

AEROCOMPACT®

INSTALLATION MANUAL **CompactFLAT S 10plus** **east/west**



2

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

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.

The system requires that the module can also be used with this type of assembly (clamping to the short sides of the module). This release can be present either generally within the scope of module certification or may in some circumstances also be provided project-specifically by the module manufacturer.

The aluminum coating of the building protection mat that is included in the scope of delivery prevents any leaking of plasticizers. Because of the variety of different sealing types previously and currently customary on the market, compatibility and the minimum required friction coefficients between the protective building mat and the roof structure of the building must be ensured by the assembly company / buyer. A (wet) friction coefficient of at least 0.7 for TPO roofs and 0.4 for Bitumen roofs must be adhered to 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 Aluminum Brackets.

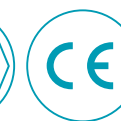
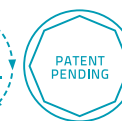
In case of doubt, please contact the Team of Aerocompact

directly at office.us@aerocompact.com
or call **+1 800 578 0474**

AEROCOMPACT®

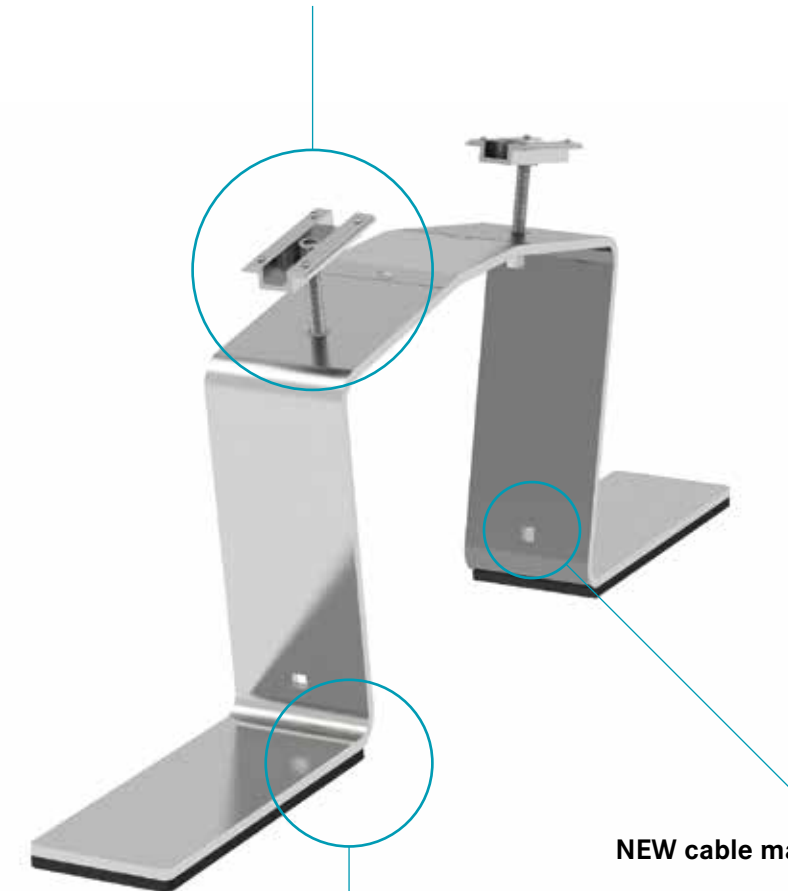
YOUR BIG ADVANTAGE

- > 25 years product warranty
- > Wind tunnel tested
- > Incl. protection pads with aluminum coating
- > TUV certified, conforms to UL 2703
- > Patent pending
- > Without roof penetration
- > 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
- > Fire tested according to UL 1703
- > 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 height adjustable module-clamp

incl. grounding-pins, TUV certified to UL2703



NEW cable management solution

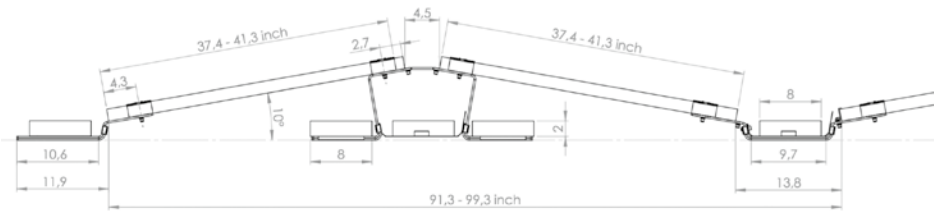
NEW fleece building protection mat

certified and long-term tested

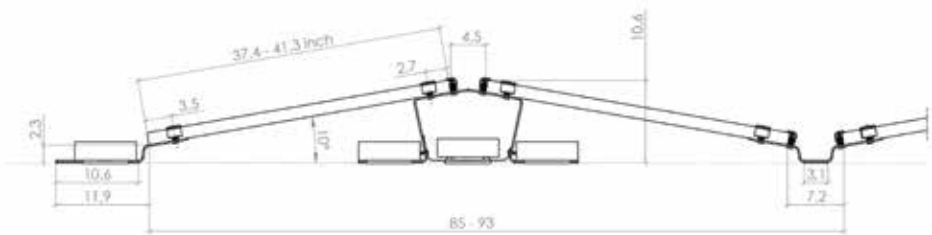
Technical Details

Mounting Tilt:	AEROCOMPACT+: 10°
Inter-Row Spacing:	AEROCOMPACT+ (18°): 18.3 inch (464 mm) AEROCOMPACT+: HD inter-row spacing (297 mm)
Min. Array Size:	AEROCOMPACT+: 2 rows with 2 double modules
Roof Edge Zone:	Roof areas F and G can be used
Module Dimensions:	37.4 – 41.3 inch x 61.1 – 81.9 inch (width – length)
Max. Roof Slope:	5 Degree
Roof Height:	max. 25 m
Windload:	up to 2.4 KN/m ² (Design load as a load combination of dead load and wind suction)
Snowload:	AEROCOMPACT Standard up to 2,4 KN/m ² AEROCOMPACT Alpin up to 4,4 KN/m ² (Design load as a load combination of dead load, wind and snow pressure)
Module approval:	Please request approved module list from the module manufacturer or Aerocompact
Materials:	Supporting materials made of aluminum EN AW 6060 T64, module-clamps aluminum EN AW 6063 T66, stainless steel screws, wind-deflector galvanized steel
Shipping:	approx. 40 KW per pallet, 700 KW per truckload
System Requirement:	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.

PLUS Standard Spacing



PLUS HD Spacing



INTRODUCTION

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

The installation system AEROCOMPACT + is a robust rack system for mounting PV modules on flat roofs. It consists of prefabricated aluminum retaining brackets with glued on Building protection pads including plasticizer barrier, 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 + is designed for systems facing east/west with an inclination of 10°. 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 inch	x	61.1 – 81.9 inch

The AEROCOMPACT + Standard Version is designed for maximum design loads of 2,4 kN/m². The AEROCOMPACT + Alpine Version is designed for maximum design loads of 4,4 kN/m². 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.

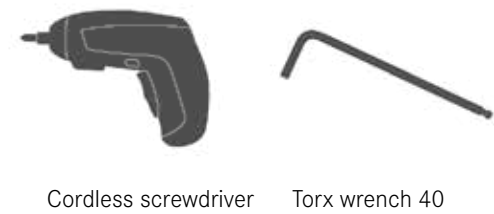
AEROCOMPACT offers the AeroTool software to design the mounting system including ballast weights. The programme creates a project report with the statistically calculation, ballast weights and system material list.

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:

15 NM
M8 Screw

REQUIRED TOOLS



SAFETY INFORMATION

It is imperative that you install person-independent fall arrest systems or reception system according to country-specific safety regulations.

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



Middle Bracket



Connector



Ballast Tray



End Clamp



Middle Clamp



Torx Screw M8x30



Washer



Cable-Tie incl. Clips function



Rivet Nut M8



Flathead Screw



Allenhead Nut



Alpine front Bracket

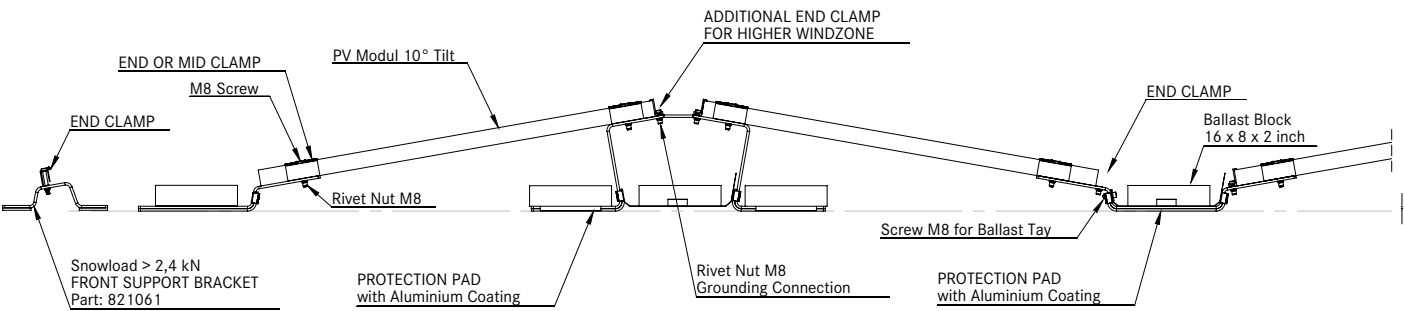


Protection Pad



Ballast Block (not included in the delivery)

SYSTEM OVERVIEW



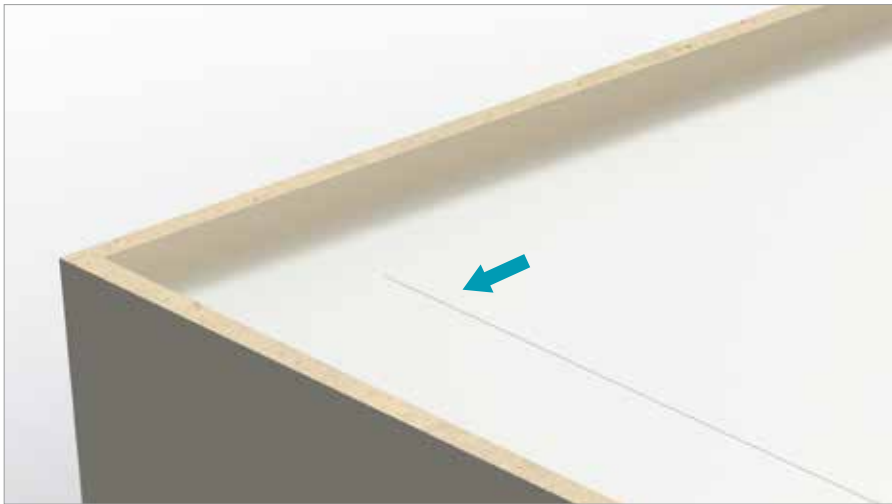
INSTALLATION MANUAL

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

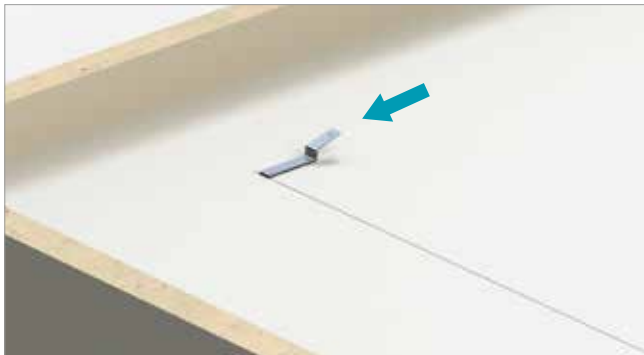


2. Measure the starting point

3. Use chalk line marking



4. Place Front Bracket

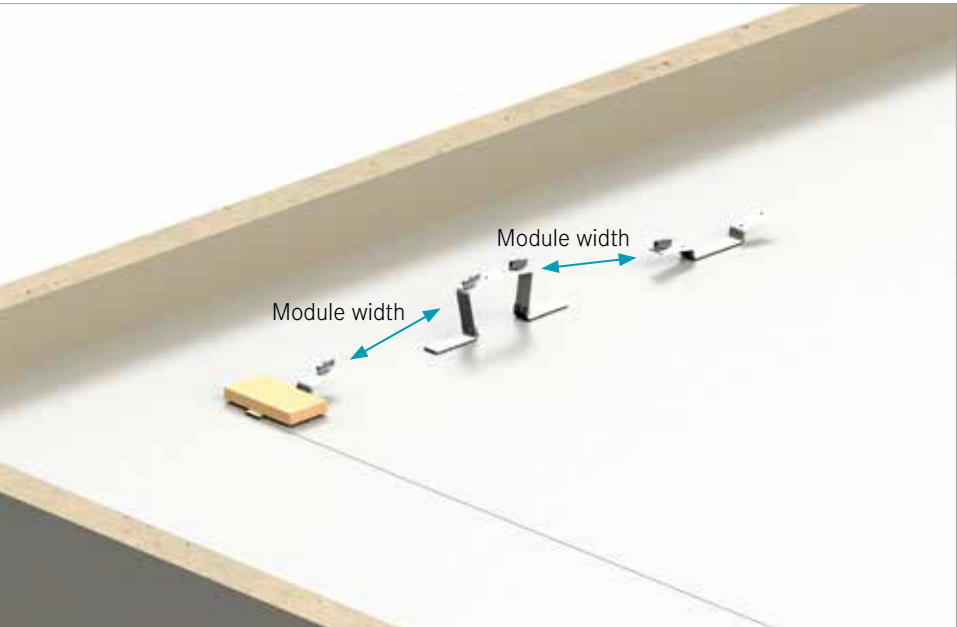


5. Secure with ballast block

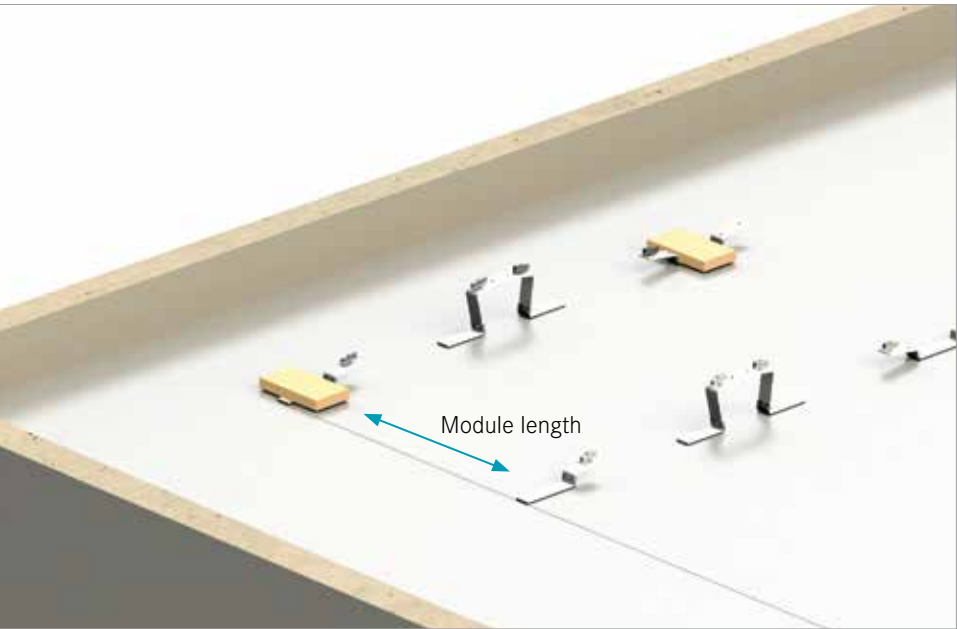
6. Place the protection pad underneath the ballast



7. Place the Middle Bracket and Connector vertically with spacing (module width). The exact distance is adjusted during module assembly.

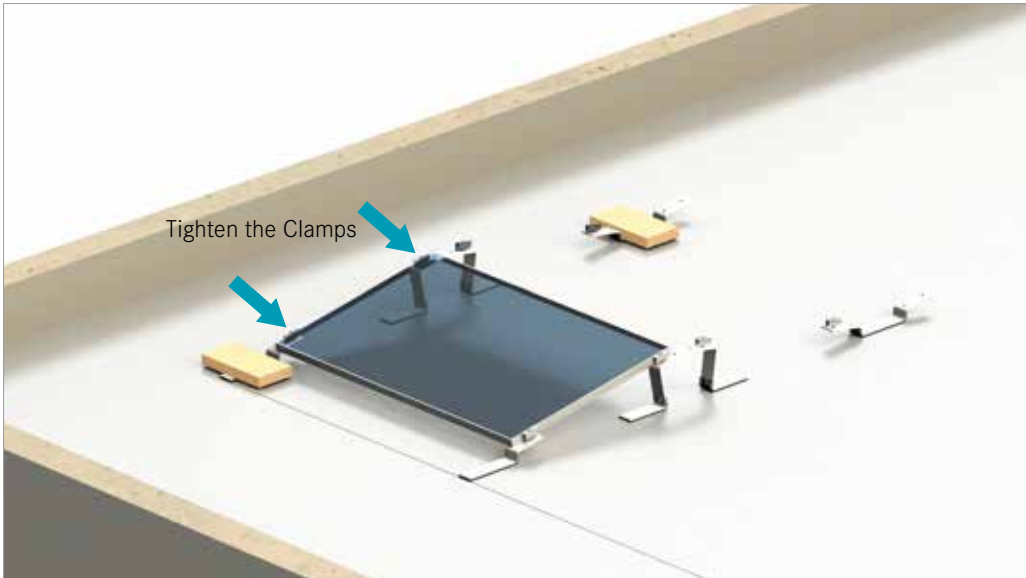


8. Place the Connector with spacing (module length) in horizontal position. The exact distance is adjusted during module assembly.



INSTALLATION of Alpine Version

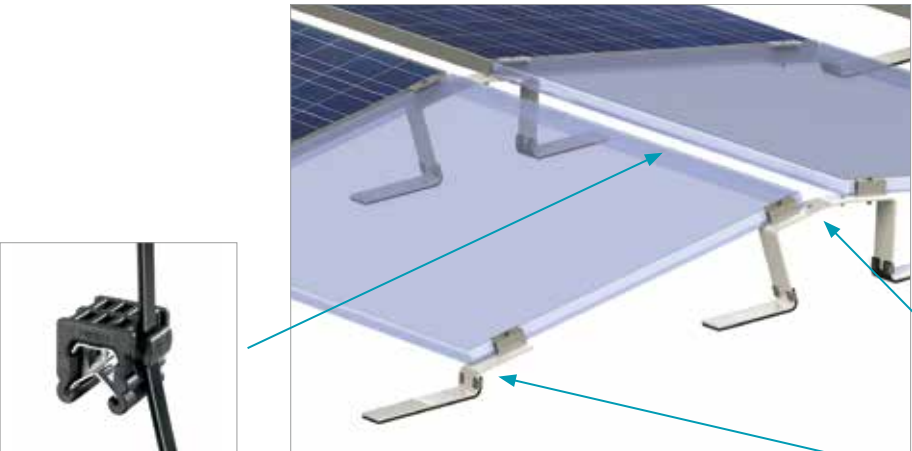
9. Mount the module in landscape orientation on the mounting brackets.



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 min. 15 to 20 Nm torque value



11. Clips the cable tie on the Moduleframe for easier cable management

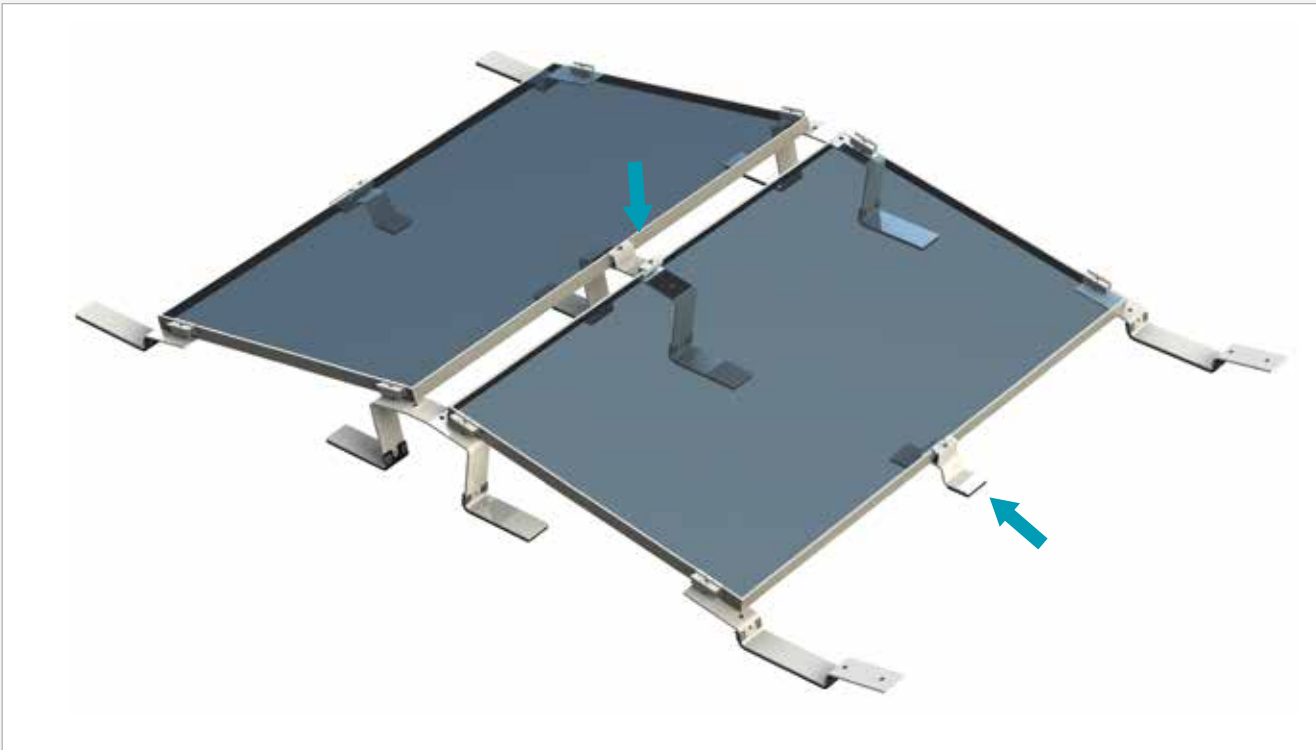


NOTE

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

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 additional Middle Bracket centered between the Modules and fixate with two End-Clamps.



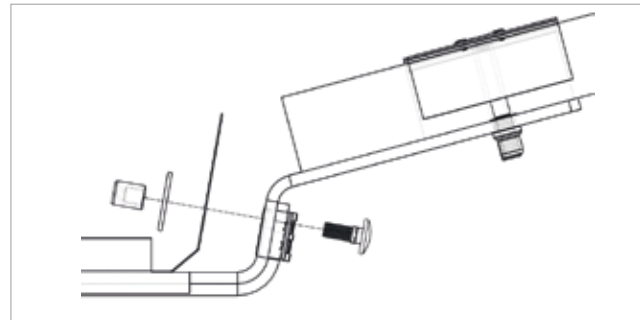
2. Place the front support bracket on the lower module end centered in the middle and tighten the End-Clamp

12. Installation of the Ballast Trays

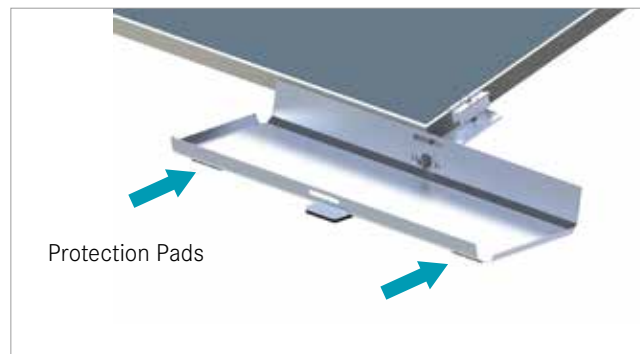
The ballast trays are used as soon as a certain amount of ballast blocks per module is exceeded. A distinction is made between the standard or long ballast tray depending on the ballast amount per module. In static report, these modules are color-coded.

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 over 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.

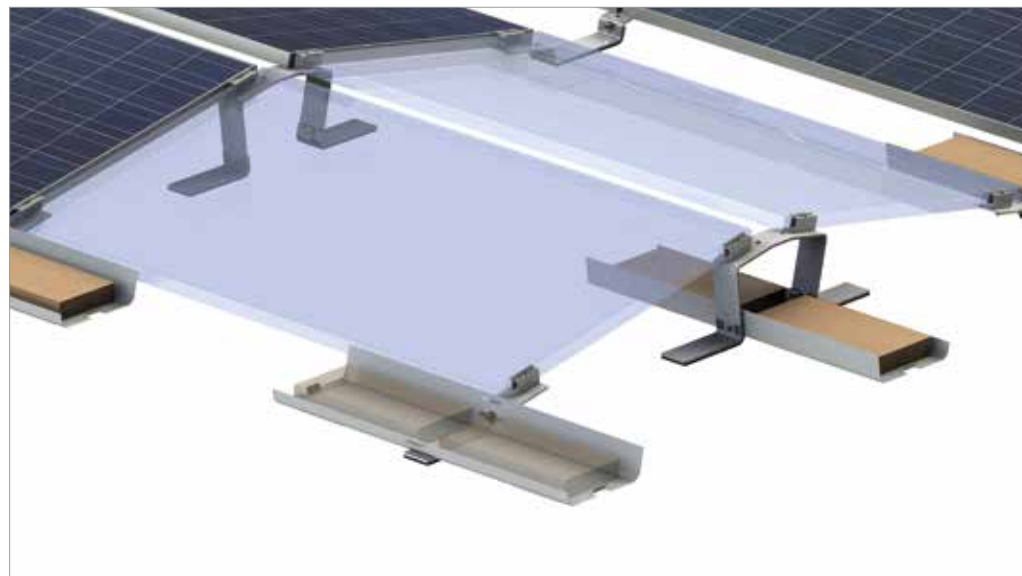


Glue the protection pads on the right and left side underneath the ballast tray. The Glue is already on the pads for an easier installation.



NOTE

The ballast trays are required to maintain UL1703 Fire Rating

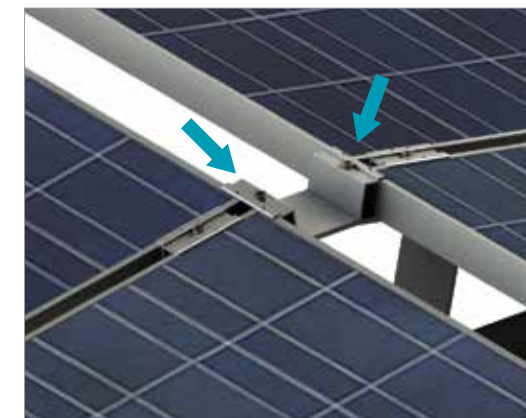


13. Finish the array with an additional End-Clamp

To achieve an optimal static array connection and therefore lower the ballast values it is necessary to mount two additional End-Clamps on the long side of each Module additional to the Middle-Clamp.

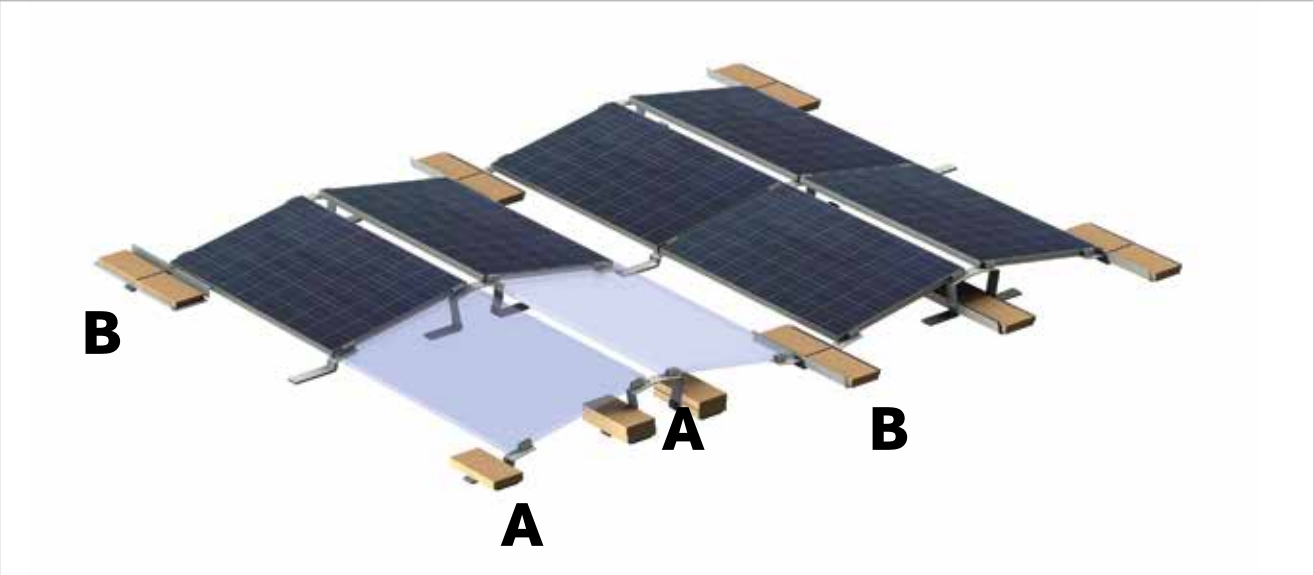


Mount the additional End-Clamp on each Middle and Connector Bracket. The additional End-Clamp is not necessary on the Front Brackets and the very beginning and end of each row.



14. Ballasting

Laydown all required ballast blocks according to the static calculation of the project report on the front, connector and end bracket. Place the protection pads always on the right and left side underneath the blocks and ballast trays. We recommend 2 mats per ballast block or ballast tray. For the long ballast tray 4 piece mats are provided. The optimal block size for the AEROCOMPACT system is 16 x 8 x 2 inch and a weight of 15 pounds. The used ballast blocks must comply with the local weather conditions and have to have a compressive strength of min. 3000 psi.



INFO

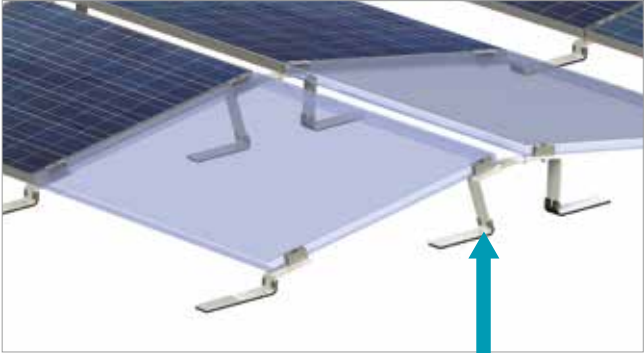
Option A:
Standard ballast without tray, ballast is placed directly on the bracket.
Option B: Ballast tray up to max. 6 blocks.

WARNING

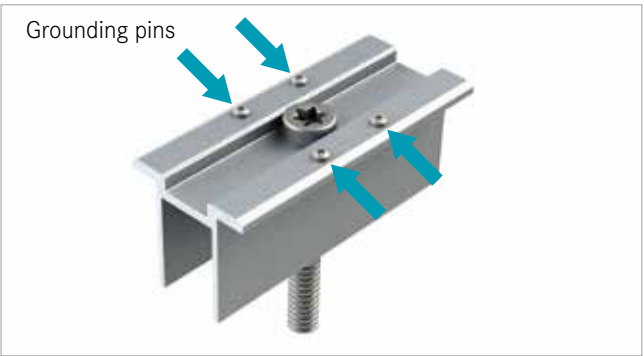
Don't leave the construction side before the modules are tightened and all the required ballast blocks are placed according the project report. Without installation of the ballast blocks the stability of the module array is not guaranteed. The correct position of the ballast blocks and building protection 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.

15. Grounding of the Array

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, however max. 40 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.



Tighten the grounding wire at the square hole in the Middle Bracket



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 liability for damages that may result from lightning strikes or grounding issues.

Aerocompact cable management


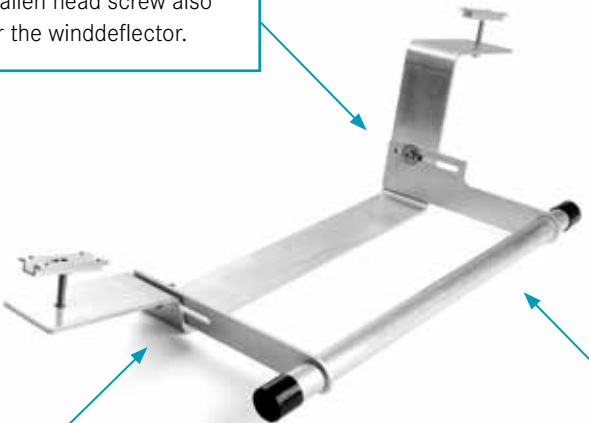
The UL certified cable management solution is designed for the string cable management (home runs) between the module rows. For the ultimate cable management please us certified cable trays according to the national regulations.

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

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.

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


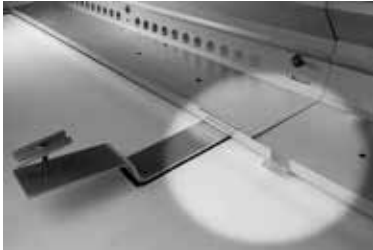

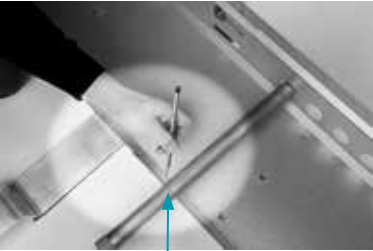


Cable management in combination with the ballast tray

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


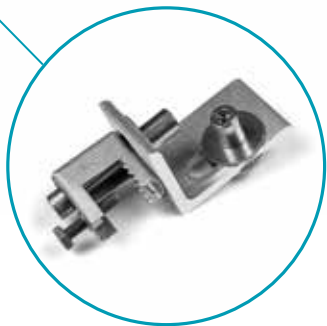
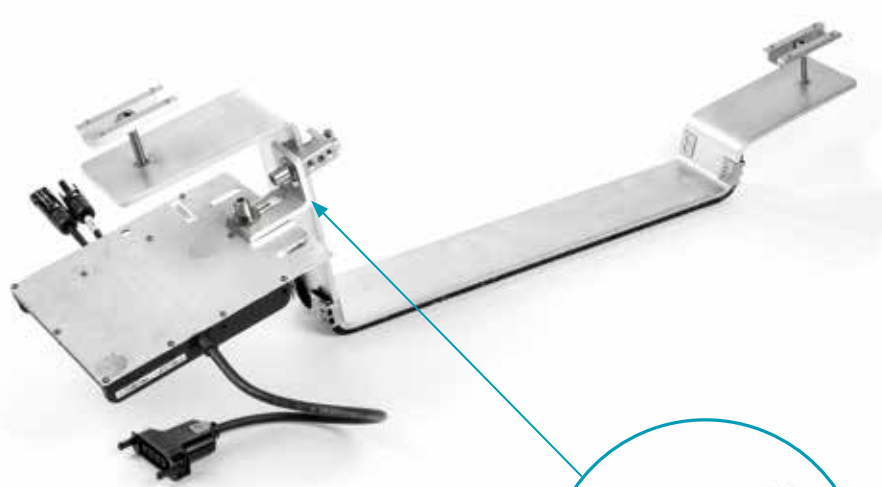
Now cut the sheet with a metal shear

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 fixate a micro inverter or optimizer us the UL certified mounting bracket specially designed for the Aerocompact Connector.

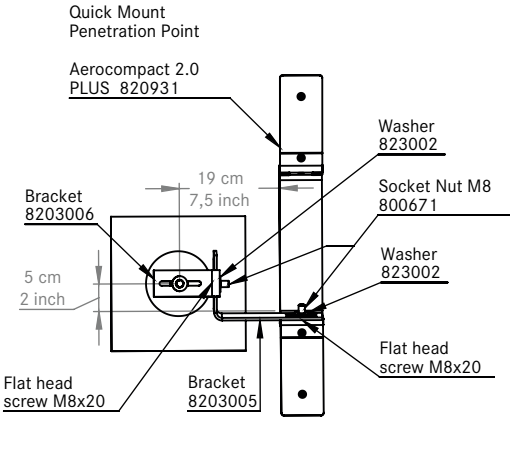


Articel Nr.: 823019

Installation of the penetration points

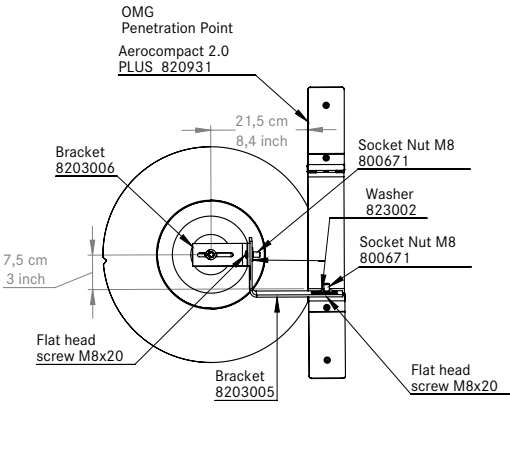
If the maximum allowed roof weight is exceeded due to PV system, Aerocompact provides a Hybrid solution. This combination of penetration points and ballast reduces the overall weight of the system. Furthermore, this option is used in areas with seismic activity to prevent movement of the system due to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

Option A with Stand-off point



Connect the provided connection brackets over the Flat head screw in the square hole 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.



Clamp the side deflectors between the bracket and the module clamp on the end of each array.

NOTE

The fire test 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.

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 an 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 AERO-COMPACT (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 Ae-roTool. 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, AERO-COMPACT 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 lightening 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 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.

Notes on frame installation

When mounting on a roof, you must adhered 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 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).

IMPORTANT NOTES

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.

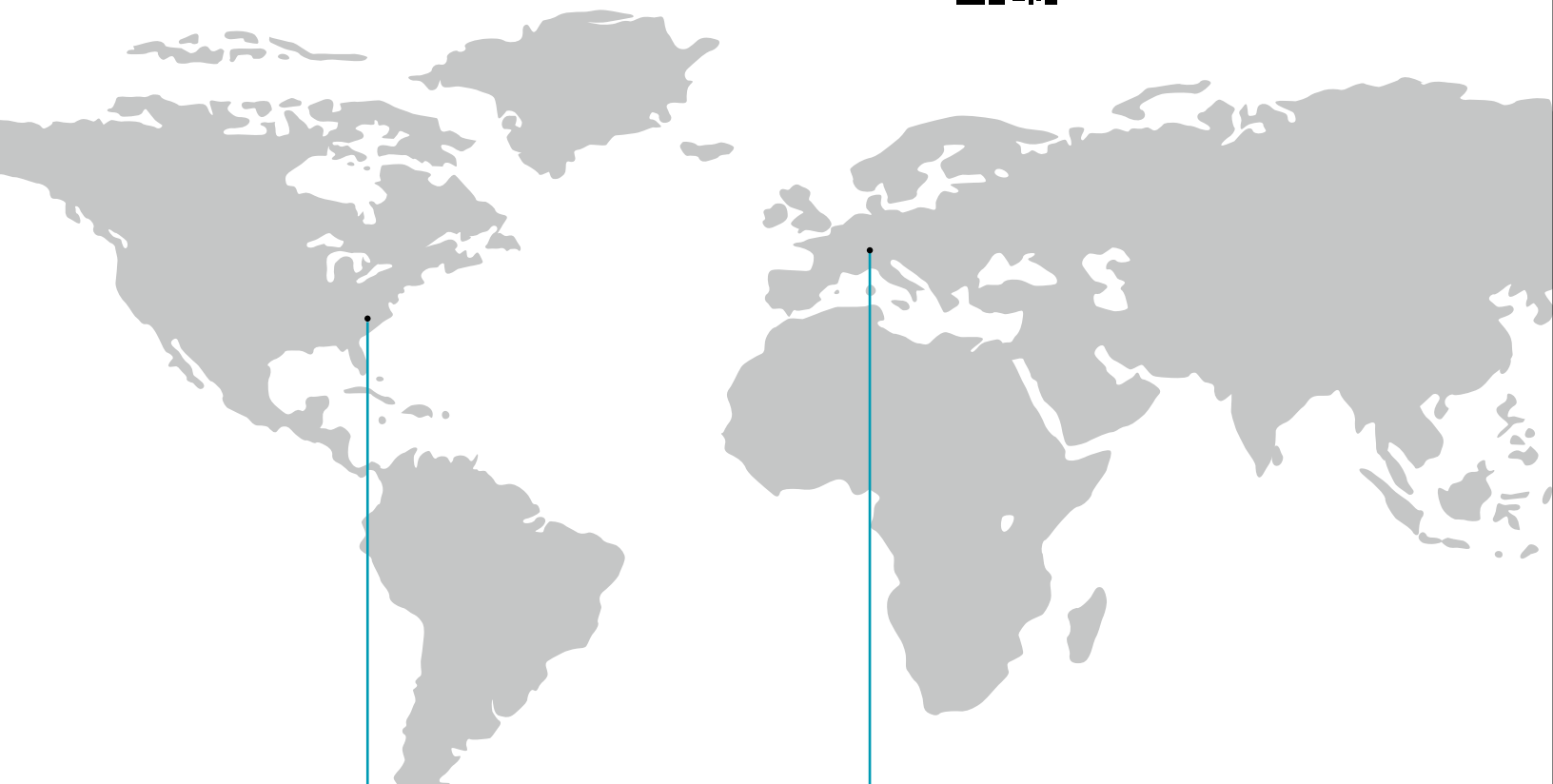
Product liability

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 also apply.



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