

# 2.1

## INSTALLATION MANUAL **AEROCOMPACT S** 5° / 10° / 15°





# INTRODUCTION

Thank you for choosing the Aerocompact mounting system.

Please read these instructions carefully before starting the installation and make sure that you can meet the required guidelines in this installation manual.

An important part of this installation manual is the additional designed project report with the structural analysis based on the project location. Please make sure that the position of the modules on the roof and the ballast distribution is installed as required in project report. In case the module layout changes do to circumstances like obstructions, the ballast calculation needs to be modified with the Aerotool software. It is required to design the static calculation of the system with the Aero Tool Software program (Solar.Pro.Tool).

The technical documentation is part of the product. The company AEROCOMPACT is not liable for damages occurring from non-compliance with the installation instructions, particularly the safety instructions, as well as from misuse of the products. In addition to this installation manual the current general conditions as well as warranty conditions apply. The current versions are available at [www.aerocompact.com](http://www.aerocompact.com)

Faults and damage as well as limited or lacking operability of the system as a result of assembly that is faulty and/or deviating from the installation instructions and/or the project report (Solar.Pro.Tool) preclude a material defect is not the responsibility of Aerocompact. With unprofessional installation, all rights of the purchaser shall expire. The required compressive strength of the roof insulation and the maximum static roof load needs to be checked before starting the installation.

Photovoltaic flat roof systems are not maintenance free. Maintenance, particular the right position of the ballast blocks and the building protection pads should be conducted annually. For exceptional high-wind events, we recommend to do a Maintenance and system check right after the storm event.

Faults and damage as well as limited or lacking operability of the system as a result of assembly that is faulty and/or deviating from the installation instructions and/or the project report (Solar.Pro.Tool) preclude a material defect is not the responsibility of Aerocompact. With unprofessional installation, all rights of the purchaser shall expire.

The system warranty shall be effective only if all system components were purchased from Aerocompact.

This racking system may be used to ground and/or mount a PV module complying with UL 1703 only when specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. In order to meet this requirement, installers are supposed to first seek approval, e.g. through general installation instructions or specific application documents, from module manufacturers, in particular for attaching the module clamps along the shorter side of the module frame, and for grounding/bonding the module frame by clamp-integrated pins. Aerocompact offers assistance to achieve such approval.

A list of PV modules with proven compliance in terms of UL 1703 is being built up by and can be obtained from Aerocompact upon request.

The material of the building protection mat that is included in the scope of delivery avoids accelerated ageing (e.g. through leaking of plasticizers) of roof membranes, and it usually provides sufficient friction between racking and roofing. Due to the variety of different sealing types previously and currently customary on the market, materials compatibility as well the friction coefficient for ballast calculations must be checked / verified by the assembly company / buyer for any individual installation. If the measured friction coefficient (lowest value out of several tests under dry and wet conditions) is below the value assumed for ballast calculations (default is 0.7), the system design must be recalculated and modified accordingly in order to ensure system stability.

If the Roof-Gravel is located right on the water-bearing roof the Aerocompact System can not be installed on the gravel layer. The gravel must be removed in this case in the area of the Aluminium Brackets.

In case of doubt, please contact the Team of Aerocompact

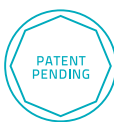
directly at [office@aerocompact.com](mailto:office@aerocompact.com)  
or call **0800 578 0474**

# AEROCOMPACT®

smart mounting solutions

## YOUR BIG ADVANTAGE

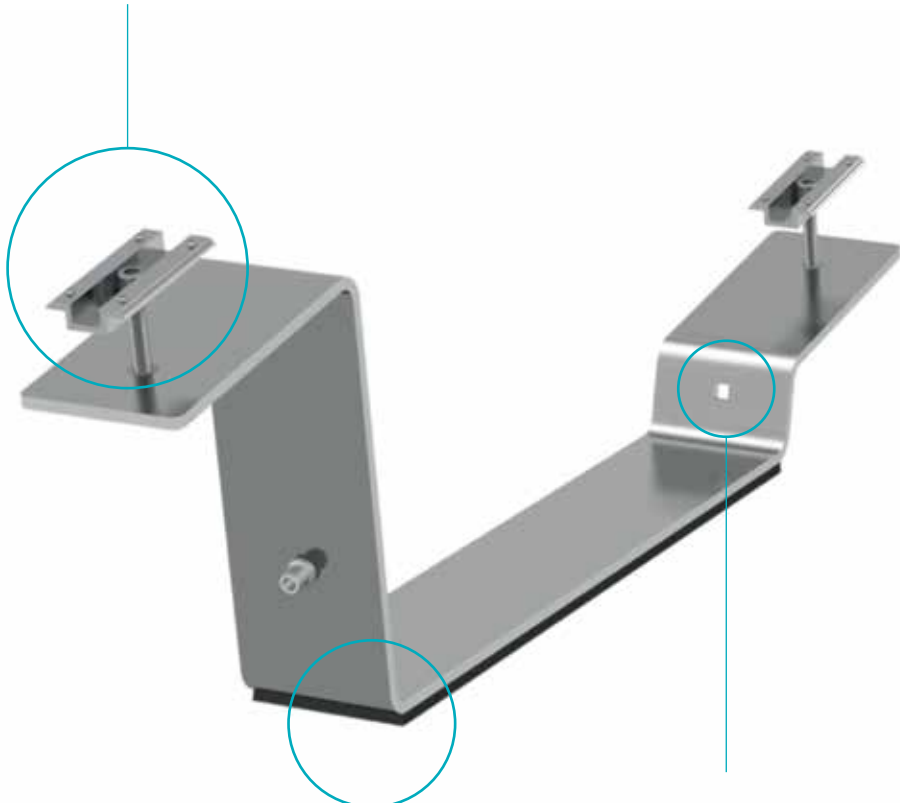
- > 25 years product warranty
- > Wind tunnel tested
- > new protection pads for long service life and enhanced friction
- > TUV certified, conforms to UL 2703
- > Patent pending
- > ballast-only as a standard, roof penetrations optional
- > Optimum module ventilation
- > Complimentary ballast calculation incl. roof layout
- > Made in Europe
- > Minimum Order only 2 kWp
- > Module Clamps with grounding pins
- > TUV certified, conforms to IEC 61215
- > Class A fire rated acc. to ANSI/UL 1703 when equipped with side deflectors (tested with the S5 racking type, to be confirmed for S10, S15, and + systems).
- > Best price value available
- > The fastest installation in the industry 1 kWp 5 min., 2 men
- > Statically optimized system
- > Less material = Less shipping costs
- > Optimized wind suction, therefore less ballasting than other systems
- > Optimum water drainage
- > Suitable for roof edge zones



# New System Update < 2.1 >

## NEW module-clamp

incl. grounding-pins, TUV certified to UL2703



## NEW cable management solution

## NEW fleece building protection mat

certified and long-term tested



## Technical Details

<b>Mounting Tilt:</b>	AEROCOMPACT S: 5°, 10°, 15°
<b>Inter-Row Spacing:</b>	AEROCOMPACT S 5 (25°): 13.2 inch (335 mm) AEROCOMPACT S 5 (30°): 7 inch (178 mm) AEROCOMPACT S 10 (25°): 15 inch (380 mm) AEROCOMPACT S 15 (25°): 22.5 inch (571 mm)
<b>Min. Array Size:</b>	AEROCOMPACT S: 2 rows with 3 modules / 3 rows with 2 modules
<b>Roof Edge Zone:</b>	Roof areas F and G can be used
<b>Module Dimensions:</b>	37.4–41.3 inch x 61.1–81.9 inch (width – length) (standard; other dimensions upon request)
<b>Max. Roof Slope:</b>	5 Degree (standard; steeper roofs upon request)
<b>Roof Height:</b>	up to 60 ft (standard; higher buildings upon request)
<b>Windload:</b>	up to 50 psf (2,400 Pa) uplift (design load)
<b>Snowload:</b>	AEROCOMPACT (standard) up to 50 psf (2,400 Pa) downforce (design load) AEROCOMPACT “Alpine” up to 92 psf (4,400 Pa) downforce (design load)
<b>Module approval:</b>	Please request approved module list from the module manufacturer or Aerocompact
<b>Materials:</b>	Supporting materials made of aluminum EN AW 6060 T64, module-clamps aluminum EN AW 6063 T66, stainless steel screws, wind-deflector galvanized steel
<b>Shipping:</b>	approx. 40 kW per pallet, 700 kW per truckload
<b>System Requirement:</b>	Proof of static load capacity of the roof and the insulation needs to be provided by customer. General terms / warranty conditions and usage agreement apply.





# INTRODUCTION

**We recommend you read the following information carefully because it is very important in dealing with the product.**

The installation system AEROCOMPACT S is a robust racking system for mounting PV modules on flat roofs. It consists of prefabricated aluminum retaining brackets with glued on building protection pads, deflector plates and all required small parts that assure a safe installation. This installation system allows installation on flat roofs with large surfaces and without roof penetration. This innovative system uses the frame structure and aerodynamic effects to ensure stability.

AEROCOMPACT S is designed for systems facing south with an inclination of 5°, 10° and 15°. It can be used for most framed PV modules of leading manufacturers with following dimension:

AEROCOMPACT S	module width	x	module length
	37.4 – 41.3"	x	61.1 – 81.9"

The AEROCOMPACT S5, S10, S15 standard version is designed for maximum design loads of 50 psf, downforce and uplift. The AEROCOMPACT Alpine Version is designed for maximum design loads of 92 psf downforce (uplift unchanged). All Values are Design-loads as a load combination of dead weight, wind and snow. Therefore, check the snow load zone of your location beforehand. The System is wind-tunnel tested, CE certified and conforms to UL 2703.

### Can be used for the following flat-roof coverings:

Foil roof, bitumen roof, Gravel roof, Green roof.

*Note: We recommend to remove the gravel and green in the area where the bracket touches the roof surface.*

AEROCOMPACT offers the AeroTool software to design the mounting system including ballast weights. The programme creates a project report with the statistically calculation, ballast weights and system material list.

If you have any other questions, make use of AEROCOMPACT's professional and comprehensive consulting service. Our engineers will be happy to help.

### PLEASE MAINTAIN THE FOLLOWING TORQUES WHEN INSTALLING SCREWS:

**133 lbf in**

M8 Screw (fixation of module clamps, wind sheets, ballast trays, and accessories)

## REQUIRED TOOLS



Cordless screwdriver



spacer bracket (S5 30° only)



Torque wrench



# SAFETY INFORMATION



It is important that you install person-independent fall arrest systems or reception system according to Norm in your Country prior to the start of work! Occupational Safety Regulation for Construction Workers and country specific regulations must be followed!



If person-independent fall arrest systems or reception systems are not available for work-related reasons then safety harnesses must be used!



Use only safety harnesses (harnesses and catching belts, connecting ropes/belts, fall absorber, rope cutter) marked and tested by authorized testing laboratories.



If person-independent fall arrest systems or reception systems are not available and safety harnesses are not used, it can result in falls from great heights and therefore to severe or deadly injuries!



Leaning ladders can cause dangerous falls, if the ladder caves in, slips, or falls over!



Work in close proximity of live, electrical overhead power lines, with which you can come in contact, only if

- power is turned off and that condition is guaranteed for the time of the work
- the parts under power are protected through covers or barriers.
- the safety distances are not too short.

Radius of voltage:

- |        |                                   |
|--------|-----------------------------------|
| 1 m in | 1,000 Volt of voltage             |
| 3 m in | 1,000 to 11,000 Volts of voltage  |
| 4 m in | 11,000 to 22,000 Volts of voltage |
| 5 m in | 22,000 to 38,000 Volts of voltage |
| > 5 m  | if the voltage is unknown         |



The manufacturer hereby agrees to take back for recycling all products that are marked with the eco-label as well as all materials used herein. Only the approved heat transfer medium may be used!



If at all possible, the safety harness must be fastened above the user. Fasten safety harnesses only on building elements or fastening points that can carry the load!



Do not use defective ladders, e.g. cracked steps and rails of wooden ladders, bent and kinked metal ladders. Do not fix partially broken steps, rails and braces!



Safely place a leaning ladder. Make sure the installation angle is correct (68° - 75°). Secure leaning ladders against sliding, falling, slipping and sinking e.g. by using enlarged bases, feet braces of ladders that are adapted to the ground, fastening devices.



Lean ladders only against secure support points. Secure ladders in traffic areas with barriers.



Touching live electrical overhead lines can result in death.



Wear safety goggles when drilling!



Wear safety shoes for the installation!



Wear cut-proof work gloves when installing the collectors!



Wear a helmet during installation!

# SCOPE OF DELIVERY



Front Bracket



End Bracket



Connector



Windsheet



Ballast Tray



Ballast Tray Long



End Clamp



Middle Clamp



Socket Screw M8x30



Washer



Cable-Tie incl. Clips function



Clips for Windsheet



Revet Nut M8



Flathead Screw



Allenhead Nut



Alpine back Bracket



Alpine front Bracket

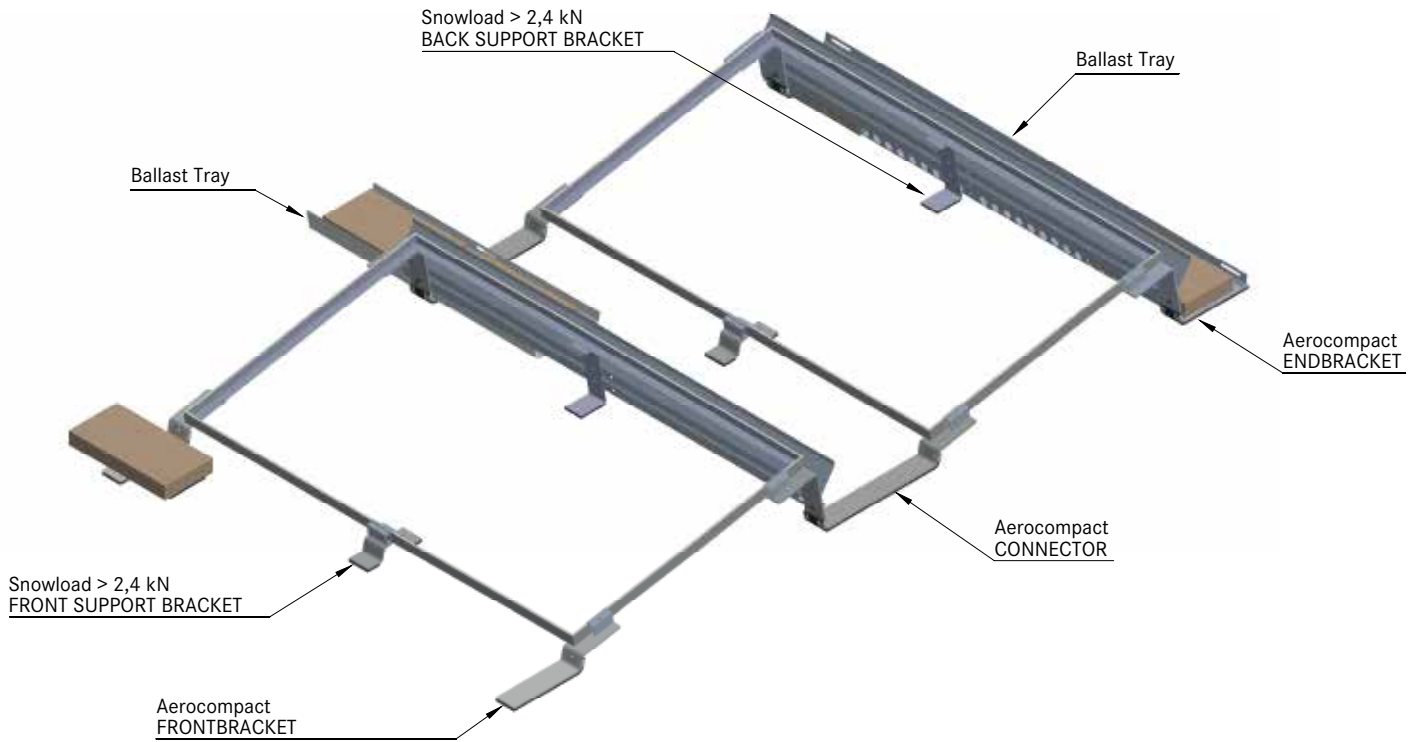
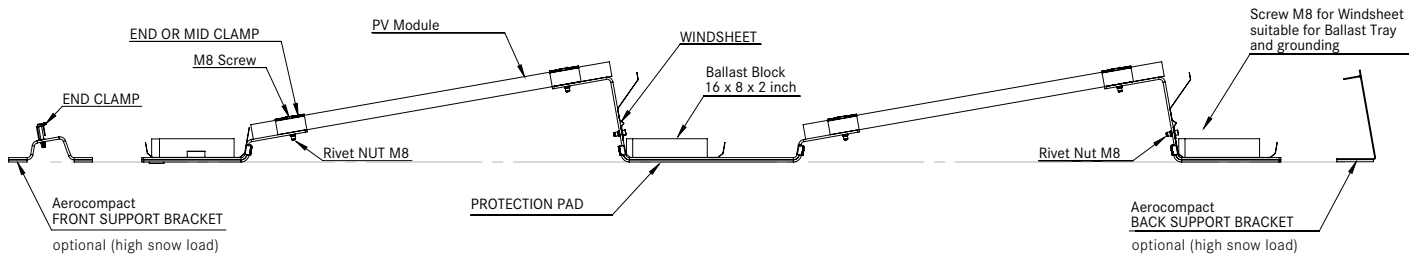


Protection Pad



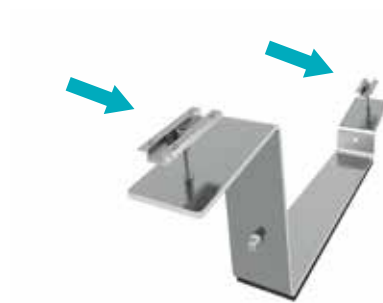
Ballast Block (not included in delivery)

# SYSTEM OVERVIEW

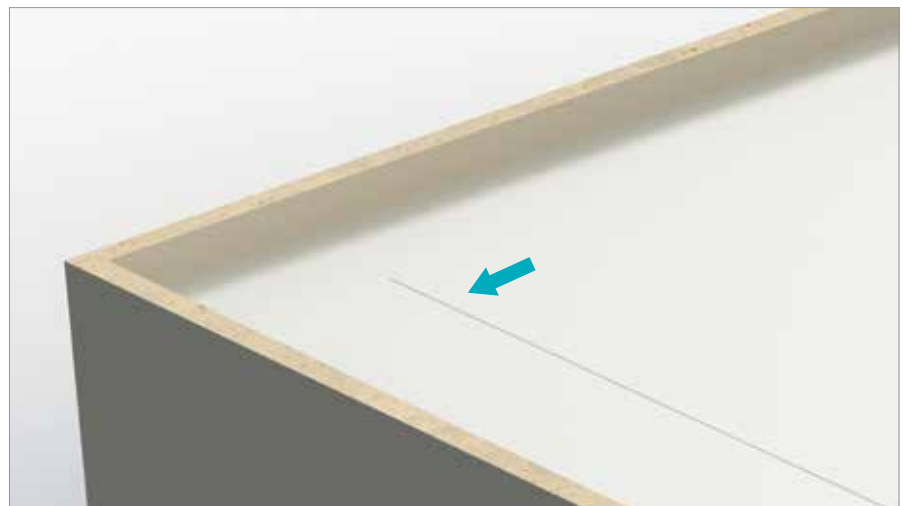


# INSTALLATION MANUAL

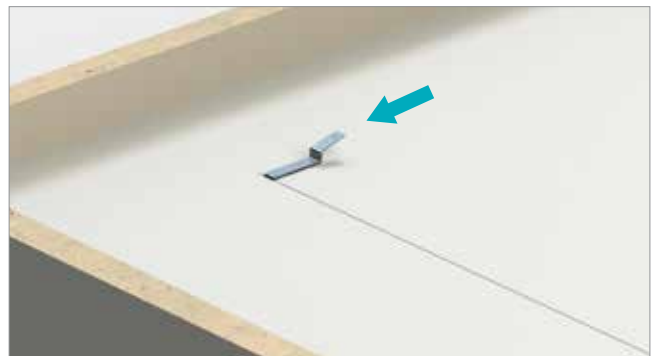
1. Attach the end and middle clamps to the Aerocompact Brackets.



2. Measure the starting point
3. Use chalk line marking

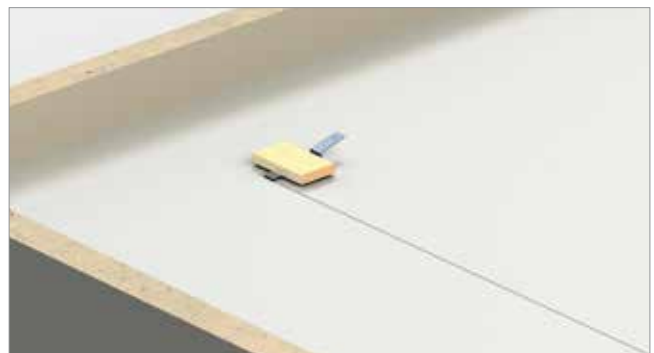


4. Place Front Bracket

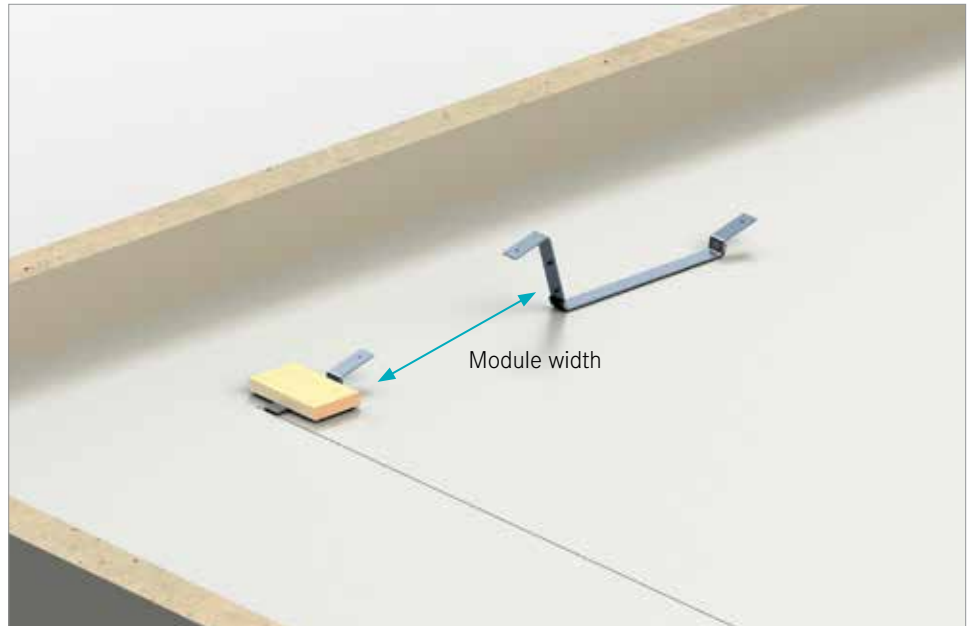


5. Attach protection pads to ballast block (Aerocompact recommends glueing, see p. 22)

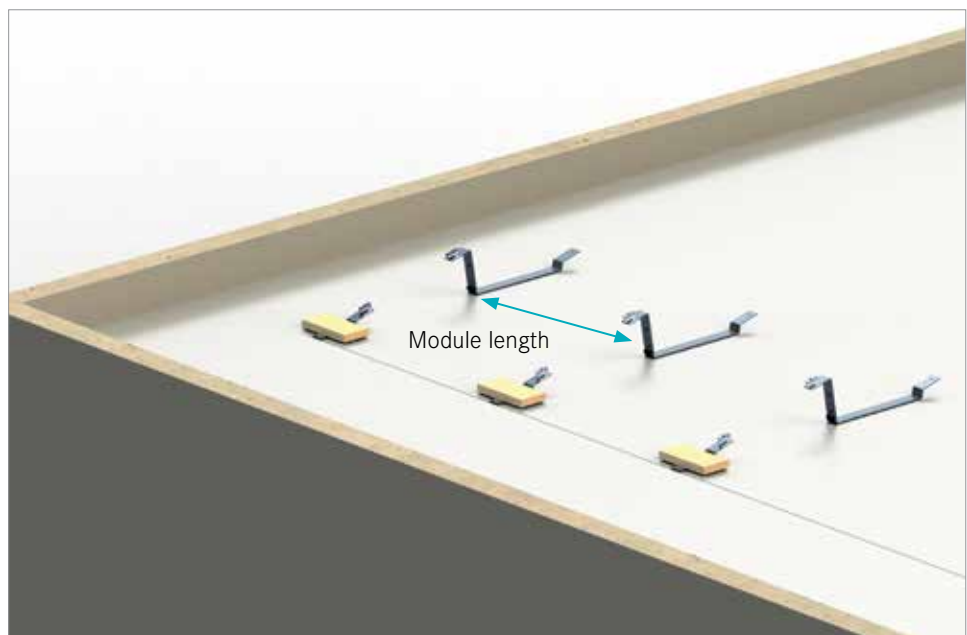
6. Secure front bracket with ballast block



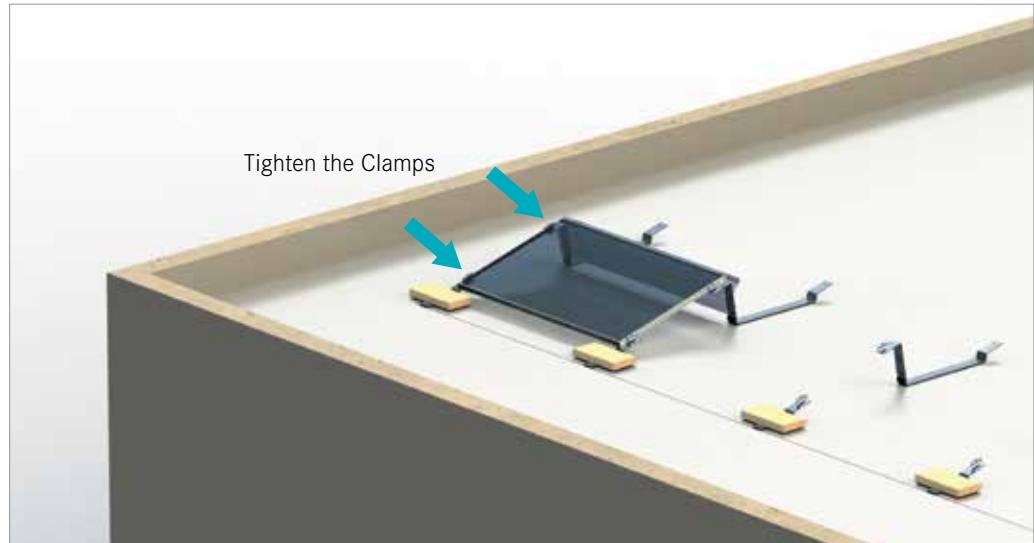
- 7.** Place the Connector vertically with spacing (module width). The exact distance is adjusted during module assembly.



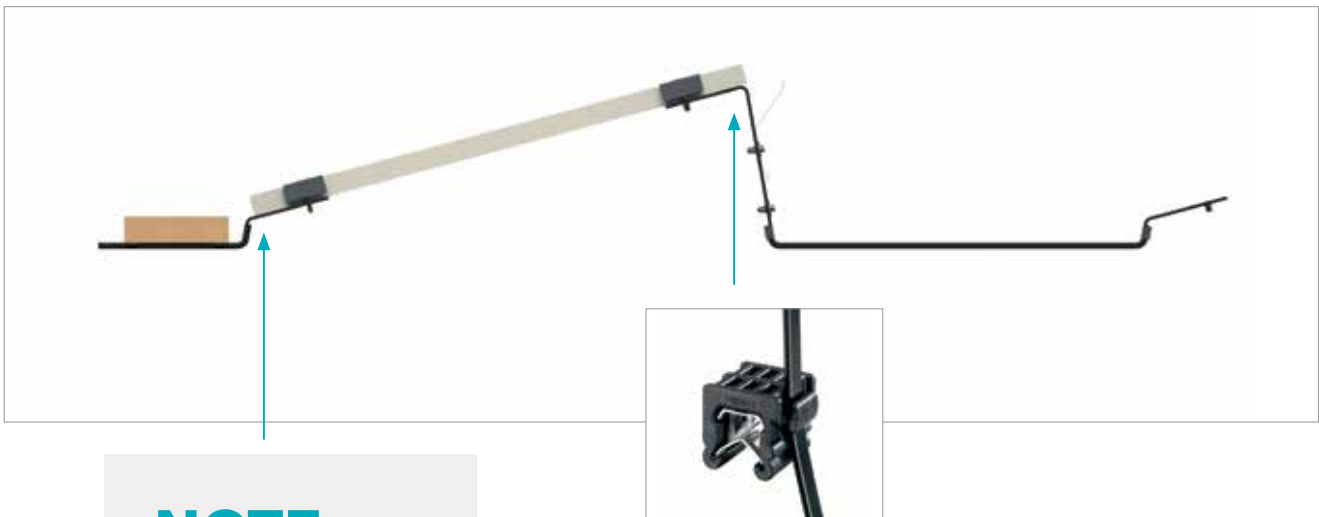
- 8.** Place the Connector with spacing (module length) in horizontal position. The exact distance is adjusted during module assembly.



9. Mount the module in landscape orientation on the mounting brackets and align flush above the back of the AEROCOMPACT connector or end bracket. **(NOTE: does not apply to S5/30° system, see p. 22 for use of the spacer bracket)**



10. Subsequently, the end or middle clamps of the previous module can be tightened and another module placed. At the end of the array end clamps are attached and tightened after alignment of the last module. The clamps must be tightened with 133 lbf in torque value.



## NOTE

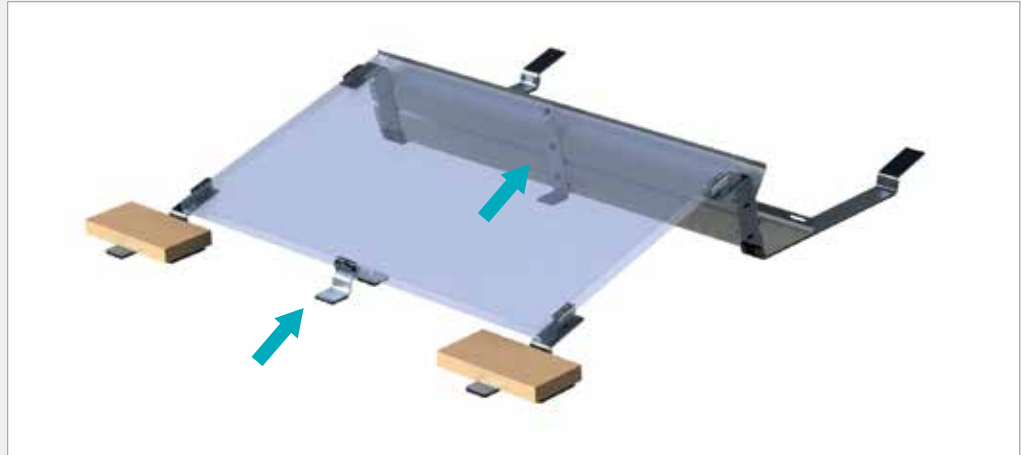
For easy alignment place the modules on the lower end on the marking notch.

11. Clips the cable tie on the module frame for easier cable management



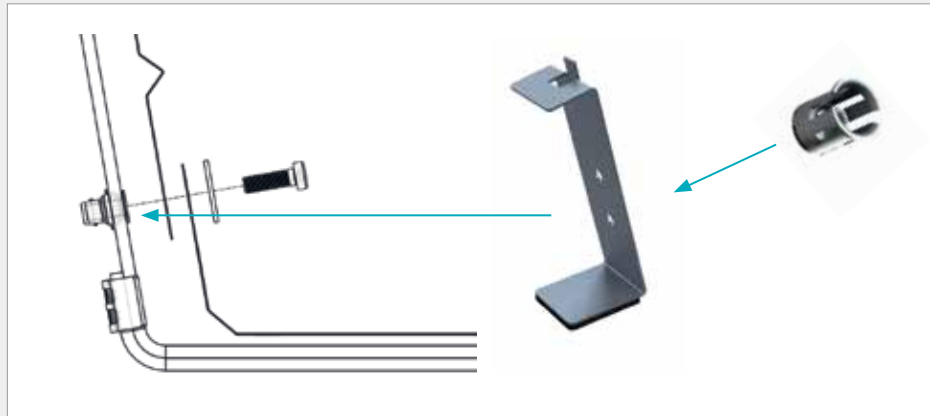
# INSTALLATION of Alpine Version

For snow load of more than 50 psf (design load) additional support brackets must be installed on the lower and upper end centered of the module.

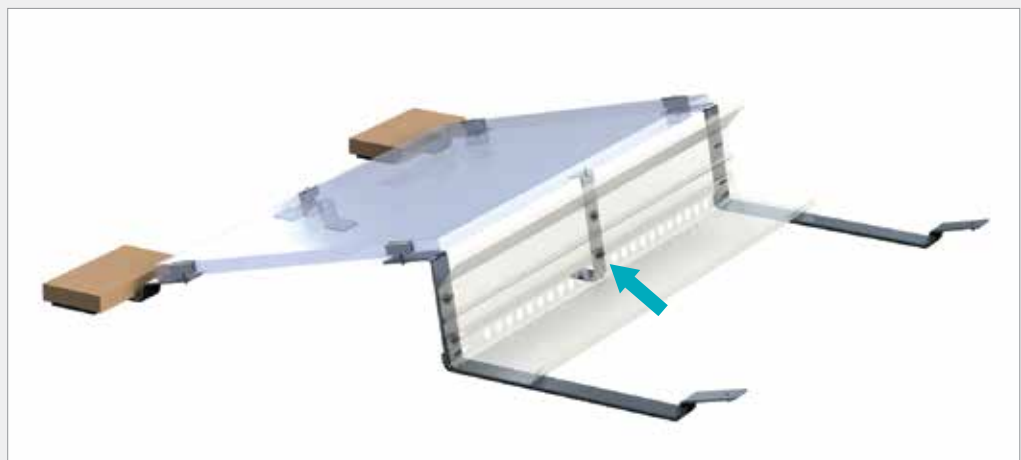


1. Place the front support bracket (after pre-assembling an end clamp on top) on the lower module end centered in the middle and tighten.

2. Place back support bracket under the upper module edge. Later, after installation of the wind sheet and ballast tray (if present), insert 2 cage nuts through ballast tray (if present) and wind sheet into the bracket.



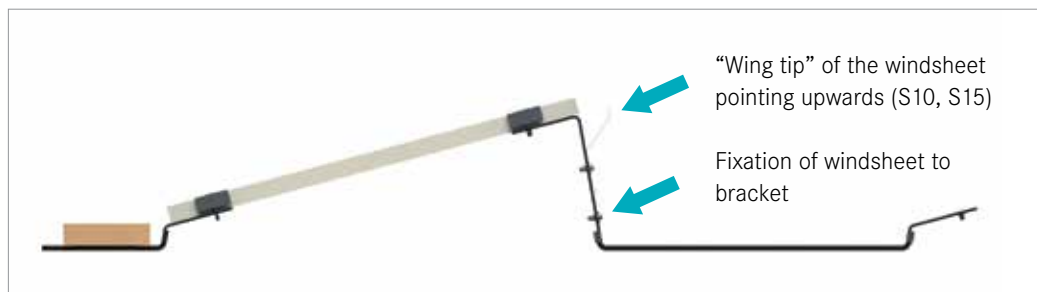
3. Fix ballast tray (if present) and wind sheet to the support bracket with allen-head screws and washers (torque 133 lbf in).



## 12. Installation of the Windsheet



The Windsheet is mounted overlapping on the connectors and end brackets, using allen-head M8x30 screws with washers. These screws are tightened after the module installation of each row with 133 lbf in.



The windsheet of the S5 systems has a symmetrical cross section, and thus no “wing tip”. Install it in a way that the slotted holes are close to the upper edge and the rounded holes are close to the lower edge.

Standard module lengths are covered by two different lengths of wind sheets and ballast trays.

Type	Module length
wind sheet / ballast tray 1775	61.1 – 66.7"
wind sheet / ballast tray 2130	72.0 – 81.9"

### ATTENTION

In order to keep the installation time low, the windsheet is always simultaneously mounted with the ballast trays.

> See installation guideline for ballast tray on the following page.

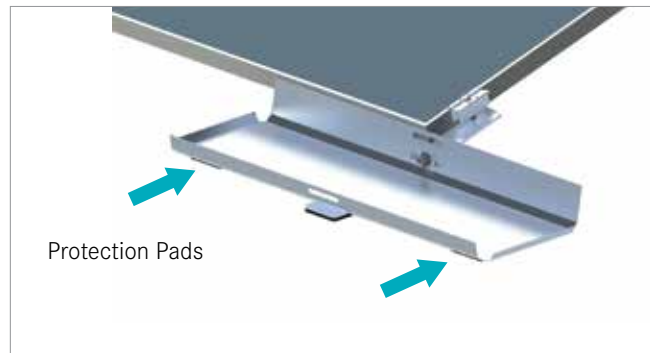
> **Please note** in the S5 system (elevation angle 5°) the ballast tray, where necessary for high ballasting, replaces the wind sheet (see opposite page).

## 13. Installation of the Ballast Trays

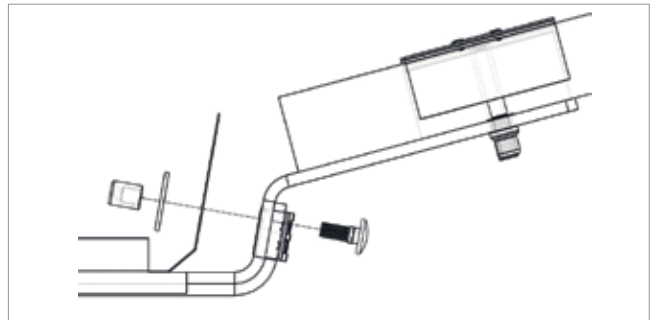
The ballast trays are used as soon as a certain amount of ballast blocks per module is exceeded. Standard (short) or high-load (long) ballast trays may be required, depending on the ballast amount per module. In static report, these positions are color-coded.

The ballast tray is also used when the point load for the roof membrane is too low. Thus, the weight is distributed evenly over the module length.

The ballast tray at the front bracket is mounted with the Flathead Screw through the square hole. Plug the screw from behind through the square and tighten the allen-head nut and the washer. Because of shadowing reasons max. 5 ballast blocks can be installed in the front ballast tray.



Attach protection pads to each ballast tray (Aerocompact recommends glueing, see p.22). The standard (short) tray requires 2 pads (left and right end), the long tray requires 4 pads (evenly distributed over the tray length).

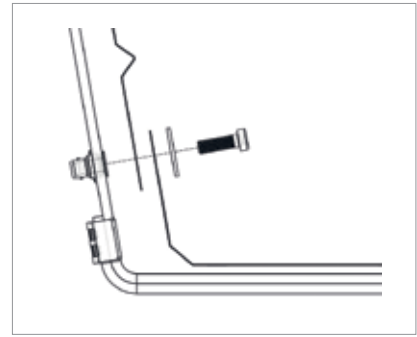


The ballast trays on the connector and end bracket are installed together with the windsheet. The standard or short tray is bolted between the brackets and the windsheet. The maximum amount of ballast blocks depends on tray size, system type (module elevation angle), and row spacing (shading angle).



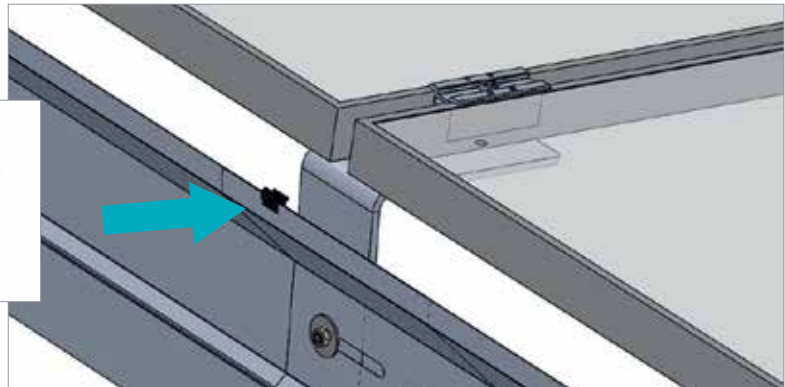
## Long Ballast Tray

Where ballast is high and/or has to be distributed to avoid high point loads, the long ballast tray needs to be installed. The tray is installed in front of the windsheet (windsheet between bracket and ballast tray) and tightened with the same screw. The tray is bolted additionally in the center of the windsheet using a cage nut, allen-head screw and washer.



## NOTE

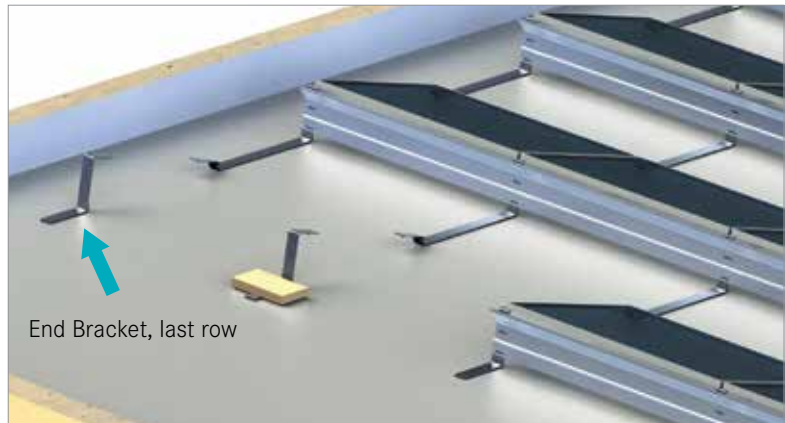
In case of the S5 systems, wind sheets are left out where long ballast trays, running over the whole length of the module, are present (see p.22).



Install the windsheet clip at the overlapping point of the sheets.

## 14. Installation of the last row

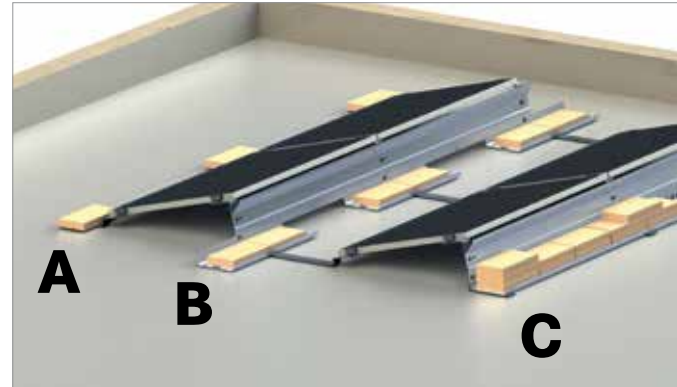
During assembly of the last row the end bracket is used instead of the connector. The installation of the modules, and the Windsheet / Ballast Tray takes place the same as before.



## 15. Ballasting

Laydown all required ballast blocks according to the static calculation of the project report on the front, connector and end bracket. Make sure that all ballast trays, as well as all ballast blocks in direct contact with the roof surface, are equipped with the adequate number of protection pads.

The optimal block size for the AEROCOMPACT system is 16 x 8 x 2 inch and a weight of 15 pounds. Choose ballast blocks that comply with the local weather conditions and have a compressive strength of min. 20.7 MPa or 3,000 psi.



## 16. Grounding of the Array

### NOTE

**Option A:** Ballast block(s) without tray, ballast is placed directly on the bracket.

**Option B:** Ballast tray up to max. 7 blocks.

**Option C:** Long ballast tray up to max. 16 blocks

### WARNING

Don't leave the construction site before the modules and wind-sheets are tightened and all the required ballast blocks are placed according the project report. Without installation of the windsheets and ballast blocks the stability of the module array is not guaranteed. The correct position of the ballast blocks and building protection pads must be checked at the annual maintenance inspection. It is the responsibility of the installer to check the required ballast block specification and weight.

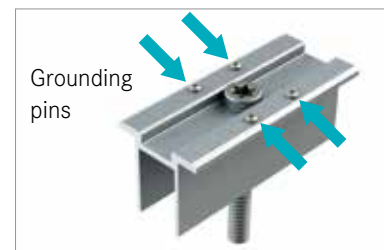
After completing the installation, the entire system must be grounded and connected to the in-house lightning protection system. One grounding connection per module array, comprising up to 120 modules, is recommended. The AEROCOMPACT system needs to be grounded according to the valid regulations of the country in which the plant will be built.

Possible connection point (M8 bolt on bracket) for grounding equipment (example).

Please note: if bare copper wire is used for array grounding, make sure that copper is permanently kept separated from aluminum and galvanized steel parts to prevent contact corrosion.



Install the grounding lug with the same screw used for the windsheet



Due to the UL certified grounding clamps and the UL certification for the array it is not necessary to install grounding wires between the modules.

### NOTE

It is important to ensure that the installed PV system does not impair the effect of the existing lightning protection system. It is also necessary to ensure that the PV system is designed that it can be included within the scope of the building lightning protection system. According to VDE 0185-305-3 supplement 5 to the separation distance between the PV system and the lightning protection system must be observed. AEROCOMPACT is not liable for damages that may result from lightning strikes or grounding issues.

# Bonding and Grounding

**For grounding and /or bonding of PV modules and PV mounting systems, national/regional/local codes apply (Aerocompact takes no responsibility for grounding/bonding and any other electrical details). On US territory, ANSI/NFPA 70 sets minimum requirements, to be met by the following:**

Continuous bonding between modules and the mounting system, and thus between all module frames and racking elements within an array, is achieved by Aerocompact's module clamps with intergrated pins. The performance of these clamps has been tested and recognized for UL listing. [PV modules lacking UL 1703 certification may require diverging, specific bonding measures, including individual bonding/grounding of the racking elements.]



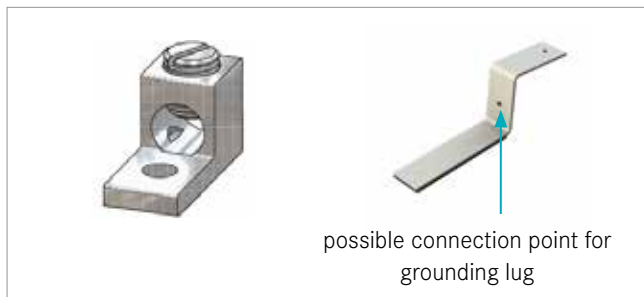
**The module clamp with its grounding pins is re-usable and need not be replaced after removal during maintenance.**

Stainless steel pins integrated in the module clamps provide bonding of module frames to racking elements; the pins pierce through the non-conductive surface of the anodized module frame; tighten module clamps with a torque of 133 lbf in.



Stainless steel M8 hardware used to fix windsheets and/or ballast trays to the racking elements provides bonding of named components, adding further to the complete bonding between all parts within an array; tighten M8 hardware with a torque of 133 lbf in.

Permanent grounding of each PV array, consisting of and interconnected by the components mentioned above, must then be accomplished by at least one (sufficient for a standard array size of 12x10 modules) point of connection to suitable grounding equipment of the building.



Grounding lug for grounding a module array, to be fixed using M8 bolting hardware, e.g. in suitable holes found in any support bracket of the mounting system; the lug accepts a range of copper and aluminum wires.

**Keep unprotected copper wire separated from aluminum and especially galvanized steel!  
Make sure to sustain continuous grounding/bonding during maintenance work!**



# Bonding and Grounding

This racking system may be used to ground a PV module complying with UL 1703 only when specific module has been evaluated for grounding in compliance with included instructions. A list of PV modules with proven compliance in terms of UL 1703 is being built up and can be obtained from Aerocompact upon request.

## Bonding Path

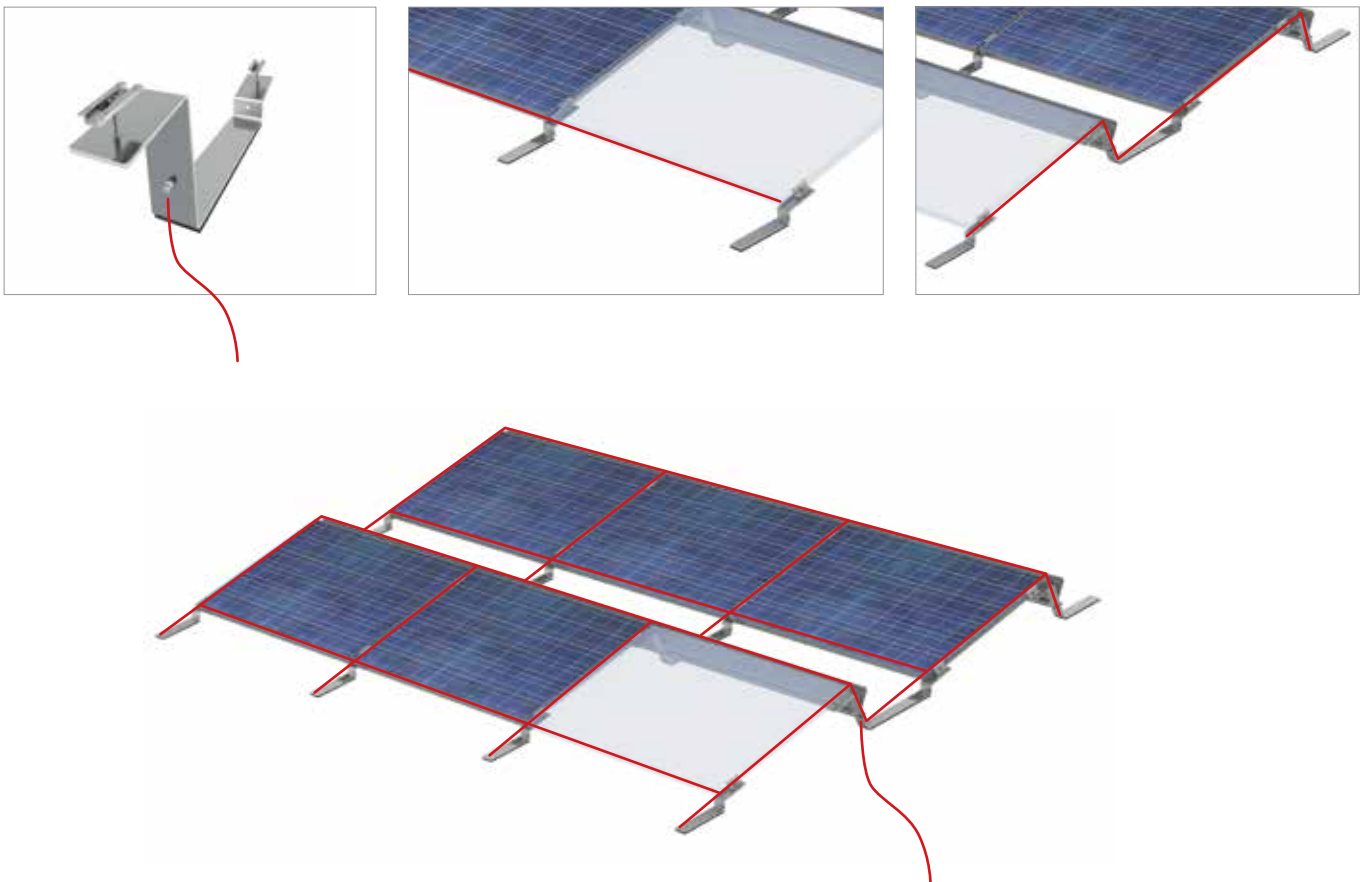
From the main grounding device of the building, direct one wire to each module array and connect it to the racking systems using a ground lug (small figure, left).

From this connection point, bonding in any direction is provided by the module clamps with integrated grounding pins, connecting brackets to module frames.

Bonding in North-South direction, i.e. from module row to module row, runs along the brackets and the short side of the module frames (small figure, right).

Bonding in East-West direction, i.e. from module column to module column, runs across the brackets and along the long side of the module frames (small figure, center).

Finally a grid of intercrossing and interconnected bonding paths is established (large figure), providing safe overall grounding even in cases where individual connections fail or are interrupted during maintenance works.



# Protection Pads / Specific Features S5

## Attaching the protection pads to ballast blocks and ballast trays

Roof protective matting is intended to separate ballast and metal parts of the mounting system from the roof membrane in order to avoid damage to the roof. To prevent lateral displacement of racking elements over protection pads, the latter should be fixed to ballast blocks and ballast trays where required by the system design. (Brackets are delivered with protective material attached firmly.)

Aerocompact recommends to use a durable, highly weather resistant silicone glue for this purpose.

Make sure that surfaces are dry and dust-free prior to application of the glue, and beyond that follow the instructions of the glue manufacturer.

## Windsheet installation with the S5 system

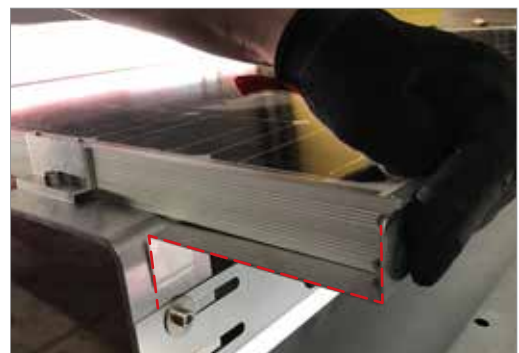
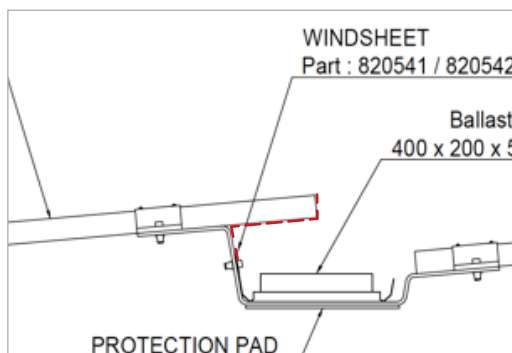
The windsheet of the S5 system (both sun angles) has to be installed in a way that the slotted holes are located along the upper edge and the rounded holes along the lower edge (see picture below).

It is left out where a long ballast tray is present (replacing the windsheet, see picture below).



## Row spacing with the S5 system at 30° sun angle

While at 18° or 25° sun angle the upper module edge has to align flush with the end of connectors and end brackets, the row spacing of the S5/30° system requires that the modules protrude into the space behind the connector. To adjust row spacing here, a spacer bracket is provided that marks the correct position. Apply as shown in the picture below (dashed red line).



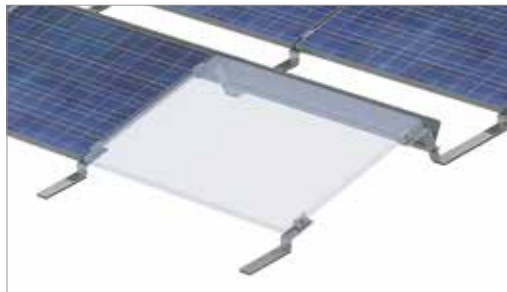
# Load Capacity and Roof Loading

The load carrying capacity of Aerocompact flat roof mounting systems has been demonstrated, tested, calculated, and verified to be in line with the basic requirements of the IEC certification for framed PV modules.

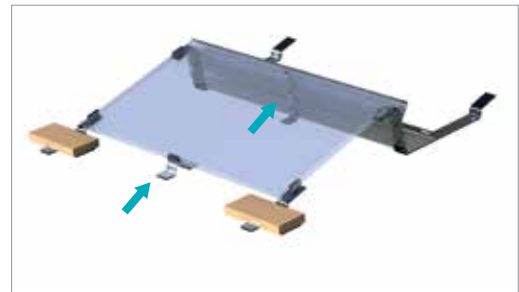
Aerocompact provides test results, calculations, and certificates upon request.

The standard application will sustain a vertical pressure of 50 psf caused mainly by snow load and module weight. The installation of “Alpine” support brackets (see p. 15) raises this value to 92 psf. Aerocompact’s software design tool automatically adds “Alpine” support brackets to the (standard) system whenever the maximum downforce load under project-specific site conditions exceeds 50 psf (lower limits can be defined by the user).

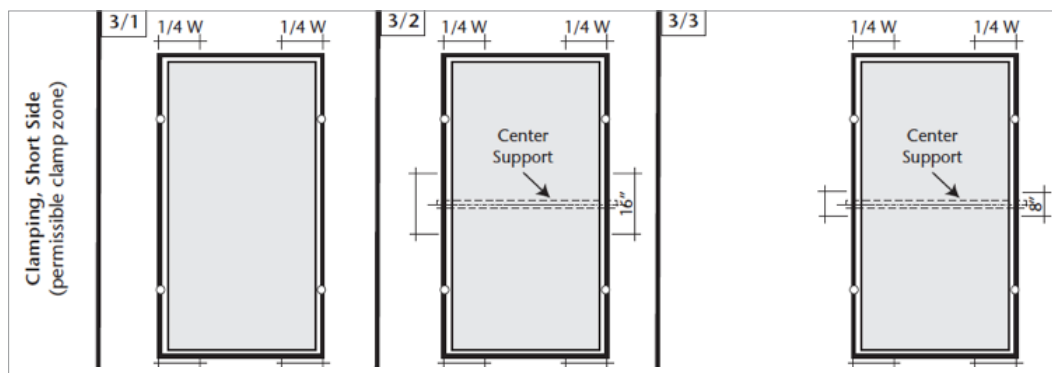
Make sure that the module sustains the load given in a specific project, and enforce the design software to add “Alpine” support where necessary for the module.



50 psf – no “Alpine” support



92 psf – with “Alpine” support



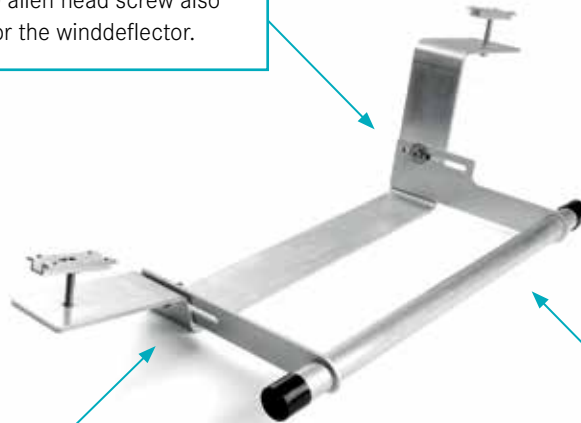
Example of module manufacturer’s approval for short side clamping with/without center support

A rooftop PV system imposes additional load onto the roof. For Aerocompact flat roof systems, the design software calculates this additional load in terms of the absolute load (in lb) for an entire roof, as a surface-related average load (in psf), as well as reduced to a point load (in lb) under each individual support element.

These results maybe used to make sure whether the roof (existing or designed) will be able to carry the system loads.

# Aerocompact cable management

The UL certified cable management solution is designed for the string cable management (home runs) between the module rows. For the ultimate cable management please use certified cable trays according to the national regulations.



Tighten the bracket with the M8x30 allen head screw also used for the winddeflector.

**TUV listed to UL 2703**

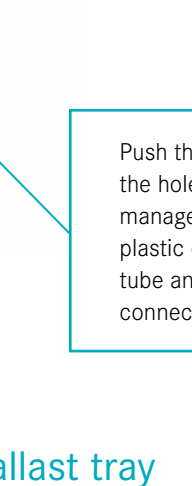
Tighten the bracket with the M8x20 flat head screw, the washer and the allen head bolt.

**ATTENTION**


Tighten the cable bracket on the connector not before the tube is positioned. After fixation the tube can not be move anymore.

Push the aluminum tube through the hole on each side of the cable management bracket. Now put the plastic cap on both sides of the tube and tighten the screws on the connector bracket.

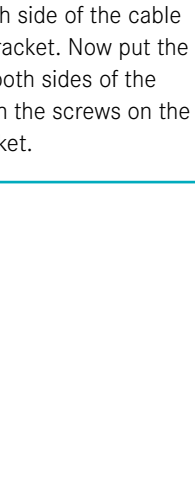
## Cable management in combination with the ballast tray



Now cut the sheet with a metal shear



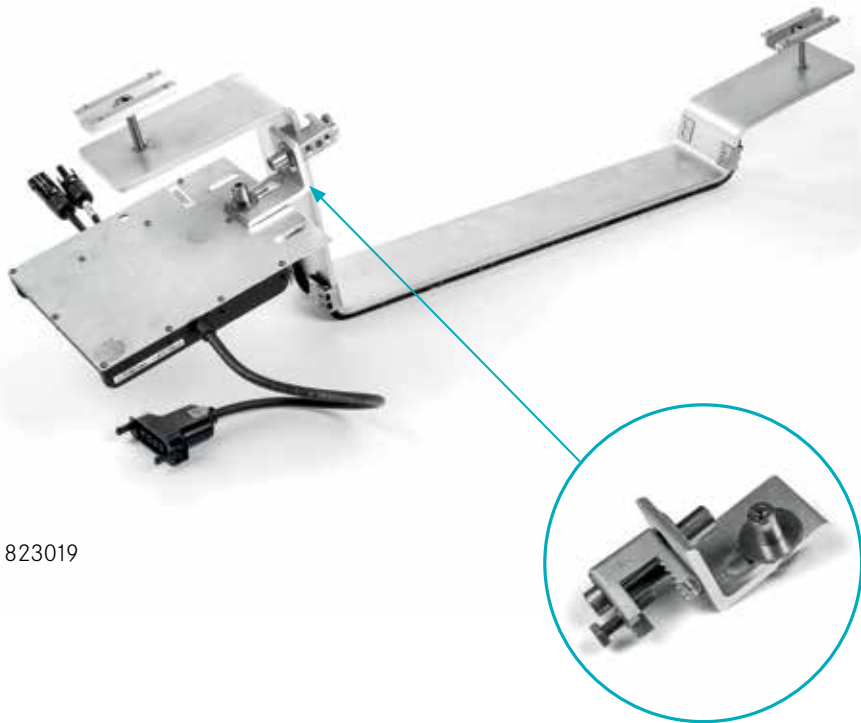
Push the tube in to the hole of the ballast tray and mark it on the opposite side.



Push the aluminum tube through the hole on each side of the cable management bracket. Now put the plastic cap on both sides of the tube and tighten the screws on the connector bracket.

## Mounting bracket for micro inverter and optimizer

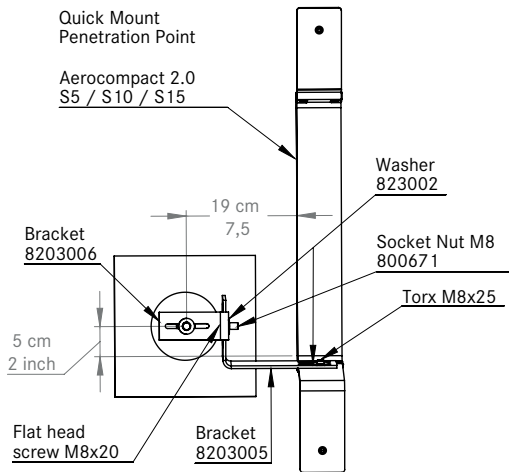
To fix a micro inverter or optimizer use the UL certified mounting bracket specially designed for the Aerocompact Connector.



Article-no. 823019

## Installation of the penetration points

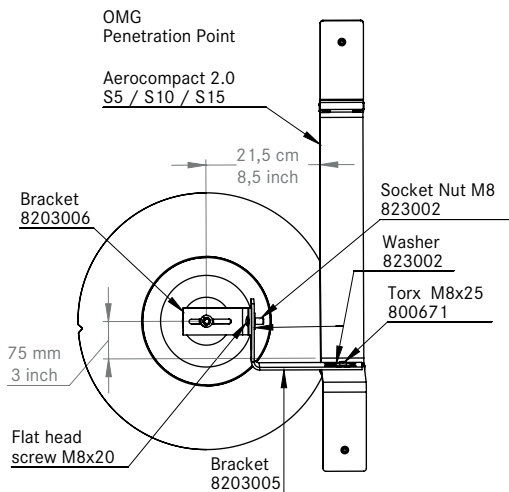
If the maximum allowed roof weight is exceeded due to PV system, Aerocompact provides a Hybrid solution. This combination of penetration points and ballast reduces the overall weight of the system. Furthermore, this option is used in areas with seismic activity to prevent movement of the system due to vibrations from earthquakes.



### Option A with Stand-off point



Connect the provided connection brackets over the windsheet screw with the penetration point.



### Option B with membrane point



## NOTE

The position of the attachment points are calculated by Aerocompact and must be strictly installed according to the static report to be code compliant.



## Installation of Side Deflectors

As a visually attractive solution it is possible to close the row end with side deflectors. This version is also installed in areas where the mounting system must be fire tested according to UL1703.



## NOTE

The fire rating according UL1703 requires the installation of the side deflectors on the end of each row. The side deflector must be ordered separately and are not included in the regular quote and delivery. The system has achieved a Class A fire rating when installed with UL1703 Fire Classification Type 1 modules. The system achieves a UL1703 Class A fire rating when installed in the manner specified in these instructions

After finishing the installation, attach a type label to the racking system. It is provided by Aerocompact and presents essential data on the manufacturer, type, date of manufacturing, load rating, and fire rating of the mounting system.

Choose a position where the label will be easily found and can be read well. If wind deflectors along the array edges are not available, select a suitable position on one of the brackets along the array edges.

Name / Norm:	<u>Aerocompact Inc., North Carolina</u>
Trademark / Marque Déposée:	<u>Aerocompact</u> <u>www.aerocompact.com</u>
Model / Modèle:	<u>Aerocompact S</u>
Load rating / Capacité de charge:	<u>50 psf (pressure and uplift)</u> <small>(Test Report 21228064-1 by TÜV Rheinland Energie und Umwelt, Köln, Germany, covering IEC 61215 and UL 2703 for mechanical load testing of PV modules)</small>
Manufactured / Fabriqué:	<u>May - July 2017</u>
Fire rated / Résistant au Feu:	<u>where equipped with side deflectors</u> <small>(Test Report R2-ACP150113 by TÜV Rheinland PTL, LLC., Tempe, AZ, acc. to ANSI/UL 1703)</small>
<small>Label composed and manufactured acc. to UL 969</small>	



# SAFETY INFORMATION AND WARNINGS

## PLEASE FOLLOW THESE INSTRUCTIONS!

The AEROCOMPACT flat-roof system is only designed to hold PV modules. Any other use is considered improper. Proper use also means adhering to the contents of this installation manual. AEROCOMPACT accepts no responsibility for damage incurred as a result of noncompliance with the installation instructions or of using the product improperly.

- > Approval from the module manufacturer is required to use PV modules with the AEROCOMPACT system.
- > AEROCOMPACT is not responsible for performance degradation or damage to the module of any kind whatsoever. We require the use of a roof insulation with a high load capacity. When any work is done on the PV installation, these instructions should be followed exactly. Installation and maintenance work needs to be done by people who are properly trained and authorized. Please observe the applicable regulations and safety advice.

We require that the used roof insulation can hold the point load of Aerocompact system and recommend the use of a insulation with a high load capacity of the Type DAA-ds according to DIN 4108-10.

When any work is done on the PV installation, these instructions should be followed exactly. The modules may only be installed, started, serviced and repaired by people who are properly trained and authorised.

Please observe the applicable regulations and safety advice.

### **These safety guidelines must be adhered to the Country specific safety guidelines.**

- > BGV A 1 – General rules
- > BGV A 2 – Electrical installations and equipment
- > BGV C 22 – Construction work (individual protective equipment to prevent falls)
- > BGV D36 – Ladders and Steps
- > Trade association rules for health and safety at work BGR 203 (working on roofs) and DIN EN 516 (equipment for accessing roofs)
- > Work clothes and industrial safety regulations pursuant to the rules of the trade association

### **The following DIN norms must be complied with:**

- > DIN 18299 – General rules for all types of building work
- > DIN 18338 – Roof covering and roof sealing work
- > DIN 18360 – Steelwork and locksmith work
- > DIN 4102 – Fire behavior of building materials and structural elements

Maintenance on the AEROCOMPACT systems may be carried out by authorized persons. The owner / contractor of the PV System has to fulfill the following safety guidelines:

- > Carry out servicing regularly once a year: checking the cables, torque value of the screws, right position and durability of the protection pads, right position of the ballast blocks, the stability and correct situation of all mechanical connections and the correct position of the array regarding movement.
- > The Aerocompact system only be installed by people with the appropriate training, skills and knowledge of mechanics.
- > The contractor must ensure that contracted persons are able to judge the tasks assigned to them and recognize any potential dangers.
- > The operator must ensure that the installation manual and project report is available during installation. The installation manual and project report is an integral part of the product.
- > The operator must ensure that the installation instructions and particularly the warnings were read and understood by the installation crew prior to installation.
- > The local health and safety at work regulations and codes of practice must be observed.
- > Suitable lifting equipment and ladders are to be used for installation. No freestanding ladders may be used.
- > It is necessary to arrange for a qualified construction engineer to assess the building's existing static loading characteristics with regard to the additional loads of a PV system.
- > Any general load reduction measures specified by AEROCOMPACT (e.g. the need to clear snow, so as to limit the snow load) are to be observed.

# IMPORTANT NOTES

## Warranty / Product Liability (Exclusion)

The information provided in this manual is information from daily practice. We provide binding structural installation and ballasting layout project specific and complimentary with the program AeroTool. It is necessary to have this static report on hand during the installation.

As an installer, you are responsible for the precise execution of the installation. AEROCOMPACT is not liable for the size information contained in the system offers.

As installer, you are responsible for the mechanical durability of the interface connections mounted on the building's structure. In particular, this includes that these are leak-tight. The components of AEROCOMPACT are designed for the expected loads and they are in compliance with the effective state of the art. For this purpose, you have to specify in writing all general technical framework conditions in the project documentation form (information on the support structure, snow load zone, building heights, wind loads, etc.) when requesting information/ ordering from AEROCOMPACT.

AEROCOMPACT is not liable if the installed components are not properly handled.

Any use close to the sea is needs to be requested prior to the installation because of the increased risk of corrosion.

If the components are properly handled, the sizes comply with the structural framework conditions and normal environmental conditions and normal conditions of the surroundings, AEROCOMPACT grants a 25 year limited product warranty on the service life and durability of the aluminum and stainless steel components and 10 years for the windsheets. Excluded are the building protection pads. This applies within the framework of generally prevalent weather and environmental conditions.

For additional information, please take a look at the Warranty condition as well as the general terms and conditions.

## Notes on electrical installation

Only if you are a qualified electrician, may you perform any electrical work. The applicable DIN standards, VDE regulations, VDEW guidelines, VDN guidelines, accident prevention regulations and the regulations of the local utility company are authoritative in this regard.

- > DIN VDE 0100 (Installation of high voltage systems with nominal voltages up to 1000 V)
- > VDEW Guideline for parallel operation of private power generation systems with the low voltage grid of the utility company
- > VDI 6012 sheer 2 guideline for local energy systems in buildings - Photovoltaic
- > Leaflet on the VDEW guideline "Private power generation systems in the low-voltage grid"
- > VDN-guideline "Private power generation systems in the low-voltage grid"
- > DIN/VDE provisions, DIN/VDE 0100 "Building high-voltage systems with operational voltages of up to 1000 V", in particular VDE 0100 part 410 "Protection against direct and indirect contact (DC voltage > 120 V, < 1000 V DC voltage) and the "accident prevention regulation of the industrial trade cooperative associations" VBG4 "Electrical installations and equipment"
- > DIN VDE 0100-540 Selection and setup – grounding, protective conductor and potential equalisation conductor
- > DIN 57185 VDE 0185 Setting up a lightning protection system and VDS 2010

# IMPORTANT NOTES

## Important warnings

Solar modules produce electricity as soon as they are subjected to light and are always energised. Although touch protection is provided in the form of the fully insulated plug contacts, you must take be aware of the following when handling solar modules:

- > Do not insert any conductive parts into the sockets and connectors.
- > Do not install solar modules and cables with wet sockets and connectors.
- > Perform any work on cabling with extreme caution.
- > Do not perform any electrical installation work in damp conditions.
- > Even if there is only little light, very high direct voltages arise at the series connection of modules, which can be life-threatening in case of direct contact. Especially the danger of secondary damage in case of electric shocks has to be considered.

Even when the unit is switched off, high contact voltages may still be present inside the inverter:

- > Be particularly careful when working on the inverter and the cables.
- > After switching off the inverter, it is essential to wait for the time interval specified by the manufacturer before beginning any further work to allow the high-voltage components to discharge.
- > Please also observe the installation guidelines provided by the inverter manufacturer.

When breaking a connected string of modules (e.g. when disconnecting the DC line from the inverter under load), a lethally strong arc can occur:

- > Never disconnect the solar generator from the inverter as long as it is connected to the mains.

## Maintenance

PV installations should be checked **at least annually, plus after extreme weather events** (high snow load, heavy storms). For the racking system the following items are most relevant:

Position; check the position of racks on the roof, of ballast blocks on racks and in ballast trays, and of protection mats underneath ballast blocks; **correct where necessary, and take additional measures** in case of a major shift of components, like glueing protection mats under ballast blocks or securing the system by a mechanical connection to the roof and/or building.

Connections; check the **tight fit** of bolted and screwed connections, use a **torque wrench** to verify secure fit of bolts; attention must be paid to **module clamps**, especially after extreme weather events. Make sure that **wind deflectors and ballast trays** are in place and well fixed. **Re-tighten or replace** loose connections.

Grounding; make sure that grounding devices are **well attached** and do not show major **signs of corrosion** (e.g. from contact to other metals not suitably applied), **mechanical damage** (e.g. from people walking carelessly on the roof), or **electrical overload** (by lightning). **Restore or replace** grounding components where damaged.

Other: watch out for **signs of serious corrosion** (might reduce stability in the long run) or **extreme accumulation of dirt** (might impede drainage of the roof). **Replace** corroded parts and **clean** soiled areas.

# IMPORTANT NOTES

## Notes on frame installation

When mounting on a roof, you must adhere to the applicable structural engineering rules, in particular the requirements set out in the DIN norms and in the rules and regulations of the German roofing trade.

- > Check to see if all screw connections are tightened correctly.
- > Keep to the specified torques.
- > Regardless of verifiable static calculation, you must ensure before the installation starts, that the product meets the static requirements on site according to DIN EN 1991
- > DIN EN 1991 “Actions on structures” - and all related national applicable documents
  - Part 1-1: Densities, self-weight and imposed loads for buildings
  - Part 1-3: Snow loads
  - Part 1-4: Wind loads
- > DIN standard EN 1990: “Principles of Structural Engineering” - and all associated national application documents
- > The design of the mounting frame is based according to DIN EN 1993 “Design and Design of steel structures” and EN 1999 “Design of Aluminum structures”
- > Ensure that the substructure, support structure and other affected layers (such as an insulation layer) have adequate load capacity (based on dimensions, condition and suitable material properties).
- > Make sure that the runoff of rainwater is not impeded.
- > Consider structural aspects (e.g. possible condensation if insulation layers are penetrated).

## Norms and guidelines

All of the norms and guidelines listed here are published for and applicable to Germany. They are to be complied with in their current version. Outside of Germany, please also observe the corresponding national norms and guidelines.

## Product liability

Technical documentation is part of the project to be supplied. AEROCOMPACT accepts no responsibility for damage incurred as a result of noncompliance with the installation instructions or of using products improperly.

Furthermore, the warranty conditions and general terms and conditions available at [www.aerocompact.com](http://www.aerocompact.com) also apply.

# MODULE COMPATIBILITY

The Aerocompact S 5°/10°/15° systems may be used to ground and/or mount PV modules complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. Unless otherwise noted, "xxx" refers to the module power rating and both black and silver frames are included in the certification.

Make	Models
Canadian Solar	Modules with 40mm frames and model identifier CS6Y-xxxZ; where "Y" can be K, P, U, V, or X; and "Z" can be M, P, PX, or P-SD.
JA Solar	Modules with 40 and 45mm frames and model identifier JAyyzz-bb-xxx/aa; where "yy" can be M6 or P6; "zz" can be blank, (K), (L), (R), (V), (BK), (FA), (TG), (FA)(R), (L)(BK), (L)(TG), (R)(BK), (R)(TG), (V)(BK), (BK)(TG), or (L)(BK)(TG); "bb" can be 48, 60, or 72; and "aa" can be MP, SI, PR, 3BB, 4BB, 4BB/RE.
Jinko	Modules with 35 and 40mm frames and model identifier JKMYxxxZZ; where "Y" can either be blank or S; and "ZZ" can be M, P, PP, P-B, or P-V.



get more information!  
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