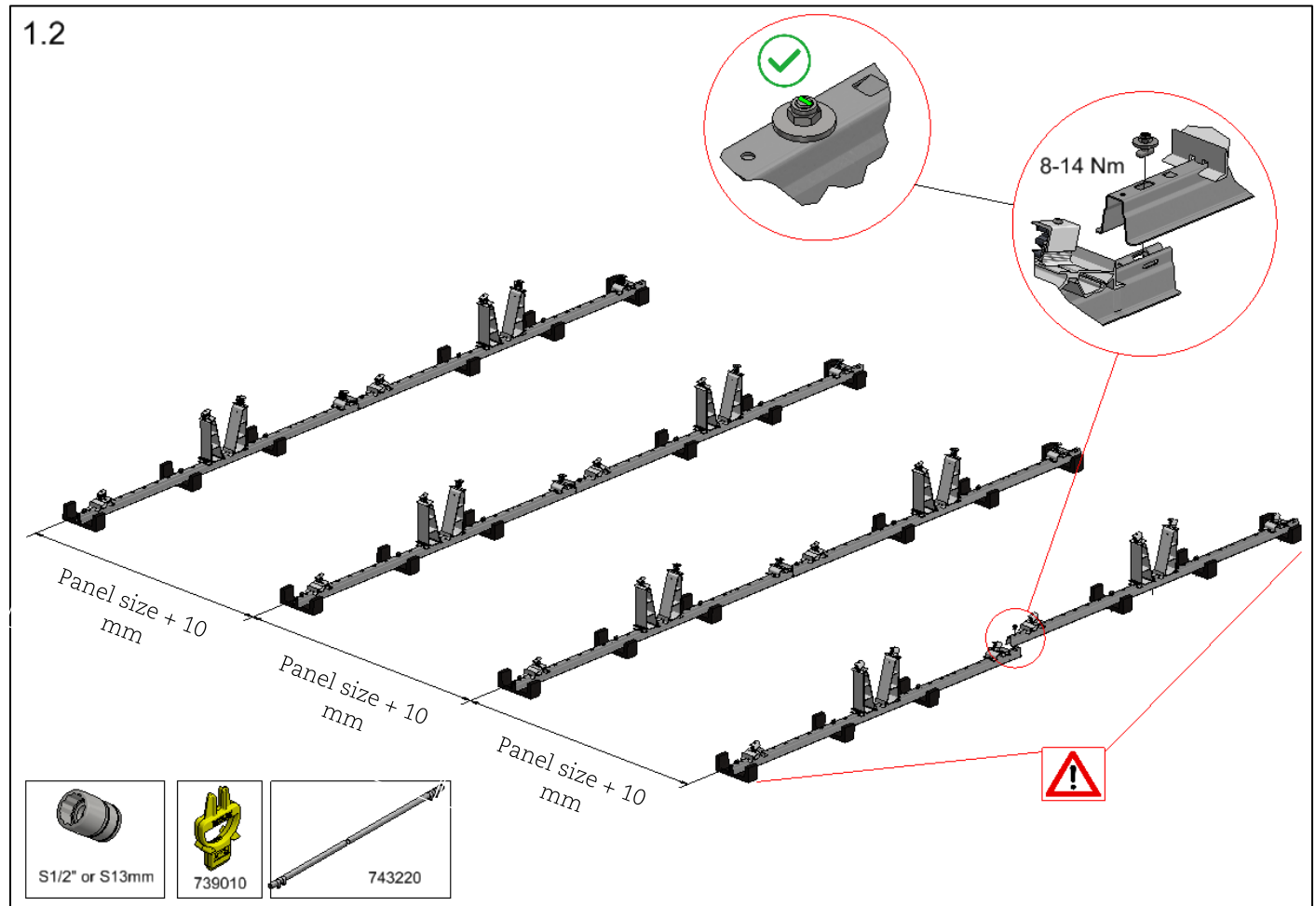
Side view



Alignment of roof carriers

Place the roof carriers on the roof in the desired layout or starting point. Connect the roof carriers by placing the end of the first roof carrier over the reduced end of the next roof carrier. The roof carriers are then fastened with the coupling set. (see 1.2)

The center-to-center distance between the roof carrier rows depends on the panel size. The following formula must be applied: panel size + 10 mm. For fast and easy alignment of the roof carriers, we advise to use the adjustable alignment tool (art. 743220).



In the first and last oblong-hole of the roof carrier row (incl. reduced part) an extra rubber tile carrier must always be placed.

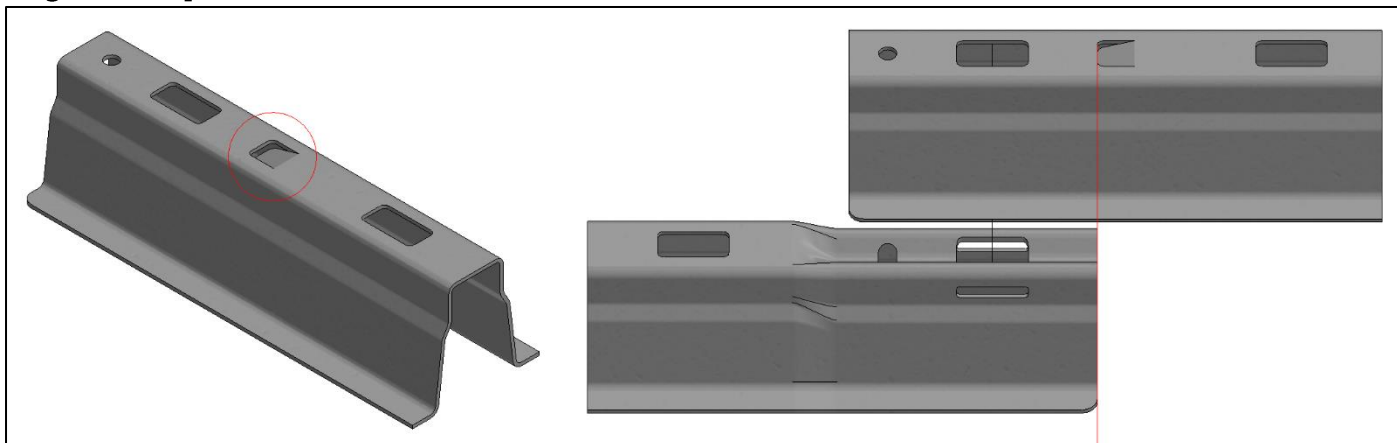
Dilatations

The coupled system has to be dilatated after certain measurements, this needs to be done because of the thermal expansion/contraction. For the South-North direction this is 60 meters, for the East-West direction this is 30 meters.

Tools for alignment of roof carriers

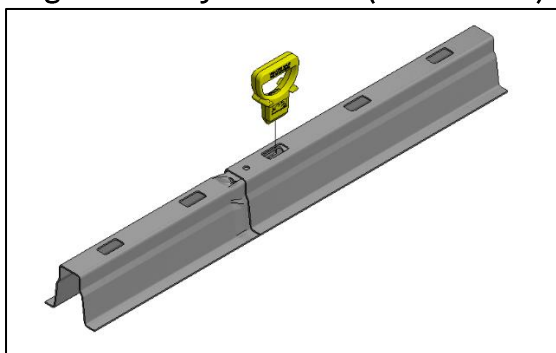
Aligning the roof carriers can be done quick and easy using the following tools:

Alignment lip roof carrier



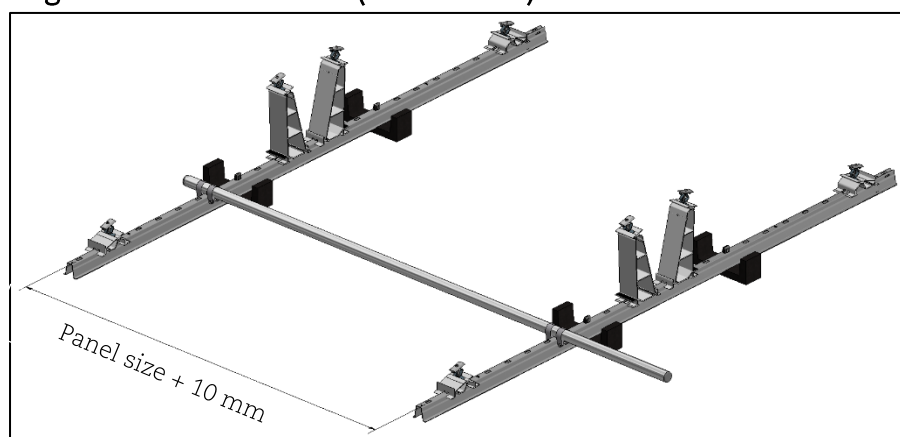
The smooth side of each roof carrier is provided with a lip which can be used when aligning / coupling the roof carriers. The swaged end of the roof carrier can be placed against the lip, this makes sure the roof carriers are always aligned properly.

Alignment key ValkPro+ (art. 739010)



The alignment key can be used to align the overlapping oblong hole of the roof carriers.

Alignment set ValkPro+ (art. 743220)

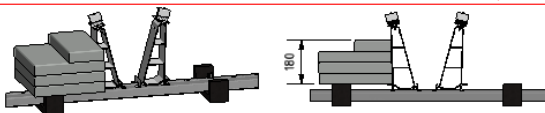
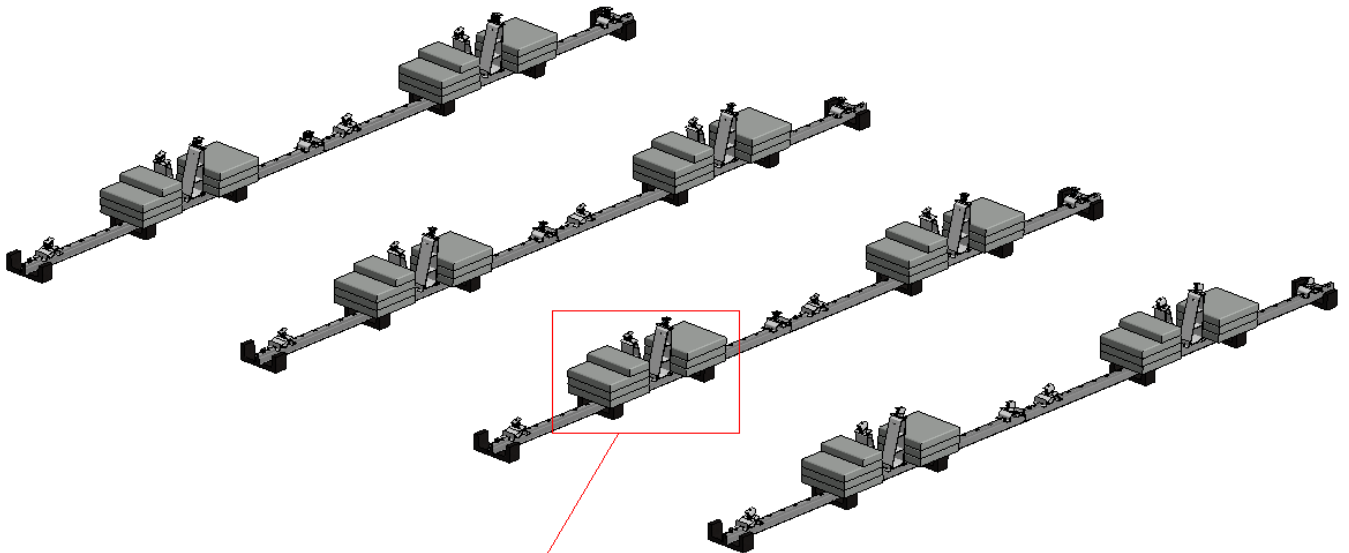


The alignment set can be used to make sure the roof carrier rows are placed at the correct pitch beside each other.

Placing ballast

The ballast can be placed on the rubber tile carriers or on the mass carriers (only when necessary). Check the ValkPVplanner project report for the required ballast weight per panel.

2.1

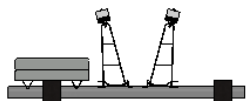
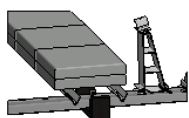
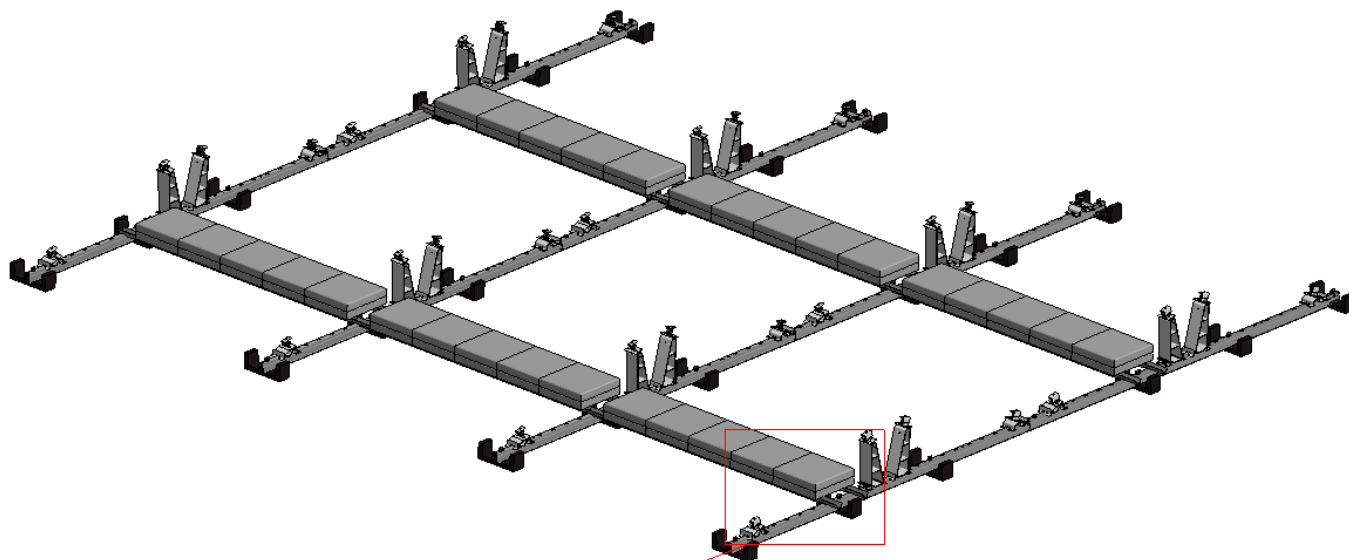


Max. no. of tiles on rubber tile carriers: 3,5 tiles (31,5 kg)

Mass carriers

In case the required ballast is more than 6,5 tiles or if the ballast cannot be placed due to side plates, mass carriers are required. The mass carriers are placed on both sides of the rubber tile carrier. The mass carriers provide the support for the tiles (see image 2.2).

2.2

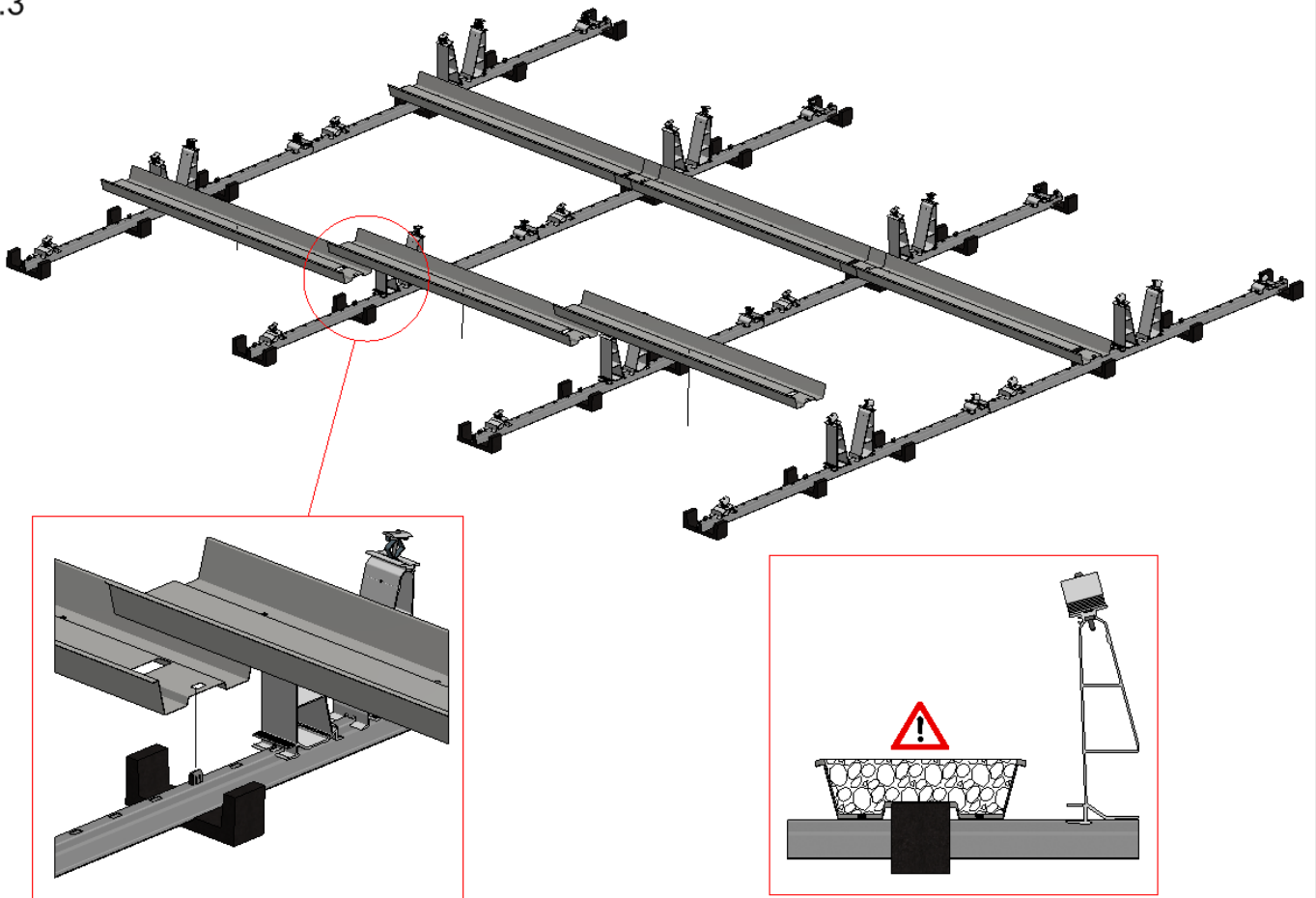


Max. no. of tiles on mass carriers: 10
tiles (90 kg)

Ballast trays

In case gravel (coming from the roof on which the system is placed) or pavers are used for ballast, ballast trays can be applied. The ballast trays are placed over the roof carriers. The slots in the ballast trays on one side will fit the rubber tile carriers so that the ballast trays cannot move. The other side of the ballast tray can be placed in the next ballast tray.

2.3



The max load per tray in case it is filled to the maximum with gravel:

Art. 742610 (1780 mm) – Max. 36,6 kg (or 0,0244 m³)

Art. 742612 (1980 mm) – Max. 40,9 kg (or 0,0273 m³)

Art. 742615 (2180 mm) – Max. 46,4 kg (or 0,0309 m³)

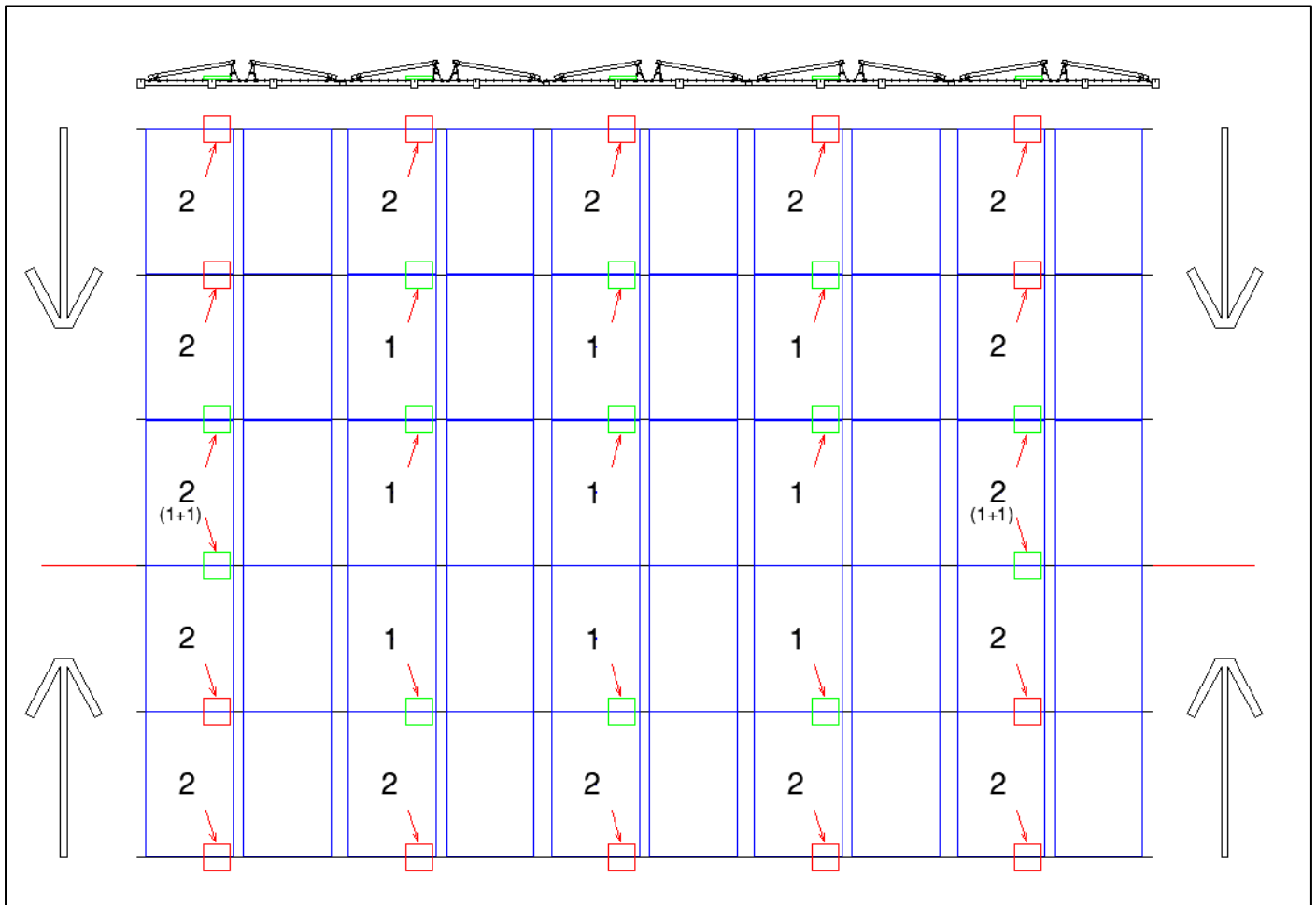
Art. 742618 (2380 mm) – Max. 50,7 kg (or 0,0338 m³)

In the calculation above a gravel density of 1500 kg/m³ is used.

Distributing ballast

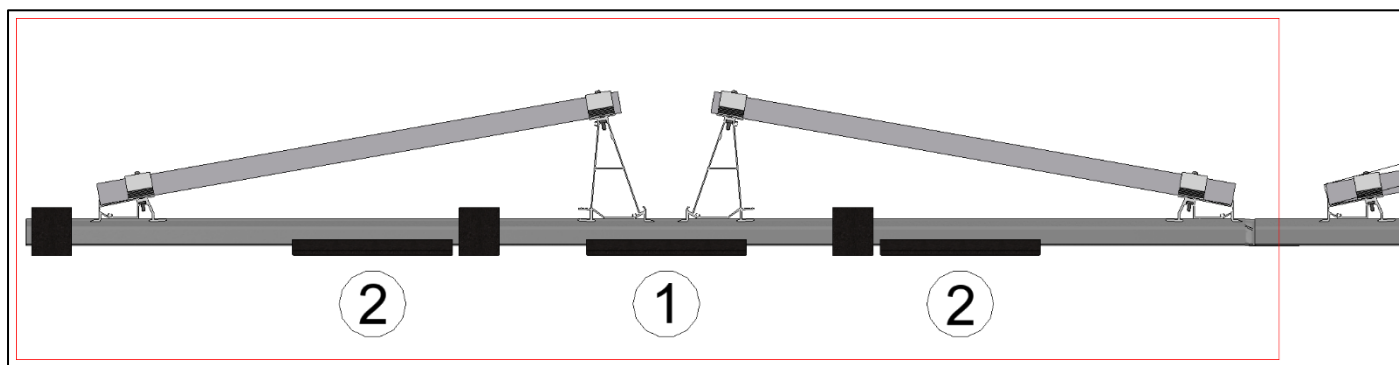
The ballast is placed according to the ballast plan in the project report. The project report indicates the required ballast per panel for a South system and per peak for East-West system. Without mass carriers the ballast is to be divided over the ballast points under the individual panel. The next image shows how the ballast should be divided over the different ballast points.

PLEASE NOTE! Image below is an example.



The required number of tiles is indicated per panel or peak (same as the project report). The ballast is always placed starting from the outside toward the centre of the system. Therefore the middle row of the system doesn't have any ballast (see red line). If possible there may be ballast placed on those foundation points as well.

When using the rubber pressure dividers, it is important that these are placed in the correct positions. The numbers in the image below represent the order of the pressure dividers when using 1, 2 or 3 pieces. For more information, please refer to the datasheet.

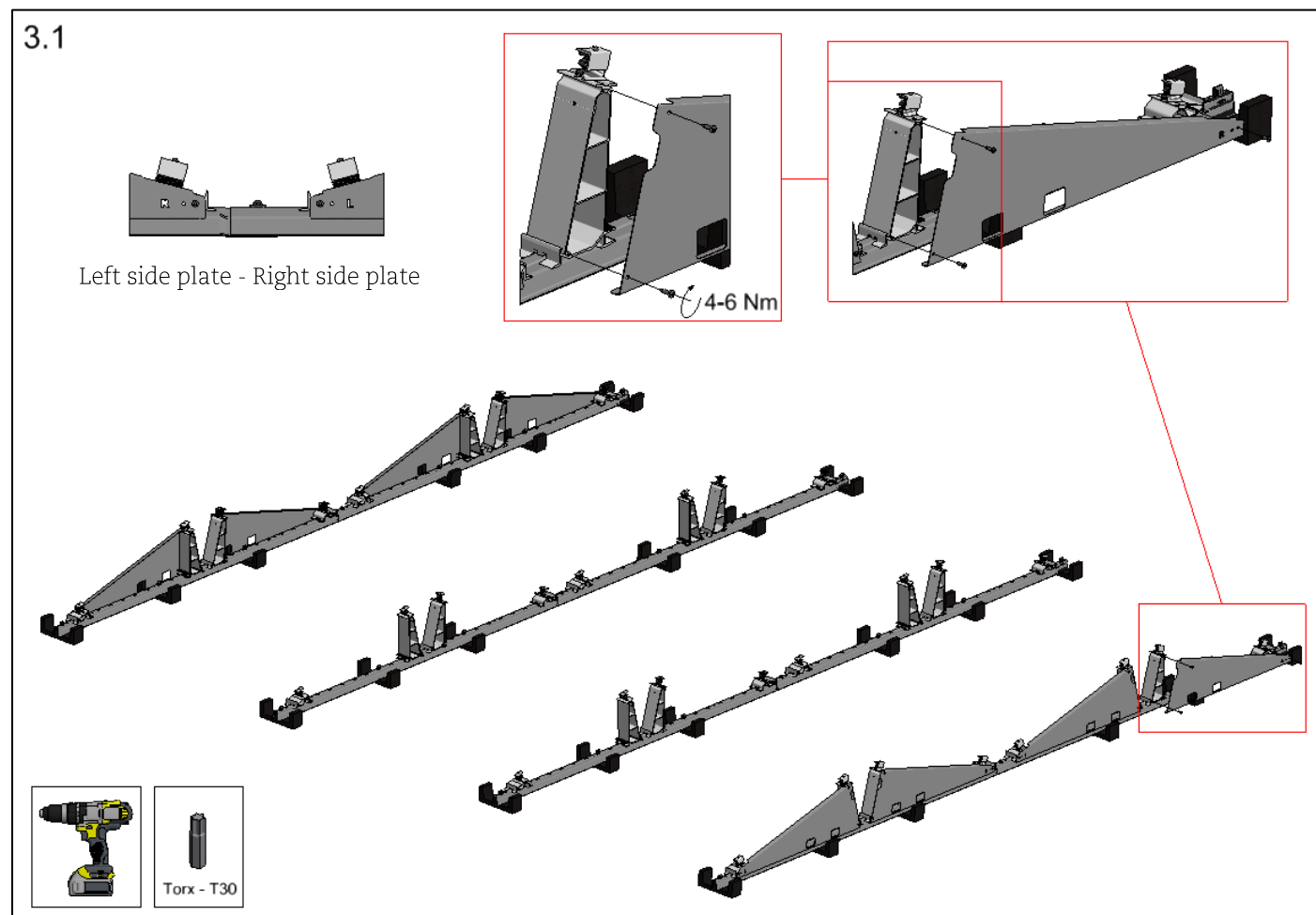


Mounting side plates

The use of side plates is optional, in case the mounting system is placed in the middle zone of the roof. Side plates are mandatory in case the following is applicable:

- The mounting system is partially placed in the edge / corner zones of the roof.
- Roof height is 25m or higher

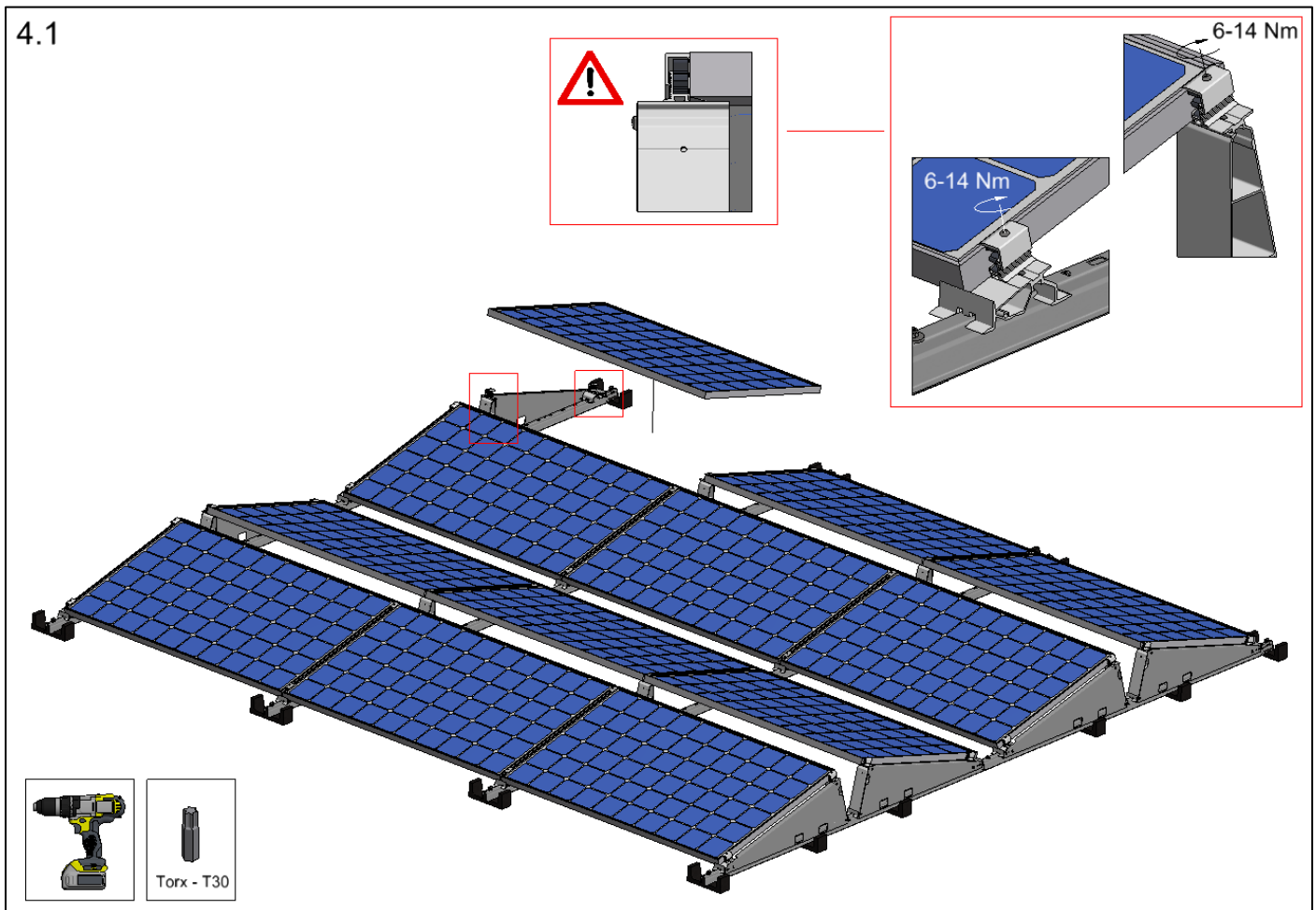
Each side plate is fixed to the sides of the aluminium feet using three thread forming bolts M6 x 10 mm. (see image 3.1)



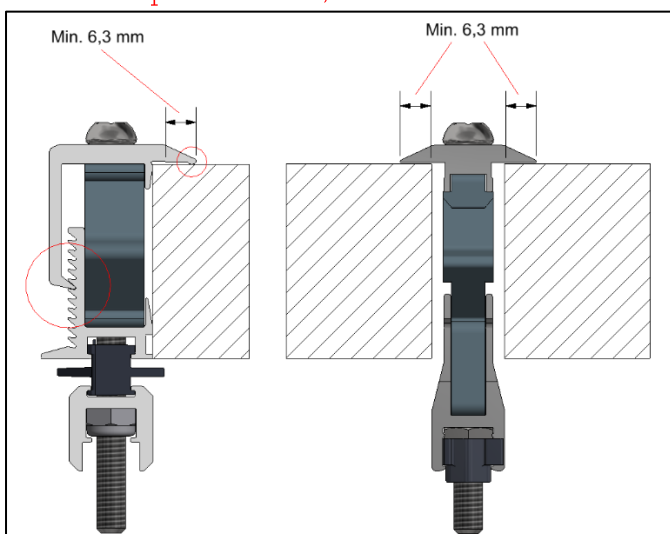
Placing PV-panels

Place the PV-panels under the clamps and make sure ALL the panel clamps are securely fastened.

4.1



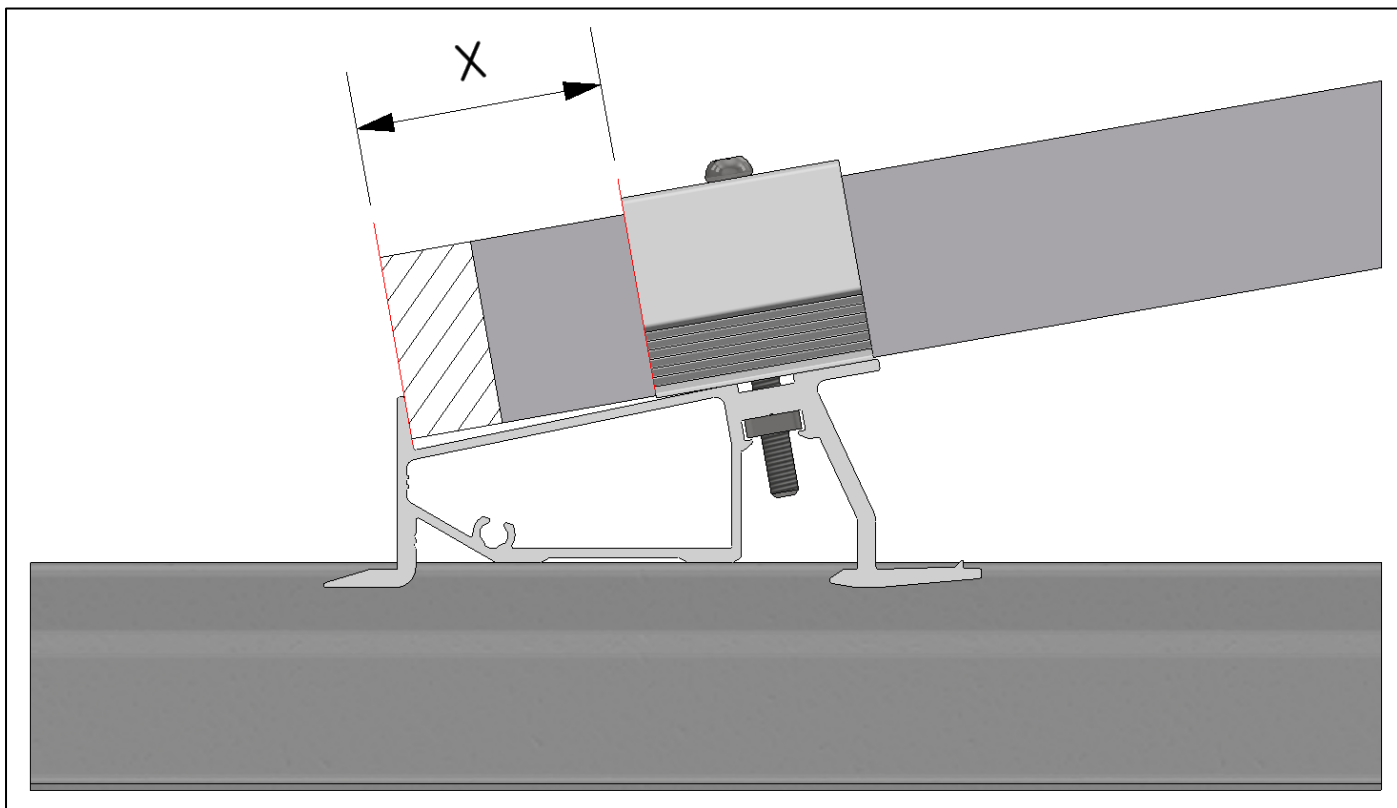
Make sure the end clamps are placed in the correct height slot, corresponding with the panel frame thickness, before they are fastened. The clamps must have an overlap of at least 6,3 mm with each panel frame, in order to ensure full clamping force.



VAN DER VALK



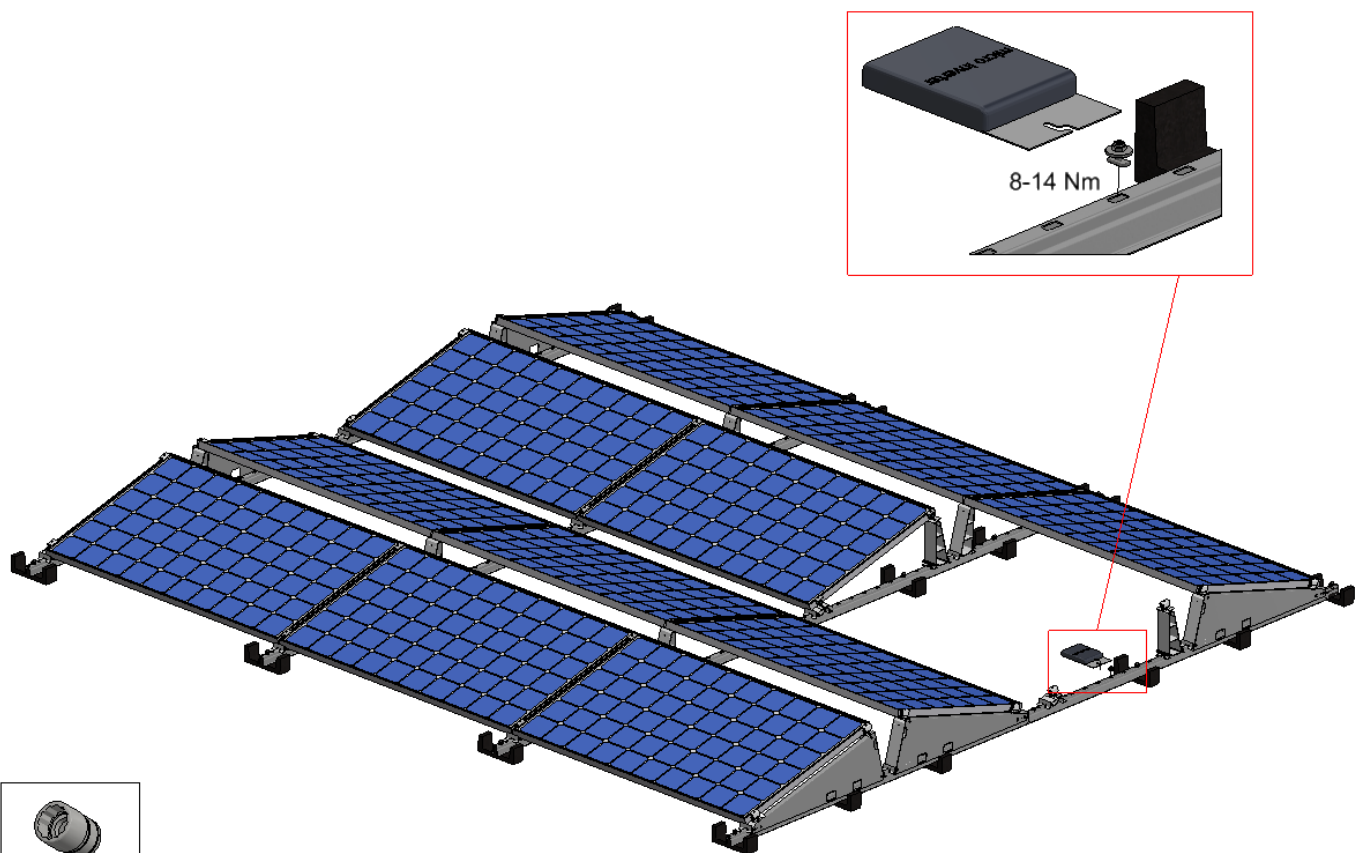
The front foot is designed with an upstanding edge, which makes it easy to align the PV-panels, when the frames are placed against this edge. This is not mandatory however. In case it is not possible to place the panels against the edge, it is ok as long as the side of the frame is still positioned in range X. The ValkPro+ system will then still apply enough clamping force on the panels.



Mounting micro-invertors

Micro-invertors can be mounted on the roof carrier using a coupling set (Art. 774221).

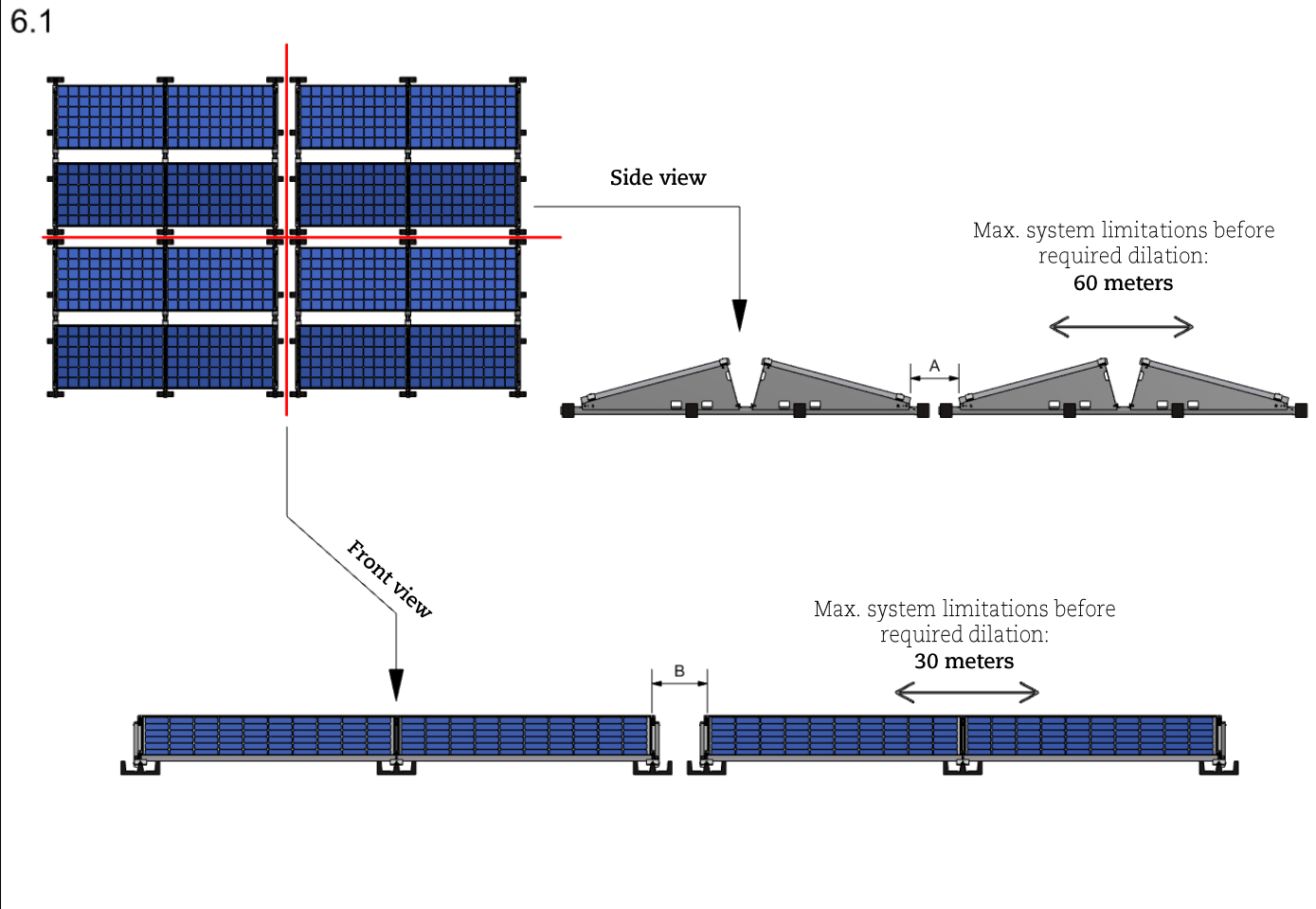
5.1



Dilatations

The ValkPro+ system has certain measurements that may not be exceeded due to thermal expansion/contraction. If these measurement are bigger than allowed the system must be dilatated. The required distance for the dilatations is shown in image 6.1.

Once the system has a dilation the system is now seen as 2 separate systems. If the dilatations are not too big some parts of the system can still be calculated as 'shielded panels'. (shielded panels have less ballast than the exposed panels)



The dimensions below refer to the distance limitations of the dilatation for the outer panels of the system to be 'shielded'. In case these distances are longer, the outer panels of the system, need to be seen as 'exposed', which means more ballast needs to be placed, compared to 'shielded' panels.

Dimension A (distance between the panels on the lower side):

Min. 66 mm and Max. 466 mm

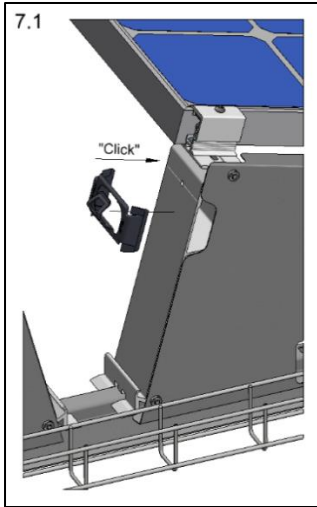
Dimension B (distance between the frames of the PV-panels):

Min. 350 mm and max. 500 mm

If the given dimensions above are exceeded the PV-panels will be seen as 'exposed'

Cable management

The ValkPro+ system offers various options to handle the electrical cables and connectors in a safe and neat way. The first option is to use plastic cable clamps (Art. 732011) that are mounted on the aluminium back feet. The cable clamps are simply “clicked” on the aluminium feet and the cable can be placed (see image 7.1)



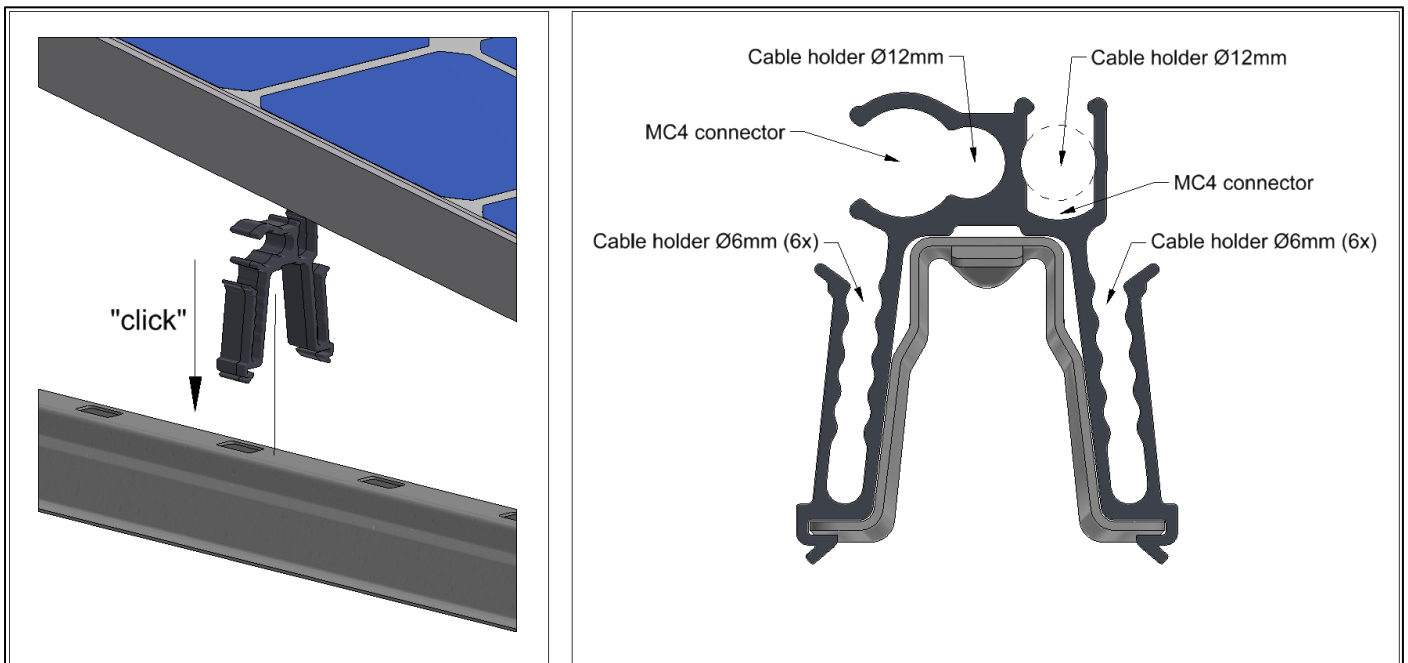
The cable clamp provides space for:

- 5 cables - Ø6mm
- 4 cables - Ø7mm
- 3 cables - Ø9mm

Multi-cable and connector clip (Art. 732012)

This clip can be placed over the roof carrier in any desired location. It has multiple options to hold various MC4 connectors and cables:

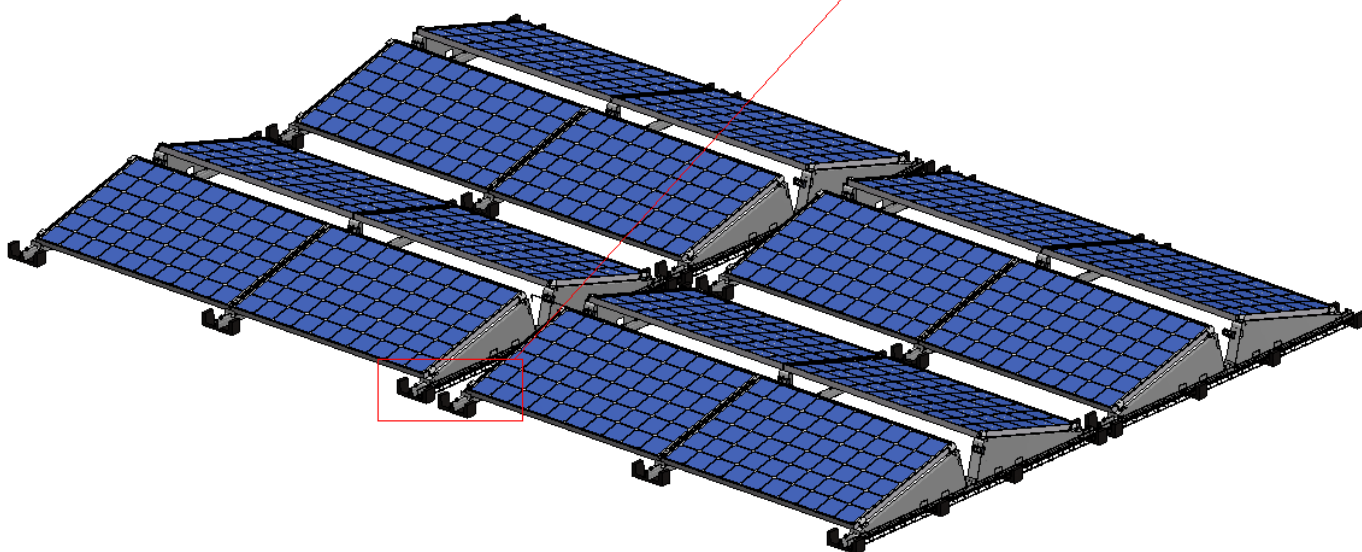
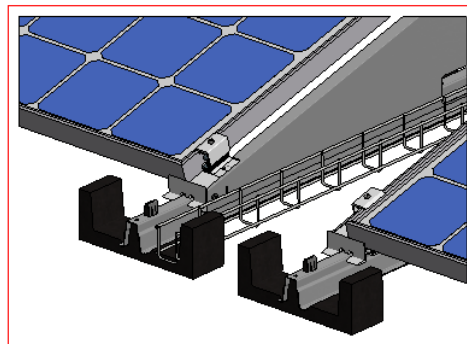
- 2 x MC4 connector holder
- 2 x Cable holder Ø12 mm (DC/AC)
- 12 x Cable holder Ø6 mm



Cable baskets can be nicely integrated in the ValkPro+ system. ValkCableCare cable baskets with dimensions 50 x 60 mm fit on both sides of the roof carrier and can be placed in the spaces of the tile carriers (see image 7.2).

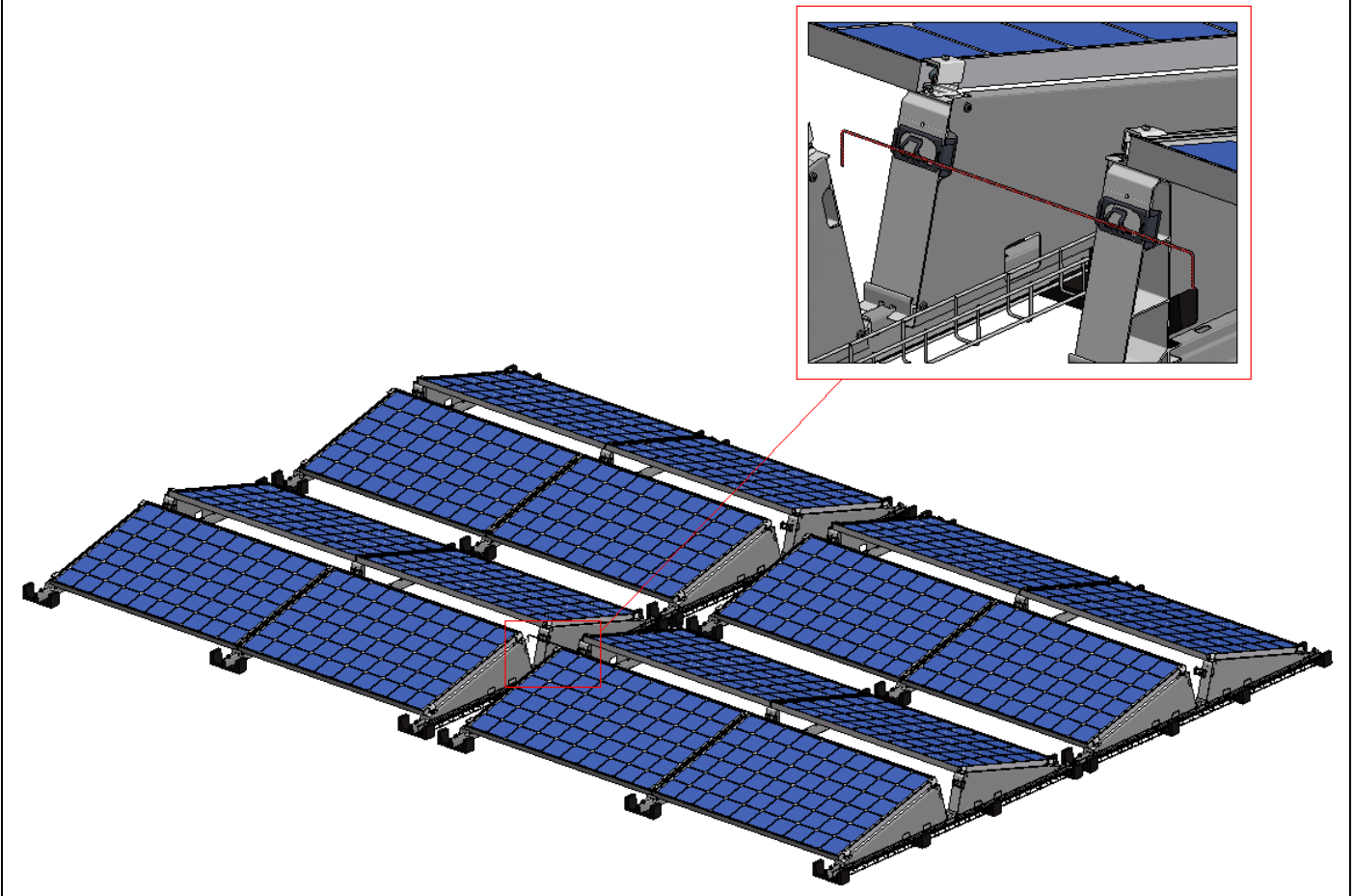
Please note: in case mass carriers are used, it is not possible to place the 50 x 60 mm cable baskets in the inside position (under the PV-panel) next to the roof carrier.

7.2



In positions where there is a dilatation in the system, a metal dilatation wire (Art. 732020) can be used. This wire can be placed in the cable clamps and the length can absorb the thermal expansion of the coupled system. The electrical cables can be fixed to the wire using tie-wraps. This keeps the cables free from the roof surface.

7.3



Special surfaces

The ValkPro+ system can be placed on a range of different surfaces, besides the “normal” roof coverings. Each surface requires a different foundation method. In this section of the manual the foundation methods for each surface are shown.

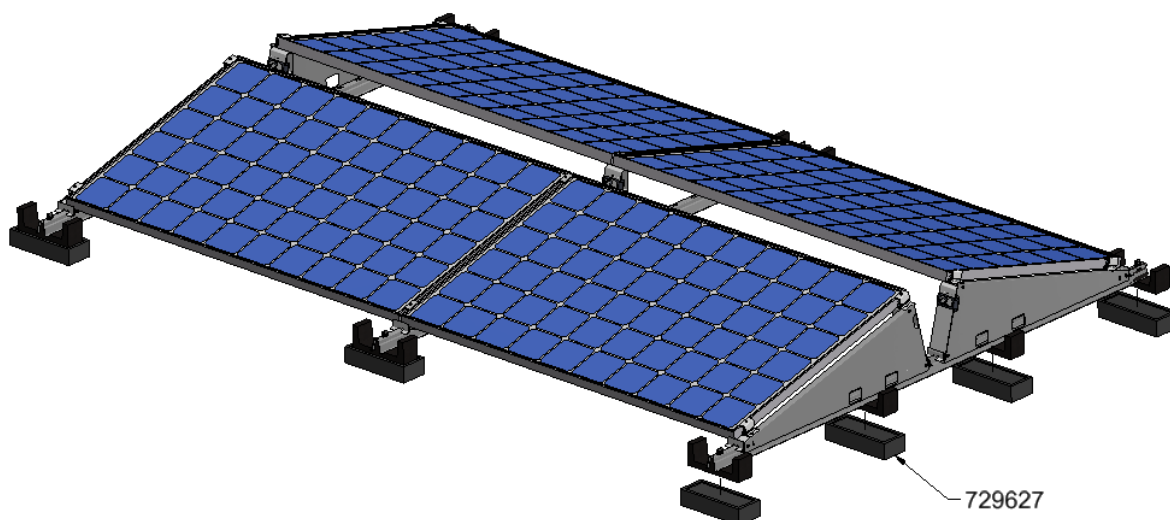
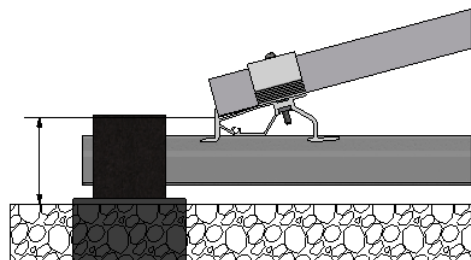
Gravel roofs:

In case the roof is covered with gravel the system can be elevated using rubber elevation blocks (Art. 729627). It is important to ensure the distance between the gravel and the lowest part of the PV-panel is always between 95,5 - 115,5 mm.

8.1

Min. 95,5 mm - Max. 115,5 mm

Gravel roof



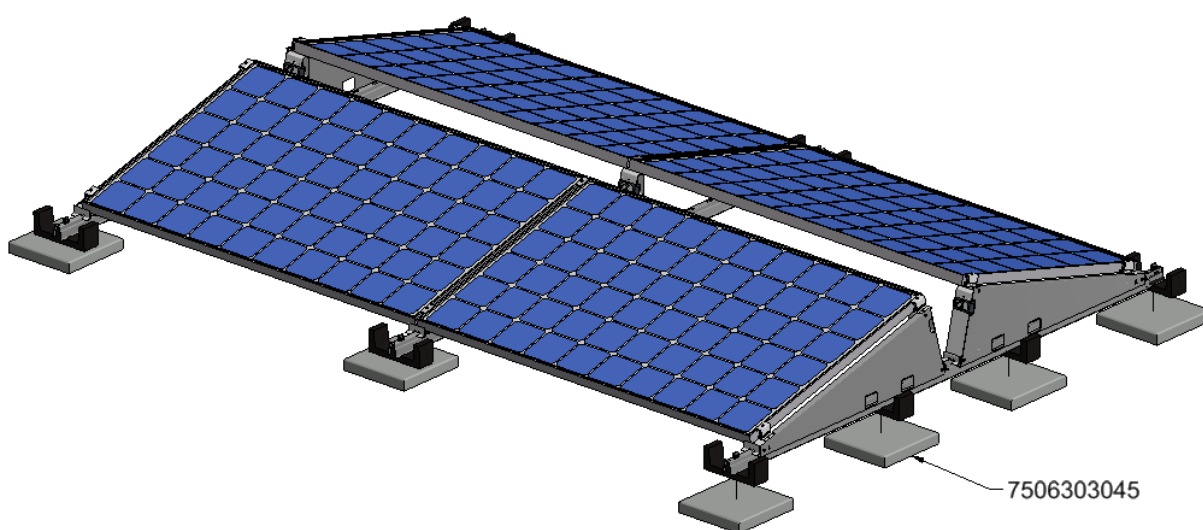
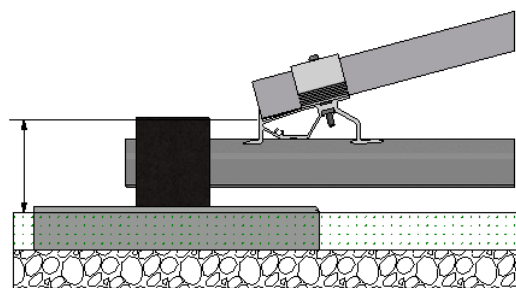
Sedum / green roofs:

For sedum / green roofs the advice is to first place tiles (Art. 7506303045) in the sedum, to support the tile carriers of the ValkPro+ system. The tiles will better distribute the point loads and prevent the system from sinking into the vegetation. It is important to ensure the distance between the sedum and the lowest part of the PV-panel is always between 95,5 - 115,5 mm.

8.2

Min. 95,5 mm - Max. 115,5 mm

Sedum / green roof

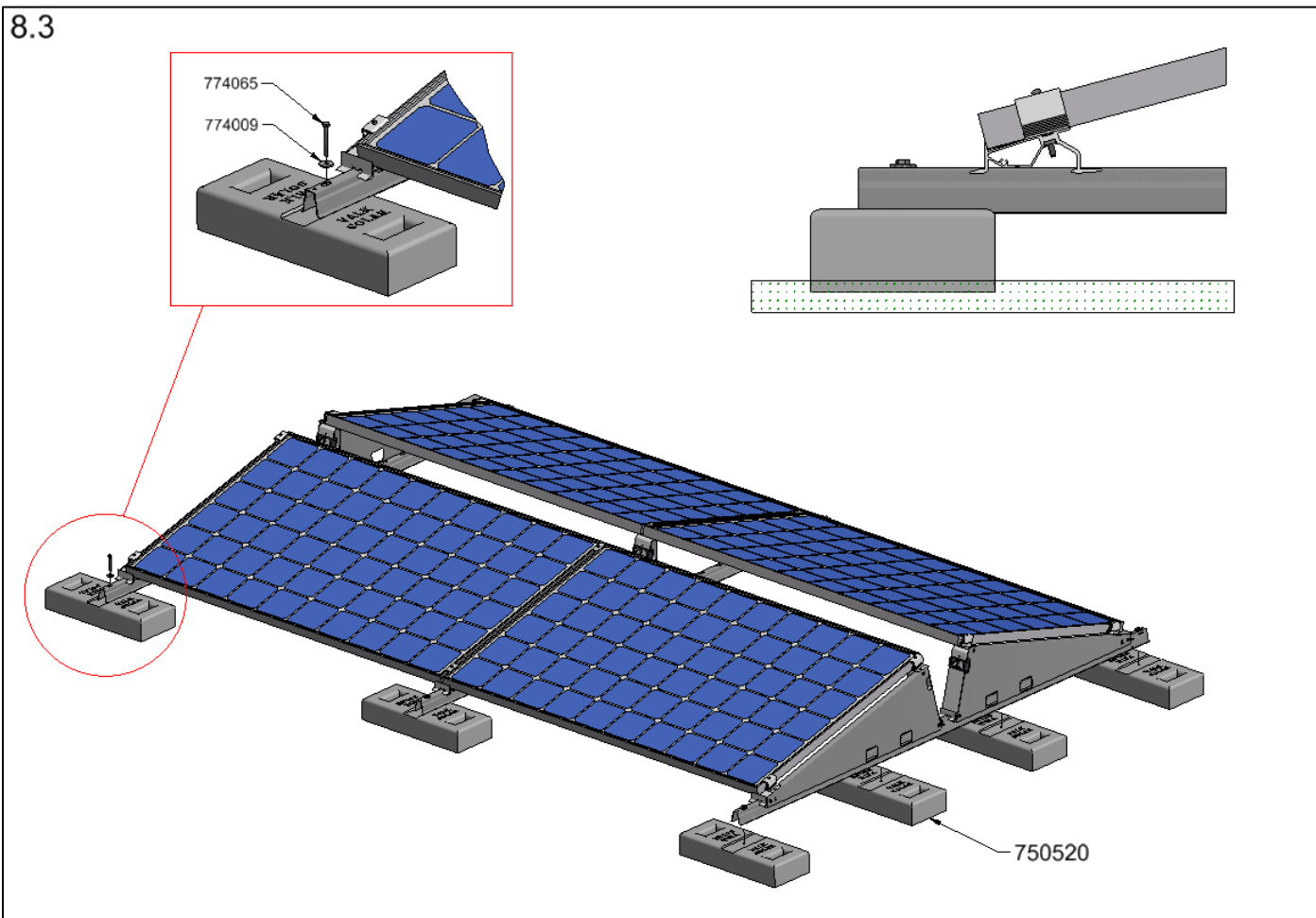


ValkPro+ as a field system:

The Valkpro+ system can be placed on the ground as a field system. For this method the system is mounted on top of concrete mass blocks (Art. 750520). These mass blocks are fixed to the roof carriers with a stainless steel M8 x 65 mm bolt and washer (Art. 774065 + 774009).

A demand for the ValkPro+ system as ground mount is that the surface should be levelled. This can be done with the following options:

- To place the system on a hard surface, such as pavement or concrete slabs (Stelcon)
- To place the system in a field we advise the ground to be levelled and quaked to a flat surface. Also a high quality rooting membrane should be placed which is covered with gravel, this prevent the spread of weeds. The gravel protects the rooting membrane against UV radiation which expands the life span of the rooting membrane. Keep in mind that the foundation point must be placed between the gravel and not on top of it.



ValkPro+ as a field system cannot be calculated with the ValkPVplanner software. Please contact Van der Valk Solar Systems to calculate your project.

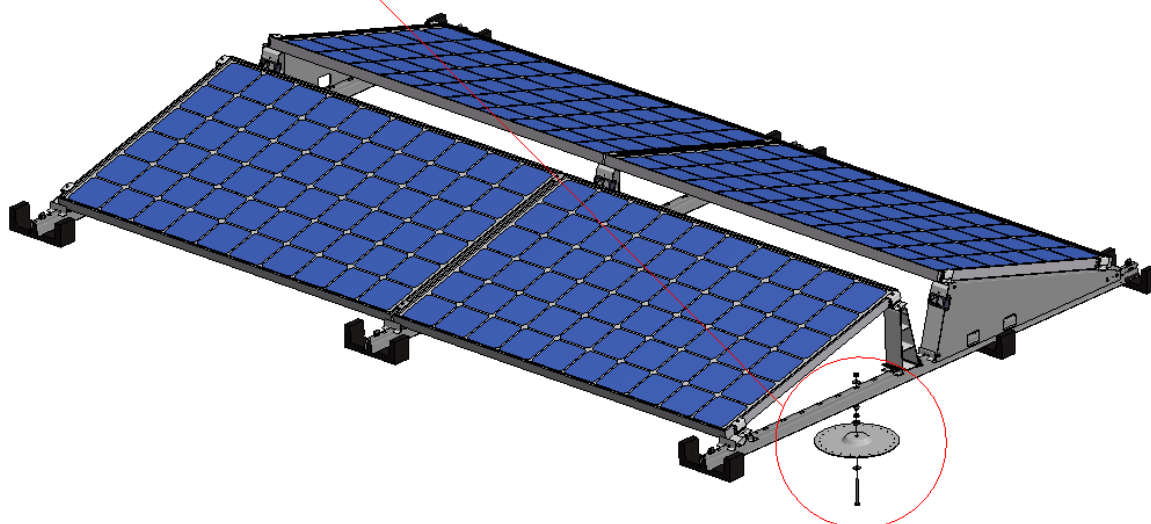
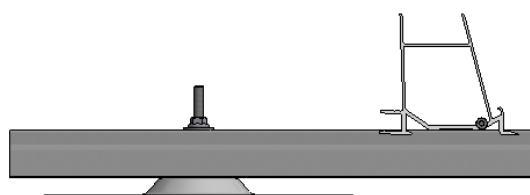
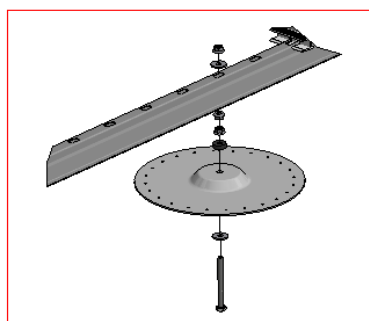
ValkSolarFix:

The ValkPro+ system can be mechanical fixed to the roof. This can be done with the ValkSolarFix consoles. The consoles with special height of 20mm can be fixed to the roof with:

- Toggle anchor
- Concrete anchor
- Roof screw for fixation in wood
- Roof screw for fixation in steel
- Roof screw for fixation in aerated concrete

For the detailed mounting of a specific ValkSolarFix anchor, please refer to the manuals that can be downloaded from our website: www.valksolarsystems.com.

8.4

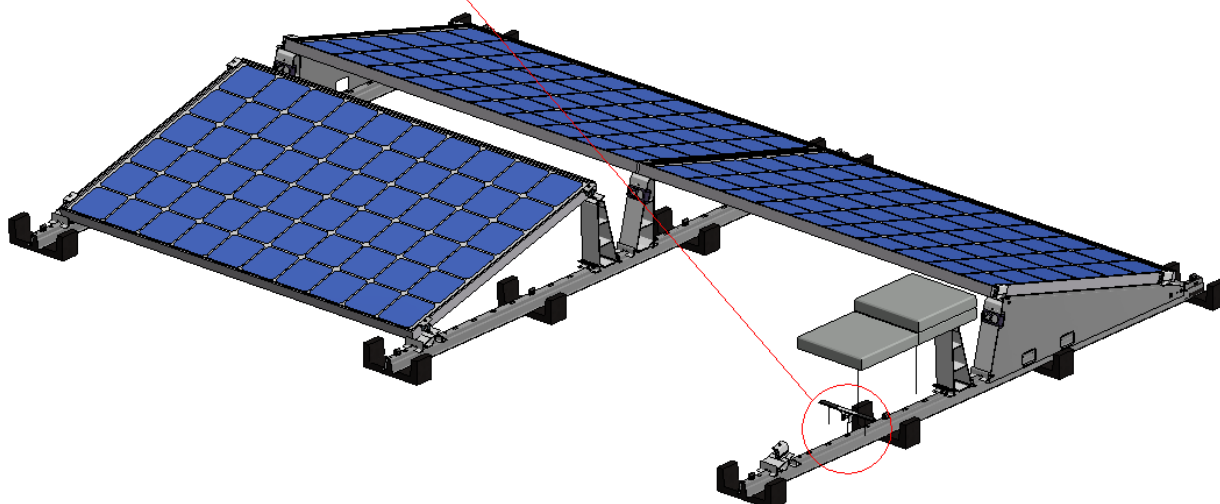
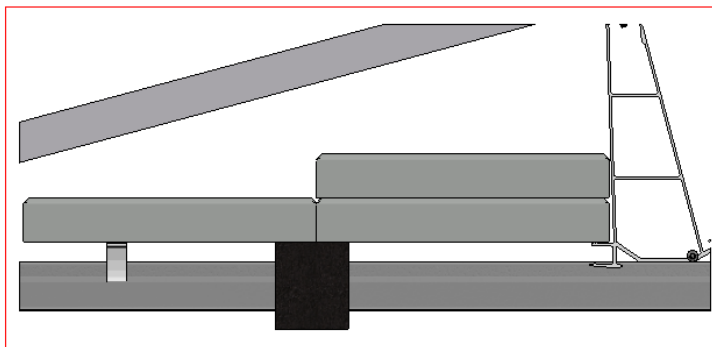
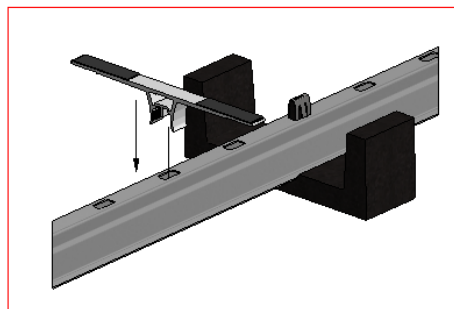


Ballast wings:

When non-standard or larger tile sizes are used for ballast and mass carriers are not ideal, ballast wings can offer a solution. In combination with the rubber tile carriers the ballast wings can provide additional support for the tiles. On the rubber tile carrier with ballast wings 3,5 standard tiles can be placed.

The ballast wing is mounted by placing it over the roof carrier above a free hole and push it downwards.

8.5



Van der Valk Solar Systems

Van der Valk Solar Systems is since 2009 one of the fastest growing companies in the solar industry and focuses entirely on the development and production of solar mounting systems for pitched roofs, flat roofs and open fields. Van der Valk Solar Systems also has an office and warehouse in the UK, offices in Sweden and Spain and is currently active in 13 countries.

Our mounting systems are developed and produced in our own factory in the Netherlands and stand out thanks to their broad area of application, the very short time in which they can be installed, and the high quality. They are developed according to the latest Eurocodes and therefore comply with the requirements defined for solar systems by banks and insurance companies.

Van der Valk Solar Systems is part of family-owned company Van der Valk Systemen, which has been a household name in the field of moving systems and mounting components since 1963.

Our shared industrial complex consists of 20,000m² of offices and factory spaces. Here we use modern machinery and the latest technologies to quickly and accurately develop, manufacture, and test products and systems.



Solar mounting systems & cable management



Flat roofs



Pitched roofs



Cable management

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