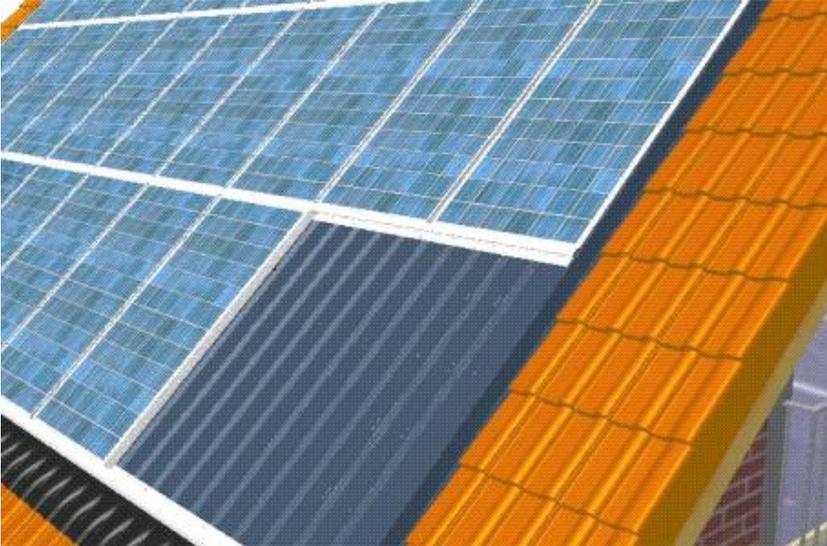


Installation instructions

20 Jahre Qualität in Solartechnik
- mit System

SOL-50 in-roof system



**Qualität in Solartechnik
- mit System**

Qualifiziertes Montagesystem
für Photovoltaikanlagen



- Qualified TUV-Spec. TZE/2.572.10
- Regelmäßig Überwacht



**Solare Energiesysteme
Nord Vertriebs GmbH**
Wörpedorfer Ring 3
28879 Grasberg

Tel. +49 (04208) 9169-0
Fax +49 (04208) 9169-50



Information

SOL mounting systems

Solar modules are often considered to be the core of any photovoltaic system.

From a technical point of view, the manner in which the modules are mounted is equally important. Only when the solar module is securely mounted can it produce energy fault-free over its entire service life.

We have developed the "SOL mounting systems" for just that purpose.

Our partners have decades of experience in assembling all kinds of photovoltaic systems on a daily basis and we have fed this knowledge directly into improving our products and components. We only approve our systems for sale once they have successfully passed all the tests and all the static load calculations are complete.

In addition to factors such as safety, durability and quick assembly, we place particular value on the visual design of the generator surface. Our aim is to integrate photovoltaic systems harmoniously with their surroundings, so that they do not give the impression of a visual foreign body and consequently appeal to the investor.

The "SOL mounting systems" use a slotting system.

Rather than screwing into the mounting system, this means the modules or module laminates are inserted and locked into the system with special aluminium or rubber profiles rather than being screwed to the mounting system. This particular type of attachment ensures that the modules or laminates are not subjected to any of the forces created by movements of the roof structure, which in turn means damage such as cracks caused by stress can be avoided. In addition to the tension-free mounting of the modules, they can also be assembled on the roof without the need for tools. This offers considerable advantages in terms of time and safety – there is not even any need to laboriously align the modules.

SOL Mounting Systems can be used with standard types of modules and are suitable for almost any form of mounting structure and roof covering. They can be used for on-roof, flat-roof, and roof canopy applications as well as on facades and even in futuristic roof-integrated systems.

The "SOL mounting systems" can easily and reliably handle solar modules with frames of varying heights and laminates of various thickness.

Service:

We are available at any time for rapid and competent advice, or individual problem solving.

Mo. - Fr. 8.00 - 17.00

Tel: +49(0)4208/91690

Fax: +49(0)4208/916950

Mail: info@sen.eu

Internet: www.sen.eu

Additional information on the SOL Mounting System, such as layout tables, price lists and installation videos is also available. You can also view or download current information by registering at www.sen.eu.

Thank you for your interest in our products.

We look forward to working with you.

With best regards,

Your SEN team

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Description of System

The SOL-50 Premium in-roof system

The SOL-50 in-roof system is a fastening system for all framed standard solar modules up to 50 mm frame height. The modules can be mounted upright or sideways. It was specially developed for roof integration on pitched roofs from a small roof angle and completely replaces the traditional roof covering. Installing the SOL-50 in-roof system consisting of the trapezoid roof profiles and the generator surface ensures simple and waterproof mounting. Cover sheets provide the connection and lateral connection between roofing tiles and in-roof system in a stylish and attractive manner. Ventilation grills provide good ventilation behind the modules as with a traditional on-roof installation.

The integration of the SEN combination collector for service water heating can likewise be easily implemented with the in-roof system. This patented installation system is often superior with regard to cost and visual appearance to normal on-roof installation for new buildings and roof renovation. As with other systems in the SOL-50 series, high-quality, corrosion-resistant materials are used for the SOL-50 in-roof system. Simple installation by inserting the modules makes the fast building of the in-roof system in accordance with requirements even faster.

Cover strips and section end caps provide a harmonious look to the frame along with optimum rear ventilation and prevent snow collection. Furthermore, the special profile shapes provide a protected area for holding cables using cable protection nets along with functional anti-theft protection.

Advantages of the SOL-50 premium in-roof system:

Optical:

- Can be used with roof slopes from 10°
- Use with angles under 10° on request
- Aesthetic integration of the generator surface in the roof covering
- Attractive side connection between roof tiles and in-roof system
- Framing system in black or anodized aluminium available matched to the solar modules

Costs:

- Use of standard framed solar modules up to 50 mm frame height
- High yields from the modules from the stack effect
- The conventional roof cladding is no longer required: the photovoltaic system serves two purposes.
- Installation instructions and installation video for rapidly learning the simple installation process

Safety:

- Double waterproofing with two levels for carrying water and static calculation for the SOL-50 in-roof system
- High-quality silicon sections for sealing between modules and as a visual eye-catcher
- Stress-free, safe seating of the modules with a positive-fit connection with the installation system.
- Use of multiple support profiles for increased snow loads.
- SOL-Guard module lock for securing modules with distance pieces
- Cable protection net for secure module cabling.
- Patented TÜV-certified mounting system.

Building notes

General:

Roof coverings have limited resistance to precipitation.

As a result, there are technical requirements that must particularly be adhered to that are generally formulated in the rules for roof coverings.

Tile-type roof coverings are generally proof against rain, but in extreme locations or particular weather conditions, they cannot completely prevent the ingress of driving rain or very fine, driven snow. For this reason, additional measures such as the installation of trussing, underroofs or roof lining are necessary.

The SOL-50 in-roof system

The SOL-50 in-roof system is designed on two levels – the generator surface and the tiled roof covering. This is constructed with the SOL-50 in-roof system using trapezoid metal profiles and is laid with overlapping dependent on the roof slope:

(see also SAM installation instructions appendix)

Roof slope	Overlap
10° — 20°	200 mm
> 20°	150 mm

Roof slopes <10° possible on request.

The special rules for roofing and the general rules for the technology used are to be observed in the choice and design of the overall construction.

We recommend:

* When choosing, the local building regulations and the use of the roof area are to be observed. In cases of doubt, a higher level specification should be chosen. (see "Data sheet for roof liners, underroofs, trussing" from the German roofers' association)

Roof slope	Building requirement
≤ 22°	waterproof underlay
> 22° *	Underroof
> 35° *	trussing

The edge covering of the generator surface must be adapted to the local requirements for designs with a roof slope = 22°. Integration must be carried out properly by qualified professionals.

General notes

Standards and regulations:

- DIN VDE 0100 (IEC 60364), Section 712 "Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems"
- VDEW Directive (2001), VDI 6012 (2002)
- BGV A1 (Accident prevention regulations)
- BGV A2 (electrical equipment and means of production)
- BGV C22 (building work)
- Regulations of local energy suppliers
- Local building regulations
- Special rules for roofing
- Employers' Liability Insurance Association of the building industry/roofing industry

Safety notes:

- Use fall protection on roof as required by regulations!
- Wear safety shoes on the roof!
- Maintain safety distances to exposed electrical cables!
- Lay module laminates carefully, as they are shock sensitive and cannot be walked on
- Under the influence of light, the PV modules are sources of electrical energy that cannot be switched off. Therefore, do not insert metal parts into the plug connections!
- The plug connections must be kept clean!
- Before beginning work on the system, the power inverter must be disconnected by a specialist electrical firm on the alternating and direct sides!
- Follow the installation instructions for all components used (power inverter, solar modules, etc.)
- The connection to the power inverter may only be made by a certified electrical installer!
- Test the phase voltage before connecting the power inverter!
- Note the maximum input voltage for the power inverter!
- Before connecting or disconnecting the connector from the solar generator, isolate from power inverter! Never connect or disconnect under load current!
- It must be ensured that the weight of the construction can be taken by the roof

Notes on the system statics

The static calculation provides the evidence for the applicable sub-structure components of the SOL-50 in-roof system for various module weights, sizes and arrangements.

For this, systematic constraints are assumed, which you can find illustrated systematically on page 7.

No evidence is provided for the roof design, i.e. rafters, beams, etc. must be shown to be sufficiently strong in the building statics. If the roof design is shown to be with normal pantiles throughout, the design is generally sufficient. The PV modules and their attachment have been proven by suitable load tests. The statics calculation can be viewed on request.



Notes on statics

The following constraints are pre-requisites of the system statics.

- The SOL-50 in-roof system may generally only be installed up to a building height of 18 metres and not on the North Sea islands (exceptions possible on request).
- A 6/4 cm NH S10 (cutting grade) roof batten was selected as the basis for the statics. Existing roof battens may have to be replaced or more added. The roof battens must be screwed on and not nailed.
- A maximum roof batten spacing of 35 cm has been assumed.
- A maximum rafter spacing of 95 cm has been assumed.
- The connection of the trapezoid sheets to the roof battens is made in every second raised bead and on the roof batten above and below the position of the horizontal profile in each case.
- The connection of the SOL-50 horizontal profile is carried out using two self-drilling screws in each case in every second raised bead of the trapezoid metal sheet.
- With the specifications given, adherence to the edge area to be kept free on the roof is assumed. (area H according to DIN1055-4).

Installing on the edge area:

The edge area is defined as 1/10 of the building width or length (the higher value is applicable) or 1/10 of double the building height. Here the lower value is applicable:

Example:

ridge height = 7 metres; building length = 15 metres; building width = 8 metres

1/10 of double the ridge height = 1.4 metres

1/10 of the building length = 1.5 metres

1/10 of the building width = 0.8 metres

building length > building width => building length is applicable (the higher value is applicable)

building length (1.5 metres) > double ridge height (1.4 metres) => double ridge height is applicable (the lower value is applicable). The edge areas are thus defined as 1.4 metres.

Where the edge area is used, the statics prescribe a general limit of 2400 Pa (2.4 KN/m²). This limit arises from the maximum permitted negative pressure load (wind suction) of the standard solar modules on the market. Ensure that you do not exceed the 2400 Pa at the system location.

The SOL-50 in-roof system can be used up to a maximum permitted wind suction load of 2400 Pa. At the same time, additional measures are necessary:

- Additional use of roof battens in the edge area used centrally between the existing roof battens. (insert additional roof battens and screw on).
- Screw on the SOL-50 horizontal profiles to each raised bead of the trapezoid metal sheet in the defined edge area using two self-tapping, self-drilling screws.

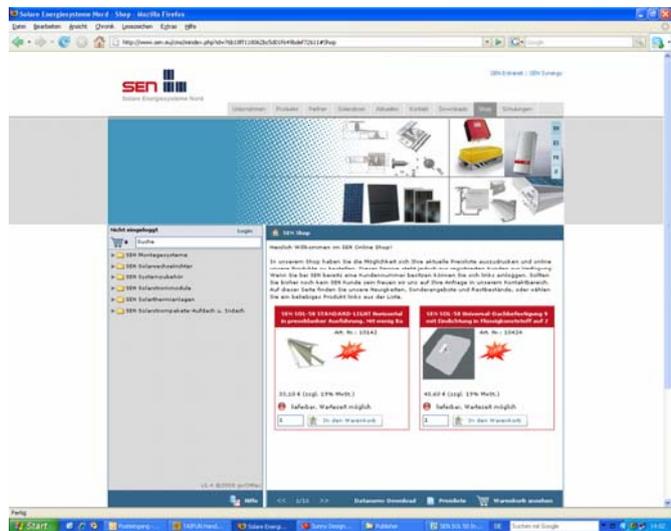


Scope of delivery

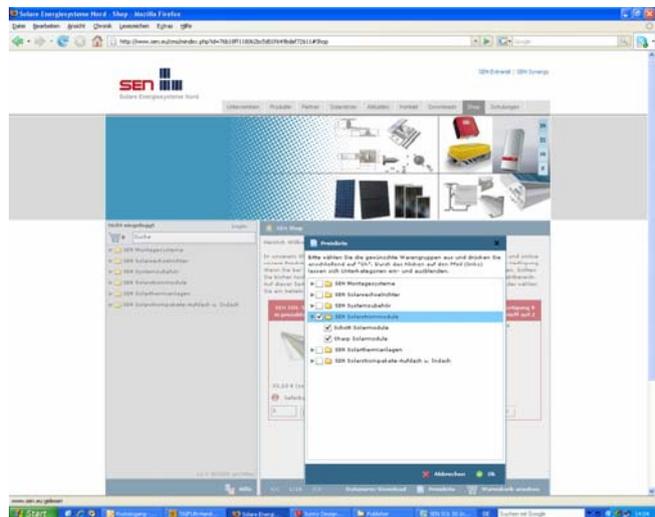
For every part the actual specifications you will find at our Web Shop at www.sen.eu (please choose the english version). You will be able to download a pricelist where all parts are decriped. Please follow the further steps to download the price as a summery for all designated parts of the SOL-mounting system.

Please follow decriped steps:

1. www.sen.eu
2. (click „EN“ on the right site)
2. Click Menu Item shop
3. At the lower right position you will find the buttom „price list“. (Blue area)



4. Please mark the requested groupe of parts.
5. There it will be prepared a price list at the background as a PDF document. You will find all specification for the singel parts at the price list.
6. A new POP-Up will be generated with the pricelist as a PDF document.





Scope of delivery

7. **To save the price list please use the „save as“ function of the adobe reader.**

8. **To print the document please use the print function of the adobe reader.**



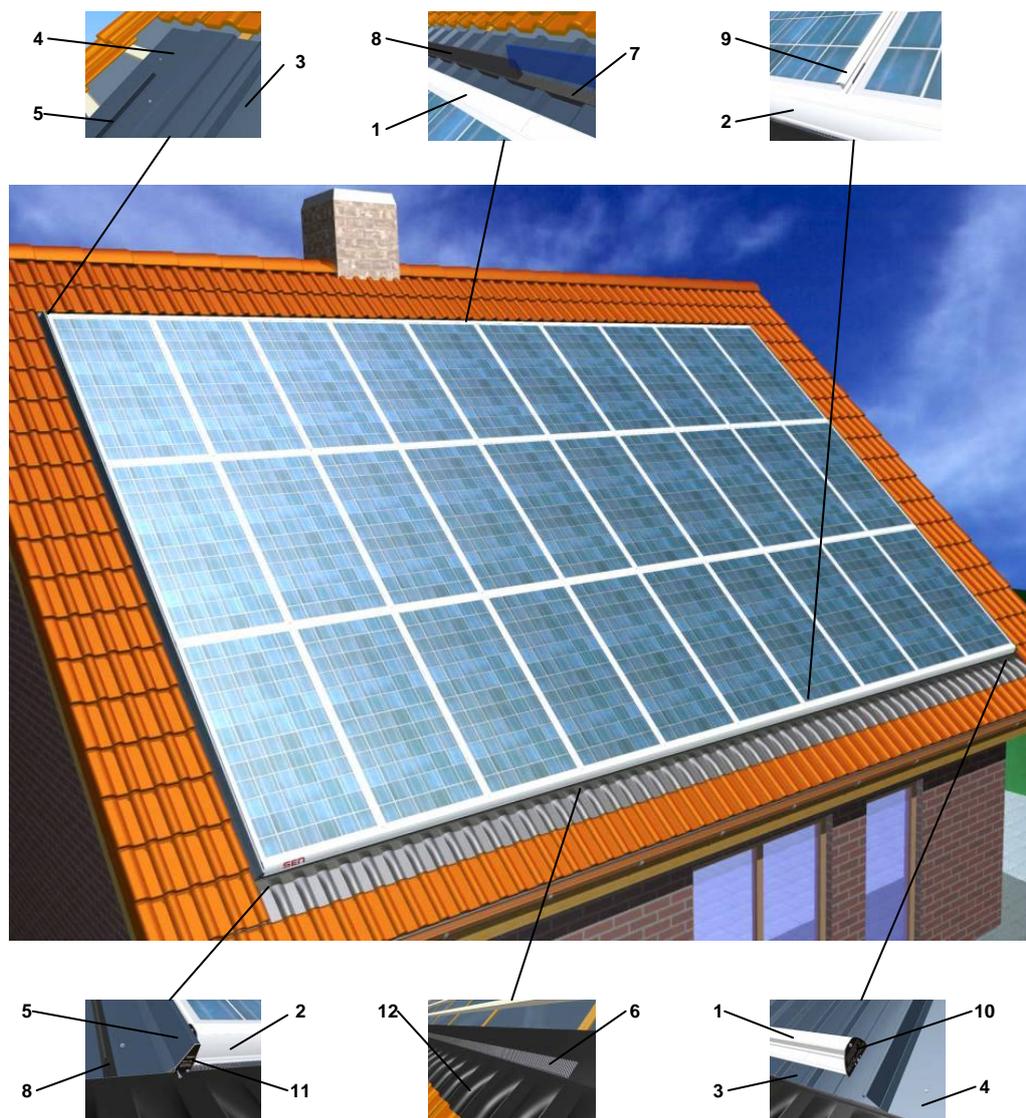
If you have any problems please do not hesitate to contact one of our employee at SEN

Your SEN—Team



Layout example

SOL 50i materials summary using an example generator
surface (8150 x 5030)



Item. no.	Notes	Order amount	Length	Description	Item
17510		17 pce.	In running metres	SOL-50 in-roof horizontal plug section/anodic coating	1
17580		9 pce.	In running metres	SOL-50 in-roof plug-in cover strip/anodic coating	2
17600		24 pce.	2.0 m x 1.15m	SOL-50 in-roof S.A.M trapezoid roof profile 18-mm	3
17650		6 pce.	2.0 m	SOL-50 in-roof cover sheet	4
17652		6 pce.	2.0 m	SOL-50 in-roof end sheet 64mm	5
17660		5 pce.	2.0 m	SOL 50 in-roof eaves ventilation profile LP 18 x 60 mm	6
17610		8 pce.	1.15 m	SOL-50 in-roof profile filler 18/160	7
17615		20 pce.	1.0 m	SOL-50 in-roof sealing wedges	8
17720		1 set.	In running metres	SOL-50 in-roof vertical seal, silver or black	9
17670		1 set	10 pce.	SOL-50 in-roof horizontal end cap anodic/black	10
17652		1 pce.	2 pce.	SOL-50 in-roof vertical end cap anodic/black	11
20940		1 roll	5 m	SOL 50/25i in-roof eaves strip, black	12

System sketches

Using Schott ASI thin film solar panels **3 rows with 18 modules upright**

Vertical section

All dimensions in mm!



Generator height =

$$\sum \text{modules above each other} \times \text{axis spacing} + 2 \times 48 \text{ mm}$$

System height = generator height + 300 mm

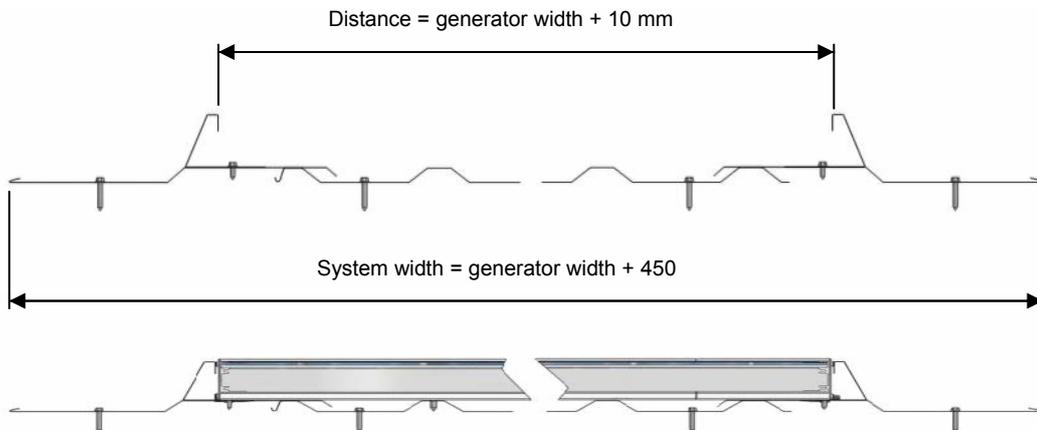
Example:

$$\text{Axis spacing} = 1308 + 24 = 1332 \text{ mm}$$

$$\text{Generator height} = 3 \times 1332 + 2 \times 48 = 4092 \text{ mm}$$

$$\text{System height} = 4092 + 300 = 4392 \text{ mm}$$

Horizontal section



$$\text{Generator width} = \sum \text{modules next to each other} \times \text{module size} + (\sum \text{modules next to each other} - 1) \times 5 \text{ mm}$$

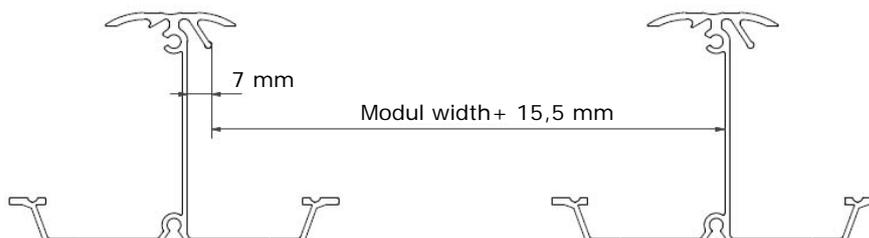
Example:

$$\text{Generator width} = 18 \times 1108 + (18-1) \times 5 = 20029 \text{ mm}$$

$$\text{System width} = 20029 + 450 = 20479 \text{ mm}$$

$$\text{Distance} = 20029 + 10 = 20039 \text{ mm}$$

Distance Horizontal profile





Preparation

Preparation

Check delivery for completeness. Note statics information. The roof surface must be checked before beginning installation, serious unevenness in the installation surface must be levelled, roof battens and rafters must be checked for condition. The SOL-50 in-roof system is rain-proof if installed correctly. To prevent any water damage, for example caused by dripping condensation, installation errors, damage to the system, weathering, local conditions, etc., we recommend following our building notes as well as the rules concerning the technology.



Tools:

- drill and/or cordless screwdriver
- one-handed angle grinder with cutting disk for metal and stone
- mitre saw for trimming the aluminium profiles
- hexagon socket screw bit, size: 8 ,10
- Phillips screwdriver or bit, drive Z2 and Z3
- 5 and 9.5 mm drill bits
- hammer (steel and plastic)
- metal shears and knife
- carpenter's square or try square (min. 1000 mm)
- measuring tape and chalk line

Only work on the trapezoid metal profiles with cold cutting tools!

Please note the installation instructions of SAM. (See appendix)

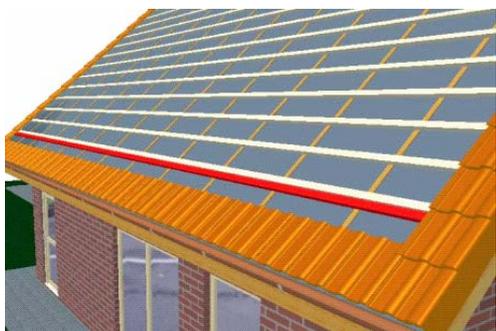


Roof partitioning



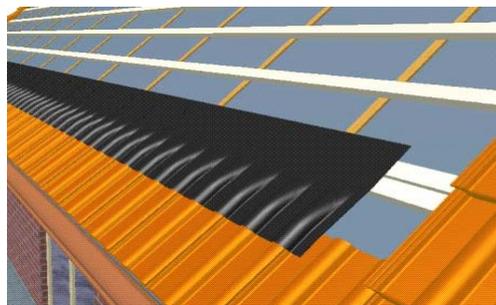
Roof partitioning

First the horizontal and vertical reference edges of the roof surface are defined. The generator surface of the solar power system is then marked using these edges as reference points. You obtain the dimensions of the generator surface from the system sketches. Within the area of the generator surface, remove the existing roof cladding down to the battens, with an extra margin of 0.3 - 0.5 m.

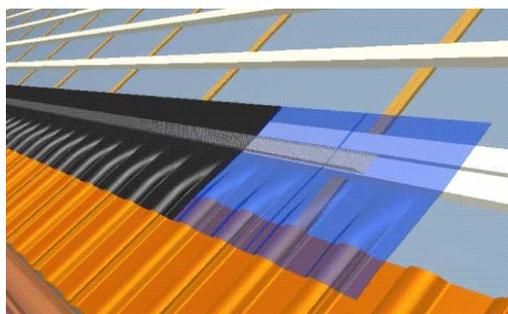


Mounting the eaves strip

The lower connection is formed with a flexible eaves strip. This realises the transition between the trapezoid sheets and the roof covering. In order to apply the eaves strip better, the space under the first roof batten almost up to the next batten below it should be filled with suitable packing wood (e.g. roof battens).



The eaves strip is then rolled out across the complete system width and fixed. Fixing takes place in combination with screwing down the trapezoid sheets. When laying the eaves tape (e.g. Wagaflex), follow the manufacturer's instructions.



Fixing the ventilation grill

The ventilation grill is fixed across the complete system width on its long side (60mm) (e.g. roofing nails). The distance should be 120 mm from the upper edge of the first roof batten into the field below. Fixing takes place later in combination when screwing down the trapezoid sheets.

Mounting trapezoid roof profiles

The direction for laying the sheets is **against** the main direction of the weather. When laying with cross-pieces, a complete row is laid first in the direction of the roof (eaves – ridge), then the next row, etc. The alignment of the sheets should be perpendicular to the line of the eaves. The cross-pieces should overlap 150mm. With roof slope of less than 20°, this should be 200mm.

Follow the SAM installation instructions!

The first section is laid with the lower edge against the short side (18mm) of the ventilation grill. The attachment is in the recessed bead (bottom chord) using self-drilling screws 6.0x 42mm with a sealing washer, ensuring that the ventilation grill is screwed on with it.

Follow the SAM installation instructions!

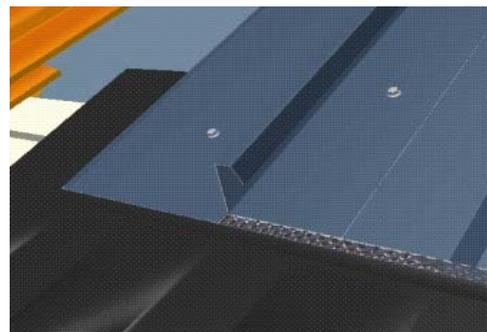
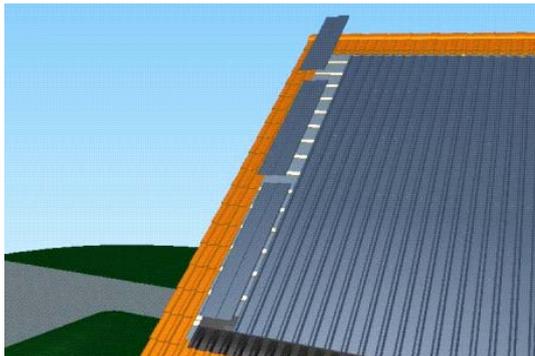
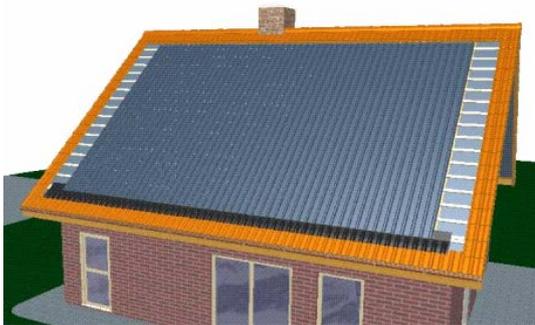
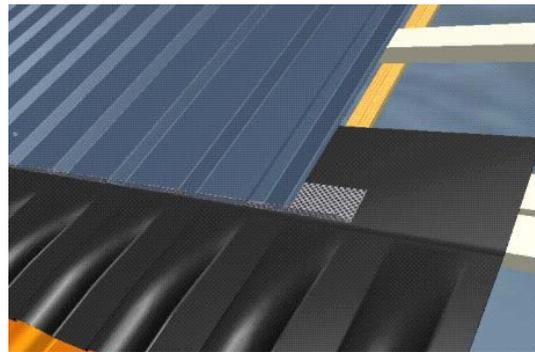
The complete width of the trapezoid roof profile surface may be no wider, and a max.

of 170mm narrower than the generator surface width, in order to achieve an optimum connection with the side cover sheets. The complete height of the surface should be 300mm higher than the generator height, to ensure the sealing in the upper roof connection by the roof covering.

Cover sheets

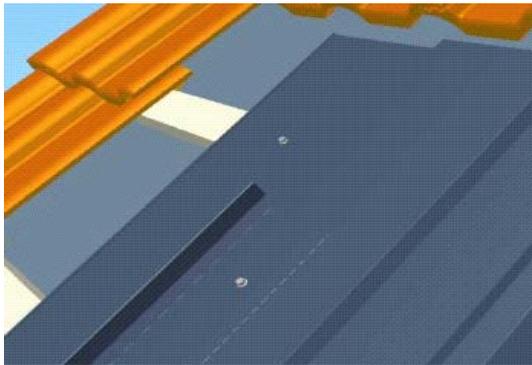
Starting at the bottom, the side cover sheets are laid with a cross-piece overlap of 150mm, or with a roof slope of less than 20° an overlap of 200mm. At the top, the cover sheets end flush with the trapezoid sheets.

Screwing on is done in the lower sections of the cover sheet on every second roof batten (approx. 650mm) using self-drilling screws 6.0 x 42mm with sealing washers (SAM). The complete width of the trapezoid roof surface incl. cover sheets equals the generator surface width + 450 mm (system width). The width between the end sheets on the left and right equals the generator field width + 10mm (spacing).





Mounting cover sheets/connection plates

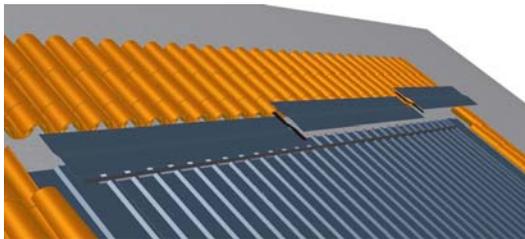


Side connection plates

The connection plates are **only** mounted in the area of the generator field so that problem-free roof covering is possible in the upper area.

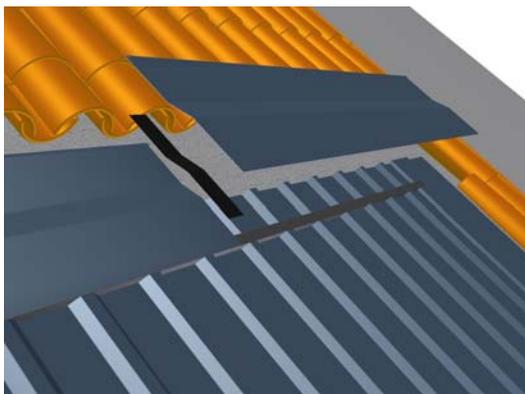
(see vertical section – generator height equals the length of the connection plates)

The attachment is carried out with 6.3x22 mm self-drilling screws onto the cover sheet below roughly at the height of every second roof batten.



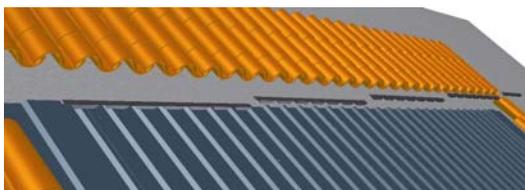
Upper connection plates < 20°

With roof slopes less than 20° or with roofing materials that do not allow normal covering, the upper connection is constructed with a suitable connection plate (upper connection plate).

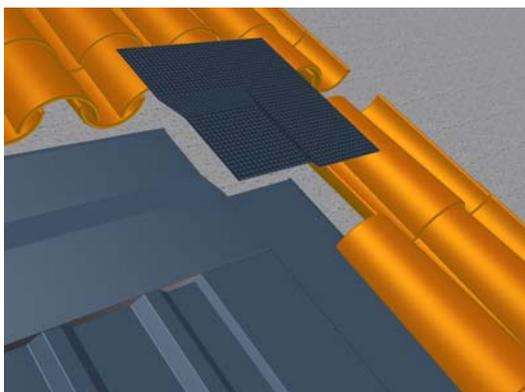


The plates should overlap 150 mm on the struts. During installation, a bitumen strip is laid in the strut area on the weather side.

The attachment of the upper connection plates is done with stainless steel, self-drilling screws (6x42 mm) with sealing washer. In the area of the trapezoid sheets, every second raised bead is screwed down. The upper connection plate part is screwed down at the same spacing into the roof battens.



Before the upper connection plates are mounted, self-adhesive profile fillers must be laid in the trapezoid sheets across the whole width of the generator with upper spacing of 150 mm.



The corner areas are formed and laid in this case from the eaves tape supplied on site. The attachment is also with stainless steel, self-drilling screws (6x42 mm) with sealing washers on the raised bead or in the edge area into the roof battens.



Mounting horizontal profiles

The horizontal profiles are put together using the plug connections (4 x 60) into the holes in the profile to extend across the whole width of the generator. The horizontal profiles are supplied in cut lengths according to the project (max. 2m lengths).

Depending on the normal temperatures, a gap of 2-3 mm should be left between two horizontal profiles (temperature expansion).

With this type of installation, the horizontal profiles are screwed directly onto the roofing using self-drilling screws with bitumen strip as an intermediate layer.

A horizontal profile end cap is now screwed onto both ends of the complete profile (screws 4.2x 13).

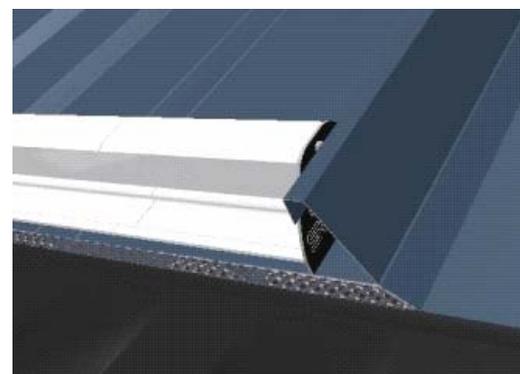
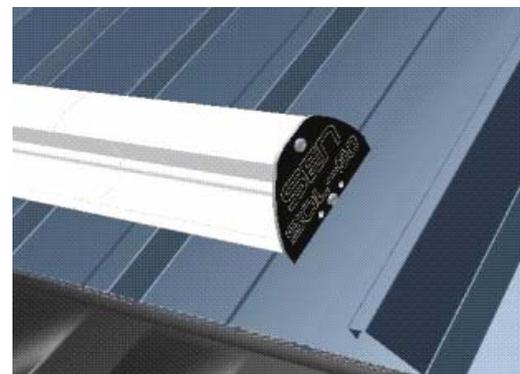
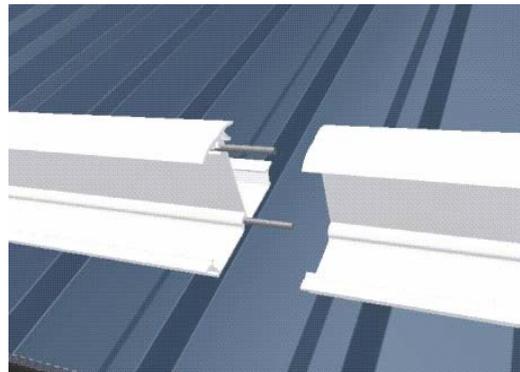
The horizontal profile is now sunk between the two end sheets along its complete length leaving an air gap at each end of approx. 5mm and ensuring the lower edge of the horizontal profile butts against the ventilation grill.

Screwing on is done on every second raised bead (top chord) using two self-drilling screws (6.3 x 22) in the grooves provided on the horizontal profile.

(for installation in the edge area, screw onto every raised bead)

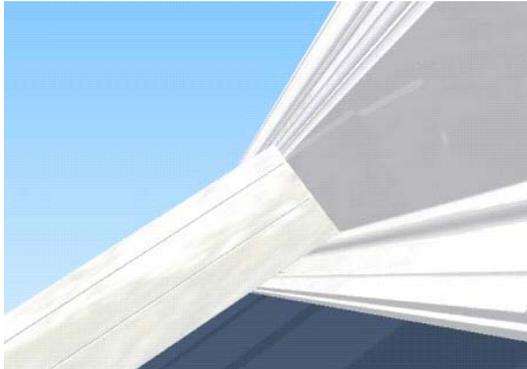
The horizontal profile should have pre-drilled holes size 6.5mm.

The distance to the profiles lying above is dependent on the modules used. It is (module height + 24mm).





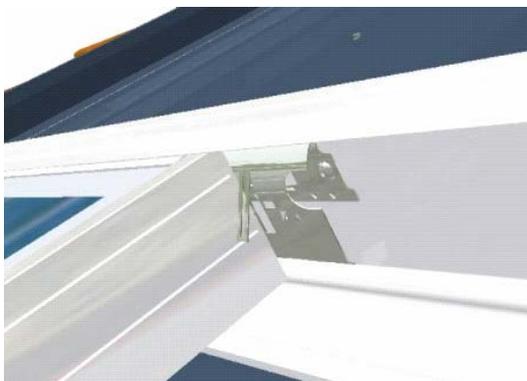
Module mounting



Once the profile has been installed the modules can be mounted, beginning with the top row. First, the modules are pushed into the upper horizontal profile.



In the next step, they are lowered to the lower profile and pushed into the horizontal profile as far as the limit lip. In this position, the module must not be able to be lifted out of the upper horizontal profile.



The module lock now mounted in the slot provided in the upper horizontal profile in each case is pushed as far as the plate on the module. It serves as a separator (5mm) between the individual modules and later for securing.



After mounting and connecting the supply cables for the modules, the modules can be locked using the Liberator by engaging the module lock.

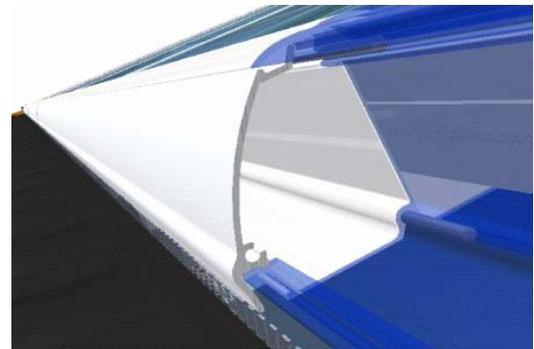


Mounting cover strips

A cover strip is used to finish the upper and lower generator edges, which is also connected with plug connectors (4 x 60) in the slots in the cover strips. The cover strips are supplied in cut lengths according to the project (max. 2m lengths).



The last cover strip must also be cut to length with a mitre saw and clicked in as shown in the picture.

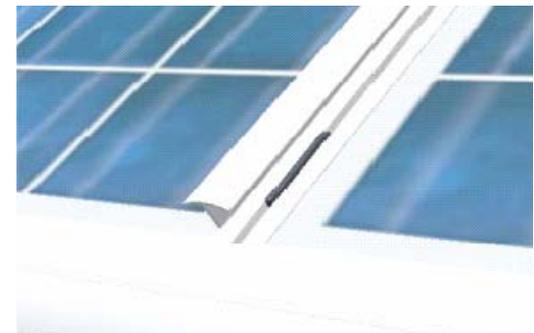


Mounting vertical seal

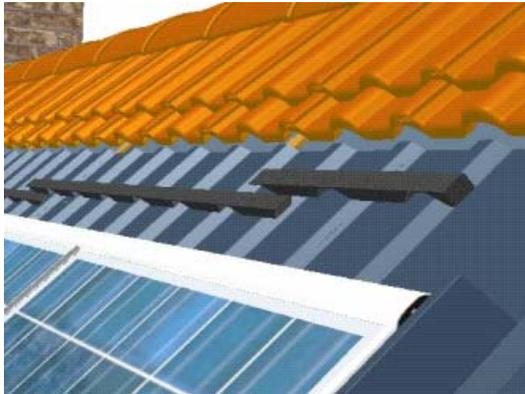
Now, between the individual modules, a suitable sealing and mounting adhesive is applied.



In the next step, the vertical seals, previously cut to length, are pushed into the adhesive/sealant as far as they will go.

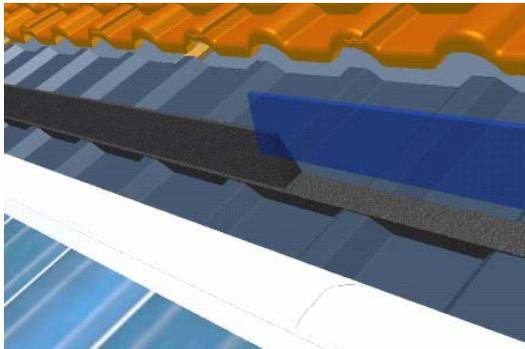


Roof integration

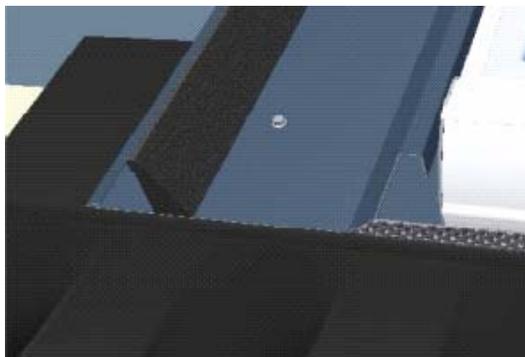


Profile filler

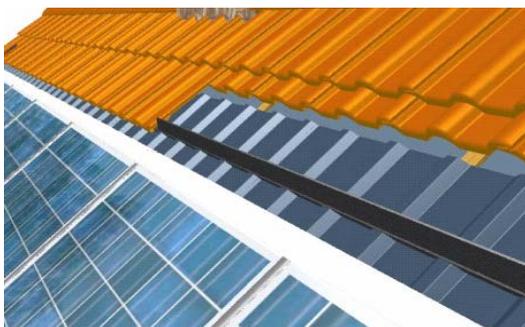
Approx. 100 mm above the upper generator edge, self-adhesive profile filler (18 – 160) is attached across the whole width of the trapezoid sheet surface.



Then, on this profile filler, a self-adhesive sealing wedge is glued on.



The lateral seal is also carried out with self-adhesive sealing wedges, which are glued on the left and right of the side cover sheets.



The roof covering can then be carried out. In the side areas, it may be necessary to cut parts of the roof covering to size.



Mounting other

Mounting end caps

For the lower edge an end cap (65 mm) still has to be attached in the ventilator grill with 4.2 x 13 mm screws before the side end sheets.



Mounting cable protection net

The net is stretched across the module rows on the trapezoid roof profile and fixed using 6.3 x 22 mm self-drilling screws and a bitumen strip underneath.



Mounting multiple support profile

With increased load on the modules at the system location (load higher than 2400 Pa), we recommend the use of the SOL-50 multiple support profile.

When using, please refer especially to the installation instructions of the module manufacturer.

The profile is screwed down on the trapezoid roof profile, centrally between the horizontal profiles using self-tapping, self-drilling screws with an intermediate layer (bitumen strip).



Mounting earth and potential equalisation

To create the potential equalisation, use a 10mm² copper cable and the earthing set provided, consisting of plastic connector and clamp.

The earthing set is attached with two stainless steel, self-tapping screws (supplied) to a suitable point on the trapezoid roof profile.

The counterpart is placed on the potential equalisation rail.





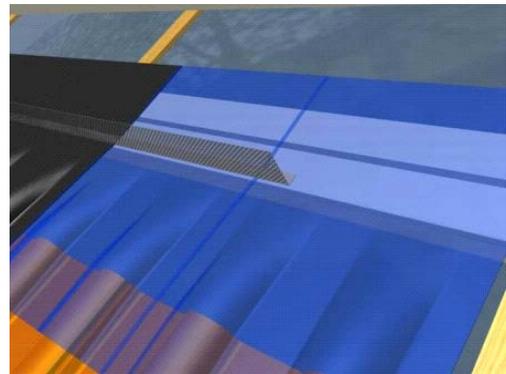
Optional: Combination solar unit

Mounting combination solar unit:

With the combination solar unit, the mounting procedure is the same as with the above-mentioned PV system. As the thermal collectors have a different installation height to the PV modules, the complete generator field is raised by distance pieces (top-hat profiles) by approx. 40mm. **All deviating installation procedures are explained below.**

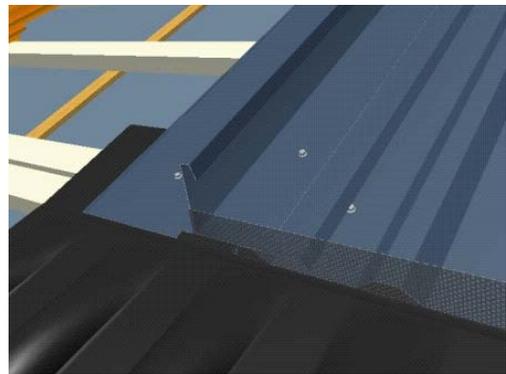
Ventilation grill:

The ventilation grill is fixed here with its short side (18mm) on the eaves tape. The long side (60mm) of the grill is fixed flush with the lower edge of the additionally mounted roof batten.



End sheets:

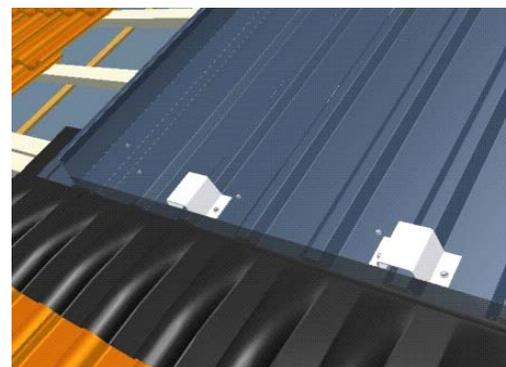
After mounting the trapezoid and cover sheets, which are also mounted as described above, the end sheets are fitted. Here a higher end sheet (105 mm) is used.



Top-hat profiles:

After all trapezoid, roofing and end sheets have been laid as described, the top-hat profiles are mounted. Beginning with every first raised bead in the edge areas, the top-hat profiles are distributed evenly over the whole trapezoid sheet width in the field on every third raised bead (potentially centrally on the second raised bead).

The distance between top-hat profile and ventilation grill is 8mm. Screwing on is done in the holes provided with two self-drilling screws (6.3 x 22) in the recessed bead of the trapezoid sheet. To ensure the sealing of the roof, each top-hat profile must be placed with a sealing bitumen strip.

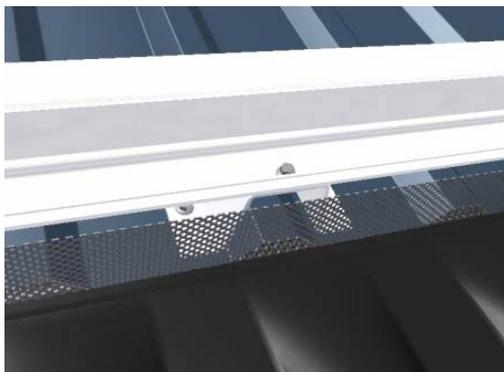




Optional: Combination solar unit

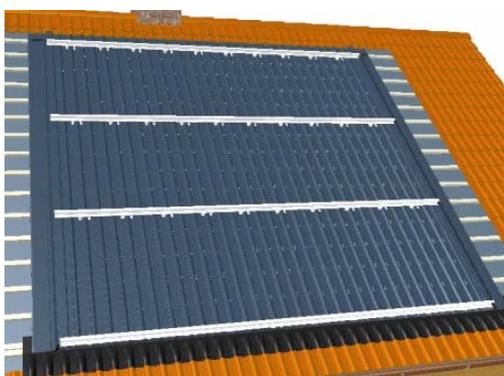
Horizontal profiles:

The horizontal profiles are now laid over the whole length between the connection plates. These are attached to the previously mounted top-hat profiles with 2 self-drilling screws in each case (6.3 x 22 mm).



The distance of the horizontal profiles to each other arises from the size of the collectors. The formula on page 13 under system sketches also applies for collector installation.

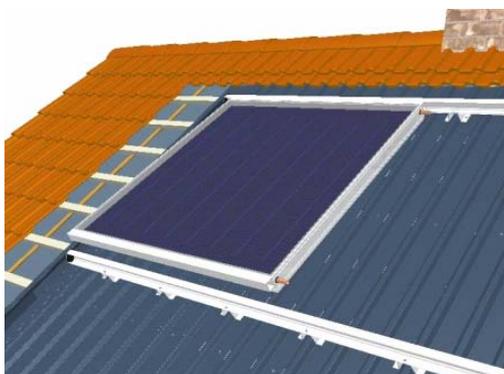
The axis spacing is calculated as collector height + 24 mm.



Collector mounting:

Once all horizontal profiles are mounted, the collectors are laid in the system. Always begin with the top row.

In the same way as the modules, the collectors are first pushed at an angle into the upper horizontal profile.



Then the collectors are lowered into the installation level and pushed into the lower horizontal profile up to the limit lip.

In this position, the collector must not be able to be lifted out of the upper horizontal profile.





Optional: Combination solar unit

The side spacing between the horizontal profile end cap and the collector must equal the width of the side cover to be mounted later.

Take care to ensure uniform laying (if necessary, in accordance with the grating of the Schott modules) of the collectors.

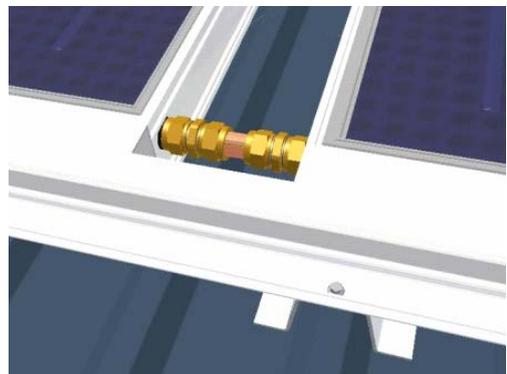


Connecting the collectors:

After each collector is laid, it is aligned to the previous one. The header tubes are now connected hand tight using clamp ring connections.

Warning: The exact spacing is determined by the cover panel to be installed later.

Once all collectors are installed, all connections should be tightened with an open end spanner.



The side collector connections in insulated corrugated hoses are fed under the horizontal profile and over the trapezoid sheet into the roof through a ventilating tile.

The connection to the collector is made here with clamp ring connections.

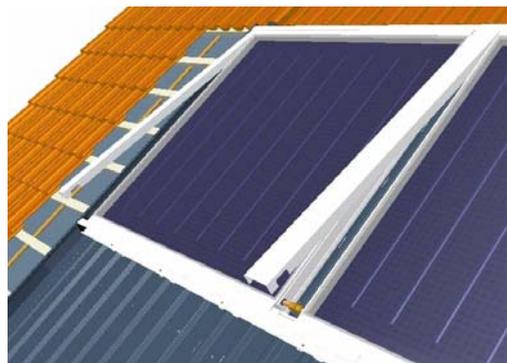


Important!

Now first of all the collector must be pressure tested, i.e. no more module laying! Notes on pressure testing and general technical system guidance can be found in the Mounting and Installation Notes for the SOL-50 combination system, system technology.

Cover panels:

After pressure testing, the side and intermediate cover panels are inserted based on the type of collector installation. They cover the connections and give the surface an aesthetically high-quality look.





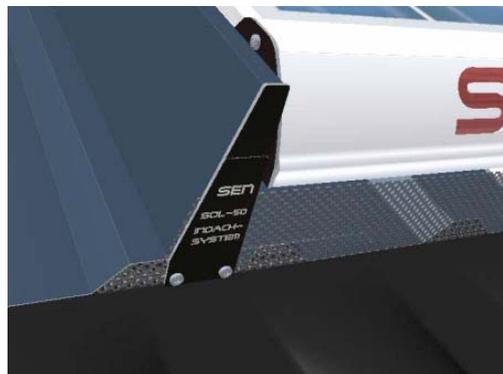
Optional: Combination solar unit

After the complete thermal system has been installed, the further mounting of the modules can be carried out as described above.



Mounting end cap:

For the lower generator edge an end cap (105mm) has to be attached in the ventilator grill with 4.2 x 13 mm screws before the side end sheets.



Maintenance notes

- The solar generator and the collectors are virtually maintenance free.
- A visual check should be carried out regularly and at least at the same interval as the normal roof inspection.
- The guidance from the module and power inverter manufacturers must be followed.



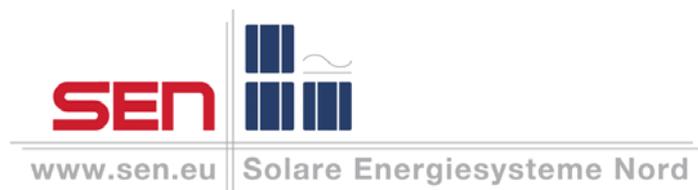
Overall view



Generator view The SOL-50 in-roof system gives a visually rounded impression with its elegant, anodised aluminium sections and panels.



Combination system view The SOL-50 in-roof combination system gives an aesthetically sophisticated overall picture with the balanced modular dimensions of the collectors with the Schott modules and the elegant, anodised aluminium profiles and panels.



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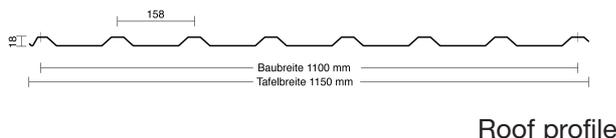
**Telefon: +49 (0)4208 - 9169 - 0
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Internet: www.sen.eu**



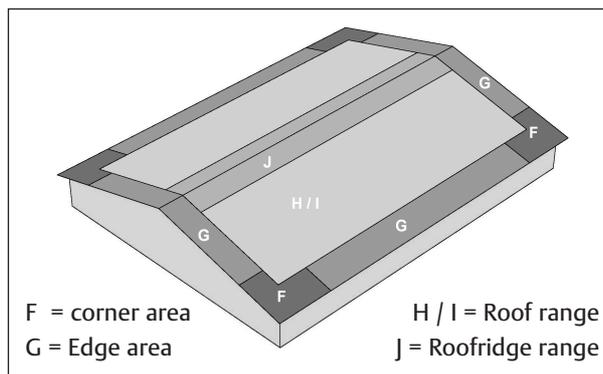
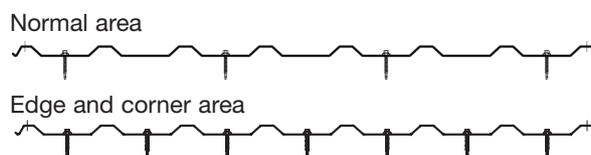
Extract from our installation instructions

for use in the SOL - 50 in - roof system
with a minimum roof slope of 10°

Trapezoid profile ST 18 - 160



Attachment arrangement - roof



The illustration standing above shows the representation of the roof ranges according to DIN 1055 part of 4 (dimensions depending upon building geometry).

1. General

We are pleased that you have decided to use our product. The following installation instructions give suggestions for correct and damage-free installation of the roof and wall profiles.

Guidance on the sub-construction and other elements of the building can be found in the relevant regulations, standards and working instructions from the respective manufacturers. These instructions are subject to the current health and safety at work regulations which must be adhered to.

The suggestions correspond to the current state of the technology. The technical use of and adherence to all regulations is the job of the installer. Defective installation, maintenance and care lead to limitations to the guarantee.

2. Transport and storage

The profiles should only be unloaded and transported with suitable lifting devices (belts and cross arms).

The factory packaging is only intended as transport protection and must be opened for continued storage.

The components must be stored stacked dry under a roof or covered with waterproof tarpaulins. Ensure there is sufficient ventilation and that they are stored at an angle to prevent condensed water collection.

Protective films are removed immediately before or after installation.

High or low temperatures and direct sunlight can lead to the film not being able to be removed completely. Avoid long storage times for components with films!

Solar sheets may not be exposed to direct sunlight before being used. The transport packaging is not protection against the sun. The solar sheets must be stored in shade or under a light-proof tarpaulin.

3. Handling and processing

The profile sheets should carefully be carried upright to the installation location. They may not be pulled over the package.

All surface coatings and mill-finished surfaces exhibit a uniform alignment. When installing, rotating the components should be avoided!

For processing the steel profiles, angle grinders may not be used as otherwise the zinc and varnish layer can be destroyed by the high cutting temperatures and the corrosion protection is thus eliminated. Also, hot particles can burn into the surface.

Only use cold cutting tools such as nibblers, hacksaws and jig-saws for cutting.

Sawing and drilling swarf should be carefully removed immediately after installation.

Connections with copper should be avoided (see ZVSHK - Central Sanitary, Heating and Air Conditioning Association).



Sub-constructions in metal and wood are permitted. When using soft wood, sorting class S10 in accordance with DIN 4074-1 is necessary. The minimum bearing area of the profiles is 60 mm. Dimensioning and other demands on the sub-construction arise from the building object statics. Before installation, the sub-construction is to be checked to ensure it is level and square.

The minimum roof slope is dependent on the depth of the roof, profile height, number of cross-struts and penetrations in the roof.

We recommend: Minimum roof slope = 10°

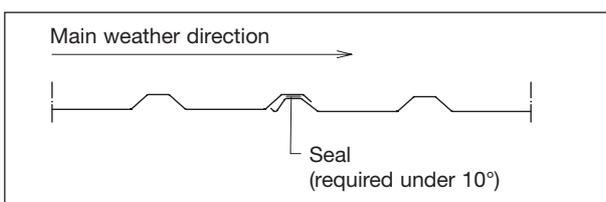
Depending on the situation, roof slopes < 10° are also possible with special measures. If required, please contact us.

5. Roof installation

The direction for laying the sheets is against the main direction of the weather. The spacing depends on load and roof slope and is found from the appropriate load table.

With a material thickness of 0.63 mm, the maximum permitted spacing is 1.50 m. The overhang at the ridge and bargeboard may be a maximum of 70 mm, and at the eaves 200 mm. When laying with cross-struts, a complete row is laid first in the direction of the roof (eaves – ridge), then the next row, etc. The alignment of the sheets should be perpendicular to the line of the eaves to avoid later cutting of the profiles or a displacement.

The attachment is made with self-drilling screws 6.0 x 4.2 mm from the accessories according to the requirements of the respective application. Fasteners are screwed in with the help of a depth gauge so that the sealing washer has sufficient contact with the profile.



When using condensate protection membrane, sealing of the sheet end on the eaves side is undertaken on site using a clear varnish spray (accessory)!

5.1. Applying cross-struts – horizontal

Cross-struts should be avoided if possible. If this is not possible, trapezoid profiles under 6 m long may be attached to a joint beam and one row of screws.

We recommend:

roof slope	Sheet length	Overlap
10° - 20°	up to 6 m	200 mm
> 20°	up to 6 m	150 mm

6. Attachments and connections

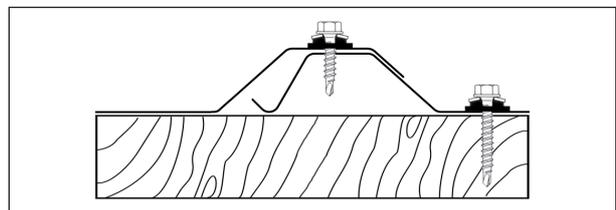
The attachment schemes and edge areas are given in accordance with the old DIN 1055 and must be checked for the individual application.

Remark: According to DIN 18807, approved fasteners must be used.

Fixing is non-positive, i.e. generally in the recessed bead (lower chord) and either on wooden or metal sub-constructions. For this, system fasteners are available that ensure permanent sealing and attachment. Mistakes in drilling should be avoided and can be closed with press closures or bucket rivets. Screws should be inserted at right angles to the roof surface. The EPDM seal should extend approx. 1 mm over the edge of the washer. As required by the design, an attachment in the raised bead (upper chord) can also be made to prevent damage and water penetration.

Attachment in the lower chord (standard attachment)

The profiles should first be screwed on in the lower corrugation next to the overlap to fix the position of the profile as well as possible before final attachment.



7. Walking on and safety

Walking on the profile sheets can only be recommended with reference to the static properties and the accident prevention regulations using running boards.

Ihr Fachhändler: