triple solar

heating without gas

manual

heat pump panels

Inhoudsopgave

1. General information

☞ Watch the video on our website with assembly instructions - www.triplesolar.eu

1.1. Safety, legal requirements, standards and regulations

Working safely is key. At a minimum, your basic equipment should include:
- Safety shoes, helmet, cut-resistant work gloves
- Fall protection in accordance with the legal standards

The installation must be assembled in accordance with the legal regulations and standards (including NEN1010). Also take into account fire safety regulations such as:

- Compatible MC4 connectors
- Electricity in cable ducts

The roof brackets are not intended to be used for standing on.

Stop the assembly in case of strong wind gusts

1.2. Allowed load of the panels

The heat pump panels are designed for the following allowable loads:

Pressure load (Snow, Wind): 5400 Pa

Tensile load (Wind): 2400 Pa

The mounting material supplied by Triple Solar is TÜV approved and in accordance with Eurocode EN 1991-1-4. Manufacturer's instructions must be observed in order to claim warranty.

Mount heat pump panels at an angle between 10° and 30°. (Areas with a lot of snow: install heat pump panels at an angle between 30° and 90°).

If the angle of inclination is greater or if there is a large wind load, more roof brackets may be required than indicated in these instructions.

1.3. Transport regulations

The heat pump panels may only be carried via the profiles on the short side. The tubes and slats must not be used for this purpose. Aids such as lifting straps, etc. must not be attached to the tubes.

As long as the heat pump panels are stored, the sealing caps remain on the tube openings to prevent dirt from entering the tubes.

2. Components

2.1. Panels

Art. nr.	***Description***	***Measures***
101125	PVT 380Wp panel, Model XL 200	1985mm x 995mm
101210	PVT 320Wp panel	1668mm x 995mm

2.2. Mounting rails per panel

Art. nr.	***Description***	***Specification***	***Number***	***Illustration***
322101	Mounting rail	2120 mm - Aluminum	2x per panel	

2.3. PVT basis package 1-s, first panel in a row SPIGOT

Art. nr.	***Description***	***Specification***	***Number***	***Illustration***
320101	Rail cover	Aluminum, black	4x per row	
310101	TS end clamp	Aluminum	4x per row	
311000	TS clamping profile	Aluminum	1x per panel	
310300	TS clamping profile slide connector	Plastic and Stainless steel	2x per panel	
311130	TS lock cap	Rubber	1x per panel	
615000	PV cable clamp	Black Plastic	1x per panel	
424010	TS-plug/spigot 20-40mm	Ribbed hose DN20	1x per row	
424015	TS-plug/spigot 110-210mm	Ribbed hose DN20	1x per row	
410500	TS retaining clip	Stainless steel (lock for plug/spigot hoses)	4x per panel	
410200	TS end plug with vent	messing with double o-ring	2	
311120	TS anti-slip bolt	Aluminum	2	
331600	Flange nut	M8 Stainless steel	4x per panel for clamps	
331240	Hammerhead bolt	M8 Stainless steelx40		

Het Basispakket 1-s is eventueel ook met een ribbelslang met WARTEL koppeling verkrijgbaar

426010	TS-plug/swivel 20-40mm	Ribbed hose DN20	1x per row	
426015	TS-plug/swivel 110-210mm	Ribbed hose DN20	1x per row	
430095	Gasket	Lichtrood 24 mm	1 per swivel	

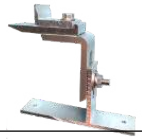
2.4. PVT basis package 2, next panel in a row

Art. nr.	***Description***	***Specification***	***Number***	***Illustration***
330101	Mounting rail connector	Aluminum with M8 flange nuts	2x per panel	
310200	TS middel clamp	Aluminum	2x per panel	
311000	TS clamping profile	Aluminum	1x per panel	
310300	TS clamping profile slide connector	Assembly of Plastic and Stainless steel	2x per panel	
311130	TS lock cap	Rubber: To prevent the clamping profile from slipping during assembly	1x per panel	
615000	PV cable clamp	Black Plastic	1x per panel	
411000	TS connecting hose	Stainless steel, with double o-ring	2x per panel	
311120	TS anti-slip bolt	Aluminum	2	
331600	Flange nut	M8 Stainless steel	4x per panel for clamps	
331240	Hammerhead bolt	M8 Stainless steelx40		

2.5. Pitched roof, bracket set

Art. nr.	***Description***	***Specification***	***Number***	***Illustration***
300232	Roof bracket with foot	ajustable, incl. cross connector	4x per panel	
336200	Screw	7,0x50 Stainless steel *(TX30)*	2x per bracket	

2.6. Pitched roof, feet for EPDM/bitumen roof

Art. nr.	*Description*	*Specification*	*Number*	*Illustration*
300231	EPDM roof foot	ajustable, incl. cross connector	4x per panel	
300292	Bracket	Aluminum	4x per panel	

2.7. Pitched roof assembly package with cover plate

Art. nr.	*Description*	*Specification*	*Number*	*Illustration*
360500	TS pipe clamps	Set	1 x per row	
360403	TS cover plate for piping	Aluminum	1 x per row	
336131 en 336108	Self tapping screw	6,5x75 Stainless steel 6,5x16 Stainless steel	2 x per row 2 x per row	

2.8. Pitched roof gland with flexible hoses

Art. nr.	*Description*	*Specification*	*Number*	*Illustration*
890020 890010	Roof gland set	Inc. collar, red or anthracite	1x	
890005	Sealing collar	EPS, diam. 50-70mm	1x	
425080	TS spigot/spigot 1000-2000mm	Ribbed hose DN25	2x	
430252	Pipe insulation 19mm	2000mm length	2x	

2.9. Flat roof mounting with Sunbeam frame

Art. nr.	*Description*	*Specification*	*Number*	*Illustration*
300510	Flat roof frames first panel south, per row	Sunbeam Universal	1x per panel	Zie Figure 2.6-a
300520	Flat roof frames next panel south, per row	Sunbeam Universal	1x per panel	Zie Sunbeam handleiding
300530	Flat roof frames first panel east/west, per row	Sunbeam Symmetrical	1x per panel	
300540	Flat roof frames next panel east/west, per row	Sunbeam Symmetrical	1x per panel	
330250	Cross connector To fix mounting rail on	Aluminum 4x per #300510 2x per #300520		

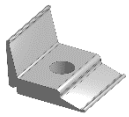
	Sunbeam frames	4x per #300530 2x per #300540	

Figure 2.6-a Sunbeam flat roof frame

2.10. Heat pump assessories package

Art. nr.	***Description***	***Specification***	***Number***	***Illustration***
430010	Afsluiter	3/4" bi/bu	1	
500200	Spoel en vul aansluitset	1” bi DN25	1	
500100	Expansion vessel	18 L	1	
500150	Expansion vessel - aansluitgroep	automatische ontluchter, manometer en overdrukventiel 3 bar	1	
500610	Microbelontluchter 1”	UA100W	1	
500615	Insulation microbelontluchter		1	
800011	TS siliconen - kranenvet	6 gram	1	

2.11. Other articles

Art. nr.	***Description***	***Specification***	***Illustration***
500000	Thermostatic mixing valve	ESBE VTA 572 10-30°C	
800100	Ethylene glycol	Premixed 35% - 5 litre per PVT-panel	
800300	Propylene glycol for active cooling	Premixed 40% - 5 litre per PVT-panel	

510100	Triple Solar cooling module CM 1.0	Including: thermostatic mixing valve, circulation pump heating system, flush- and filling nipple	
512100	Regeneration set ground heat source RS 1.0		
360151/61	PV clamp	in 35mm and 40mm	

3. Positioning the panel area

3.1. Distance between rows on flat roof.

Draw the panel area, the pipework and the position of the roof gland beforehand

The greater the distance between the rows, the less the shadowing, the more electrical output. See Figure 3.1-a. When considering row spacing, also consider walking space between the panels and the ductwork.

Panel orientation	12 degrees, south facing				2x 10 degrees, direction independent	
Row-distance	1300	1500	1700	mm	2300	mm
Shadow angle	33	22	16	degrees	9	degrees
Yield loss	6	2	0	percentage	n / a	

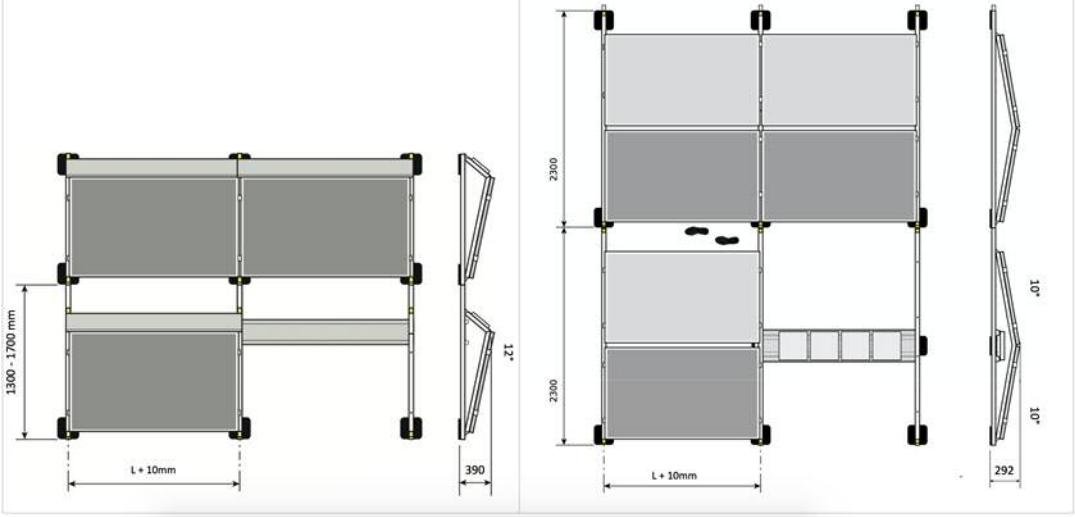


Figure 3.1-a Recommended flat roof row spacing, for type Model XL 200 landscape panels.

3.2. Distances between rows on pitched roof

Draw the panel area, the pipework and the position of the roof gland beforehand.

The space between the rows of panels in a field is at least 40 mm. Dimensions between panels and installation of mounting rails according to figure below.

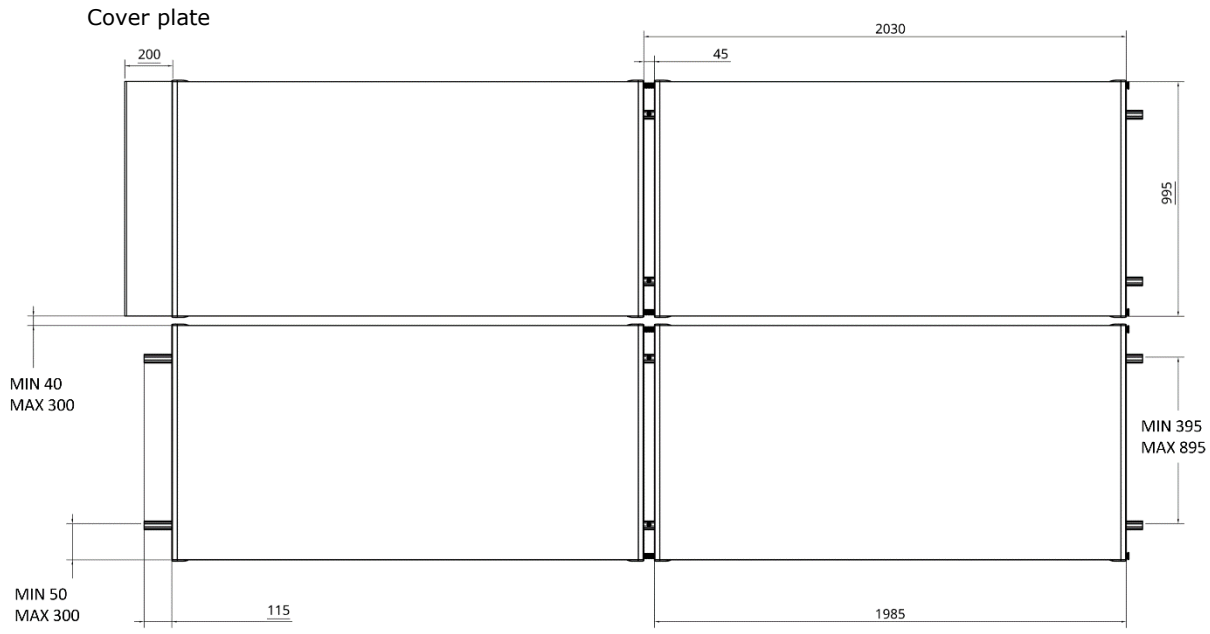


Figure 3.2-a Pitched roof row distances, for type Model XL 200 landscape panels.

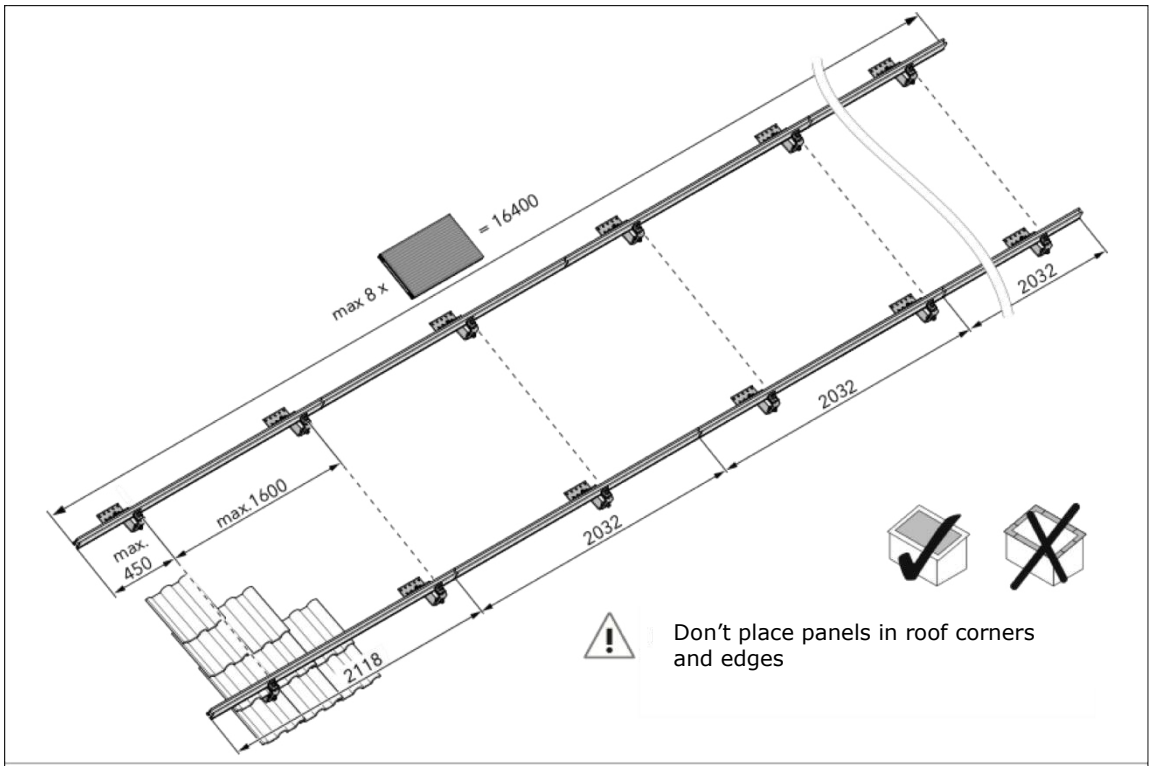
Attention:

The dimensions in figure 3.2-a are critical. If they are not respected, the warranty on the panels will be invalid.

4. Preparation for pitched roof, tiled roof

Each panel is supported by 2 horizontal mounting rails. Start assembling at the bottom of the panel field.

1. Place the outer roof bracket 450 mm from the edge of the panel field. For a 2 meter panel length and 4 roof brackets per panel, the distance between the roof brackets is approx 1000mm. Maximum 1600mm between roof brackets is allowed, see Figure 4.1-a.



Erforderliche Anzahl Dachanker / Required number of roof brackets / Nombre requis de pattes de fixation / Benodigde aantal dakankers								
Anzahl Kollektoren / Number of collectors / Nombre de capteurs / Aantal collectoren	1	2	3	4	5	6	7	8
Anzahl Dachanker / Nomber of roof brackets / Nombre de pattes de fixation / Aantal dakankers	4	8	10	14	16	20	22	24

< 18 m Schneelastzone: 1 ≤ 520 m | 2 ≤ 300 m | 3 ≤ 200 m. Schneelast bei Dachneigung > 60° nicht relevant.

Windzone 2, Mischprofil Binnenland, höhere Lasten siehe Technische Dokumentation

Ground snow load S_0 = 0,89 kN/m²; snow load at roof pitch > 60° not relevant, higher load see technical documentation

Charge de neige sur le sol S_0 = 0,89 kN/m²; la charge de neige à une inclinaison de toit > 60° n'est pas importante, charges plus élevées voir documentation technique

Bodem sneeuwlast S_0 = 0,89 kN/m²; sneeuwbelasting bij dakhelling > 60° niet relevant, hogere belastingen zie technische documentatie

Reference wind speed / vitesse de vent de référence / referentie windsnelheid v_{ref} = 25 m/s

Figure 4.1-a Pitched roof alignment (dimensions in mm) The lengths vary according to the type of panel.

2. Minimum distance between roof and bottom of heat pump panels is 90mm. To do so, slide the roof brackets into the highest position. See Figure 4.1-b

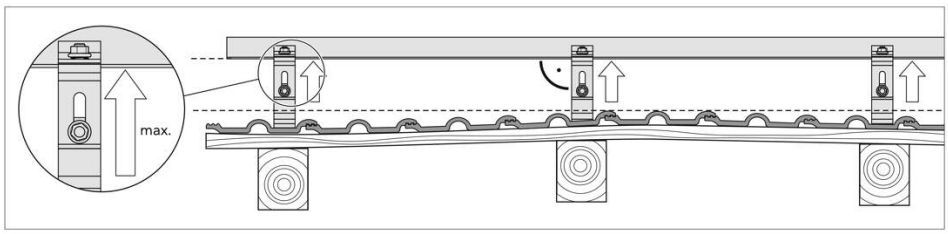


Figure 4.1-b Roof brackets in highest position. Minimum of 90mm between roof and panels is required.

3. Attach the roof brackets to the roof beams or to the roof boarding with the screws provided. Use additional underlayment wood to get the correct height and/or for a sturdier assembly. See Figure 4.1-c
4. For some tiles, it is necessary to make a small cut in the bottom of the tiles to accommodate the roof brackets.

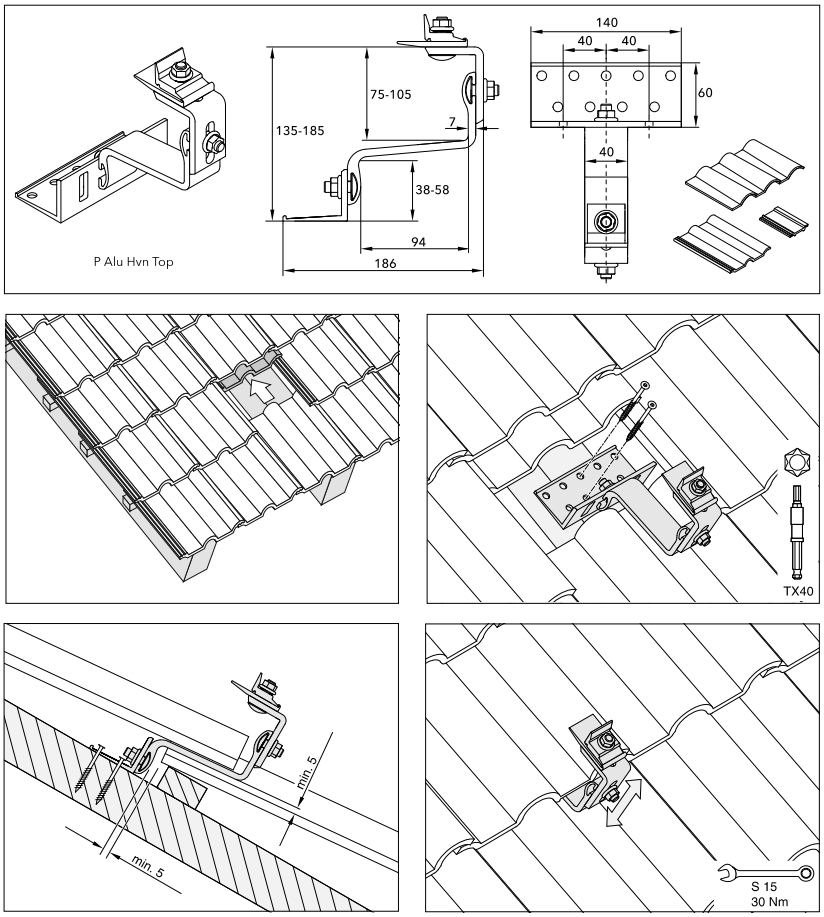


Figure 3.2-c Schuindak montage instructie dakankers (maten in mm)

5. Place the first mounting rail on the roof brackets. Secure the mounting rail by tightening the flange nut of the cross connector. See Figure 4.1-d.

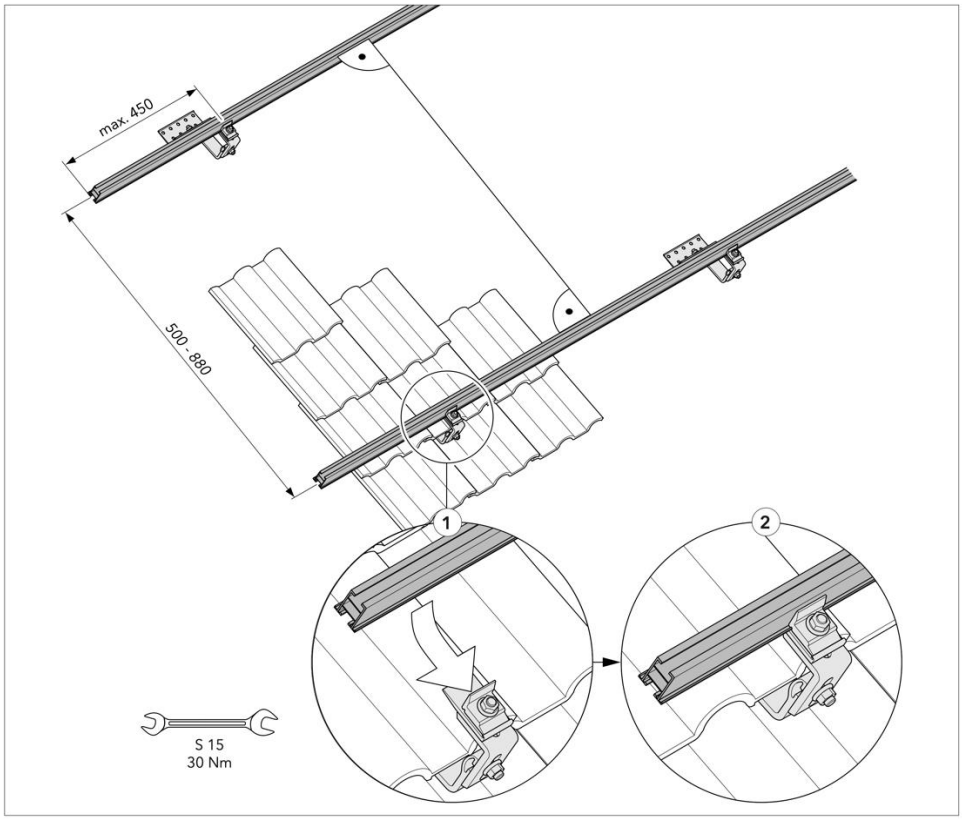


Figure 3.2-d Pitched roof mounting instruction roof brackets (sizes in mm).

6. For the next row, consider the vertical distance between the rows of heat pump panels. Distance between panels at least 40mm.
7. Connect the next mounting rail with the mounting rail interconnector. See Figure 4.1-e

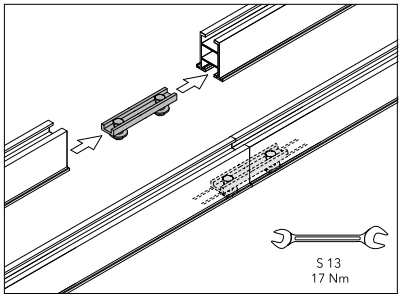


Figure 3.2-e Pitched roof, connecting mounting rails

5. Preparing a flat roof

See the Sunbeam installation manual supplied with the Sunbeam flat roof mounting system.

☞ **Attention:**

Observe the ballast plan of the Sunbeam Calculator for the ballast distribution.

- After assembling the Sunbeam mounting system, the Triple Solar mounting rails must be fixed to the Sunbeam triangles by means of cross connectors, see figure 5.1-a.

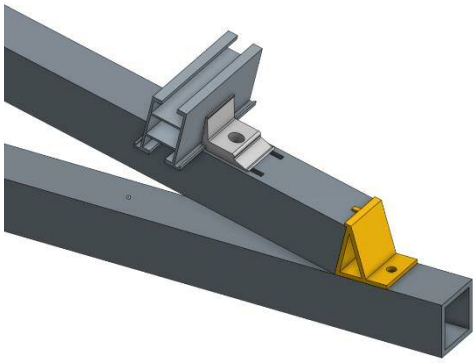


Figure 3.2-a b cross connector which clamps the mounting rail to the Sunbeam mounting system

6. Preparing a EPDM/bitumen roof

For pitched EPDM/bitumen roofs Triple Solar delivers roof feet with an EPDM layer. These can be screwed to vertical wooden beams (50mmx40mm) that are glued to the roof in advance.

The mounting rail is attached to the top of each roof foot with a bracket. Four roof feet are supplied per panel. The distance between the roof feet is approx. 1000 mm. See also the instructions for pitched roofs for the distances. This is also the center-to-center distance between the wooden beams.

Figure 6.1-a – Wooden beams glued on the bitumen roof.

7. Placing the panels on the mounting rails

7.1. The TS clamping profile

The TS clamping profile is placed on the mounting rails, in the center of where the panel will be. (Necessary profile in connection with wind and tensile loads).

1. Insert the slide connector into the rail and turn it a quarter turn.
2. Slide the TS clamping profile over the TS sliding connectors. Make sure it is placed in the right direction to fit into the panel profile later.
3. Press the TS lock cap on the back of the TS clamping profile to prevent slipping. See Figure 7.1 a, b en c.

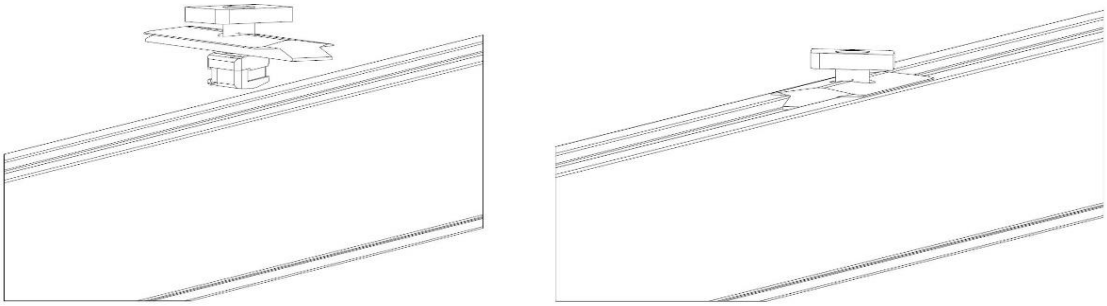


Figure 7.1-a – Insert TS clamping profile slide connector into the mounting rail

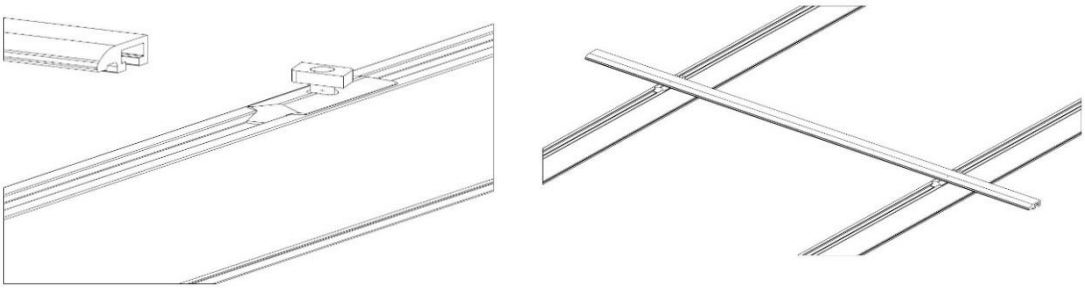


Figure 7.1-b sliding the TS clamping profile over the slide connector

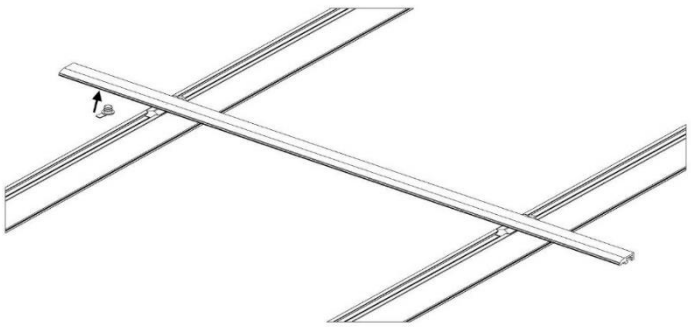


Figure 7.1-c TS Lock cap against slipping of the TS clamping profile

The TS clamping profile is only later on pushed into the panel profile. Until then, the TS clamping profile lies loose at some distance from the panel profile.

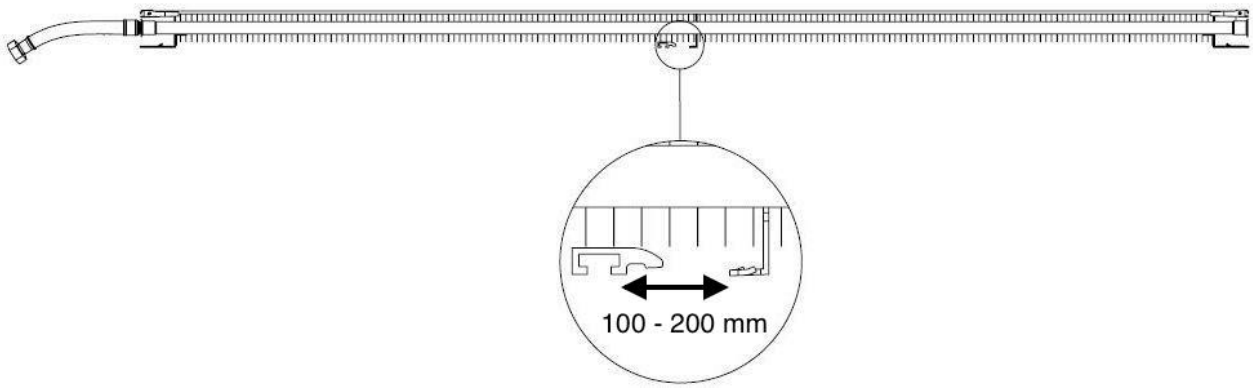


Figure 7.1-d the TS clamping profile lies loose, until the panels are permanently fixed.

7.2. Mounting of the panels

1. Insert the TS anti-slip bolt into a hole in the end profile on each side of the heat pump panel to prevent it from slipping. See figure 7.2-a.

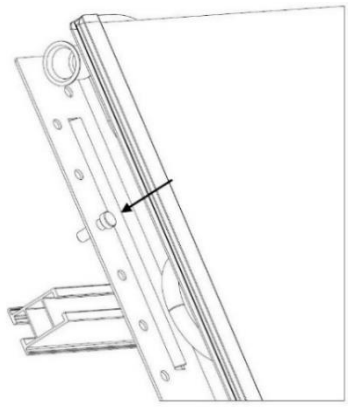


Figure 7.2-a panel with M8 bolt to prevent slipping.

2. Lay down the outer heat pump panel on the TS clamping profile and align.
3. Secure the outside of the panel with the TS end clamp and socket head screw M8x40, see figure 7.2-b

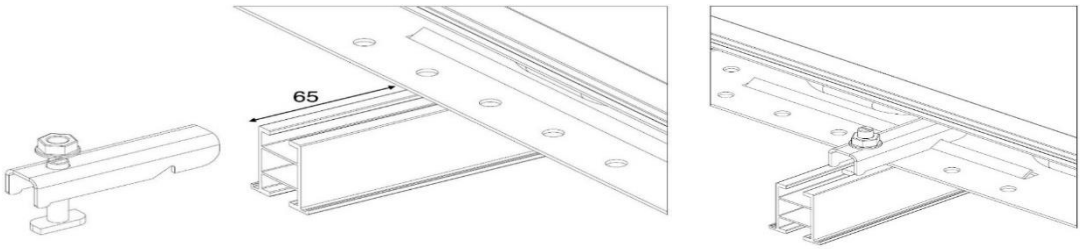


Figure 7.2-b panel with end clamp mounted.

4. Grease two connecting hoses with acid-free silicone grease.

☞ **Attention:**
Use only acid-free silicone grease (or blue gel) that is suitable for EPDM O-rings and can withstand temperatures between -20°C and +70°C. This is supplied.

5. Slide the two connecting hoses into the headers until both O-rings are no longer visible, see figure 7.2-c.

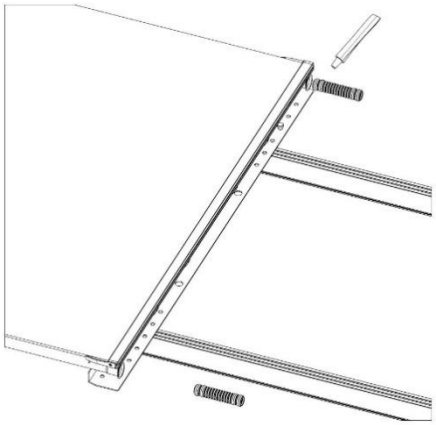


Figure 7.2-c – connecting hoses, mounted on one side

6. Carefully push the entire panel sideways in one controlled movement to allow the headers to slide over the connecting hoses.

☞ **Attention:**
Beware of damaging the connecting hoses and the O-rings. If in doubt, replace!

7. Secure both panels with the TS middle clamp and socket head screw M8x40, see figures 7.2d and 7.2e . The cutouts on either side of the TS middle clamp must fall over the ridges of the panels to secure the assembly!

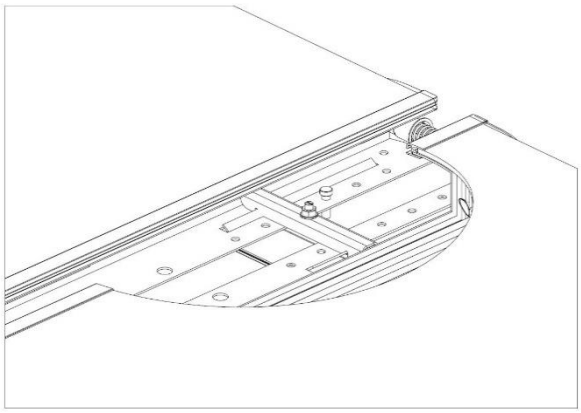


Figure 7.2-d middle clamp prepared

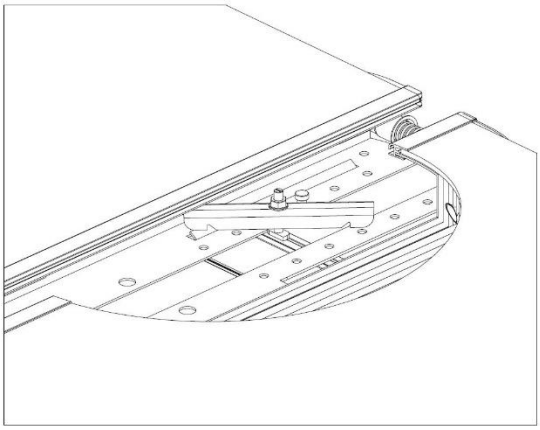


Figure 7.2-e middle clamp fixed

8. Repeat steps 1 through step 7 until the entire row of panels is in place.
9. When all TS end clamps and TS middle clamps are in place, the TS anti-slip bolt can be removed.

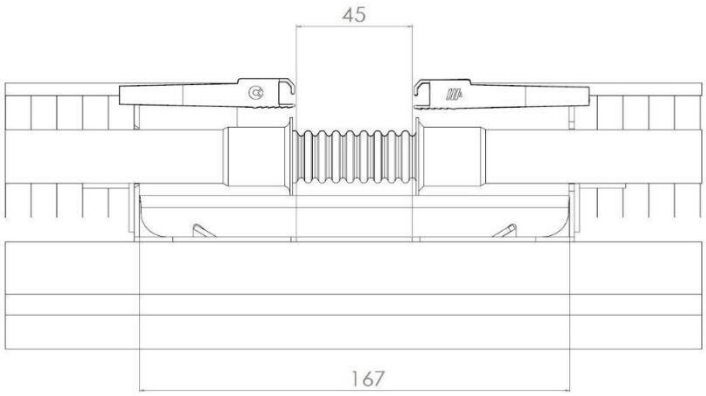


Figure 7.2-f cross-section of attached connecting hose and middle clamp.

7.3. Mounting the TS clamping profile

Now that the whole row of panels is in place and it has been checked that the alignment of the panels is correct, it is time to connect TS clamping profiles to the panels.

1. Slide the TS clamping profile sideways (over the mounting rails) over the middle support of the panel until it clicks into the panel profile, see figure 7.3-a.
2. Secure the TS clamping profile by bending the ridge upwards (at C in figure 7.4-b).

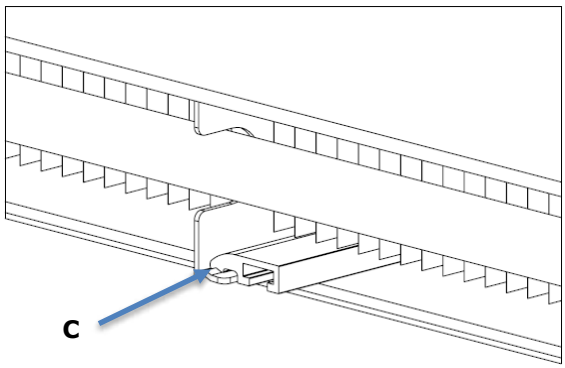


Figure 7.3-a bend the ridge upwards

☞ **Attention:**

The TS clamping profile must be clamped accurately both horizontally and vertically. The TS clamping profile cannot shift sideways anymore afterwards.

7.4. Mounting connecting hoses

The connecting hoses must not contain any sharp bends after fixing. R >=80mm. See Figure 7.4.a.

1. Grease TS plug/spigot ribbed hose (or possibly plug/swivel) at plug (use silicone valve grease, see also chapter 7.2).

2. Push the TS plug/spigot ribbed hose (or plug/swivel where applicable) into the openings.

3. Place retaining clips over the header of the panels and into the slot in the TS plug/spigot ribbed hose. See in Figure 7.4-a, at D.

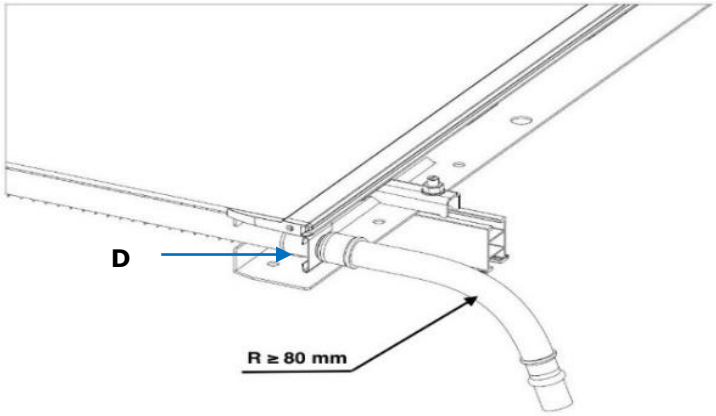


Figure 7.4-a Attach retaining clip at (D)

7.5. Connecting the PV panels electrically

The instruction for the electrical connection of the heat pump panels is identical to regular PV panels.

Mount optimizers, if you use them, as far as possible at the bottom edge of your panel field so that you can always access them easily for maintenance. If necessary, use extension cables to connect the panels to the optimizers in higher rows. (see figure 7.5-a) Connection is correct when measuring 1Volt safety signal per optimizer.

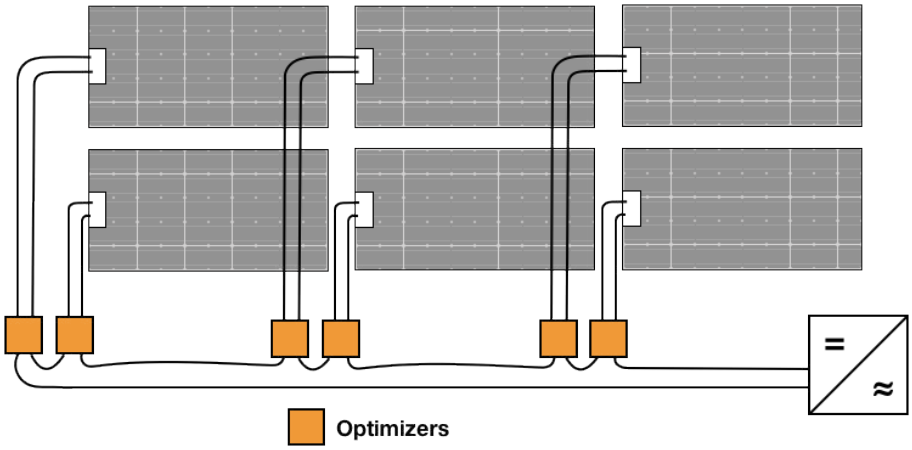


Figure 7.5-a Schematic view for connecting optimizers

It is important to avoid large induction loops in order to ground the PV cables correctly. The correct way is to lay the electrical cables next to each other as much as possible (see figure 7.5-b below)

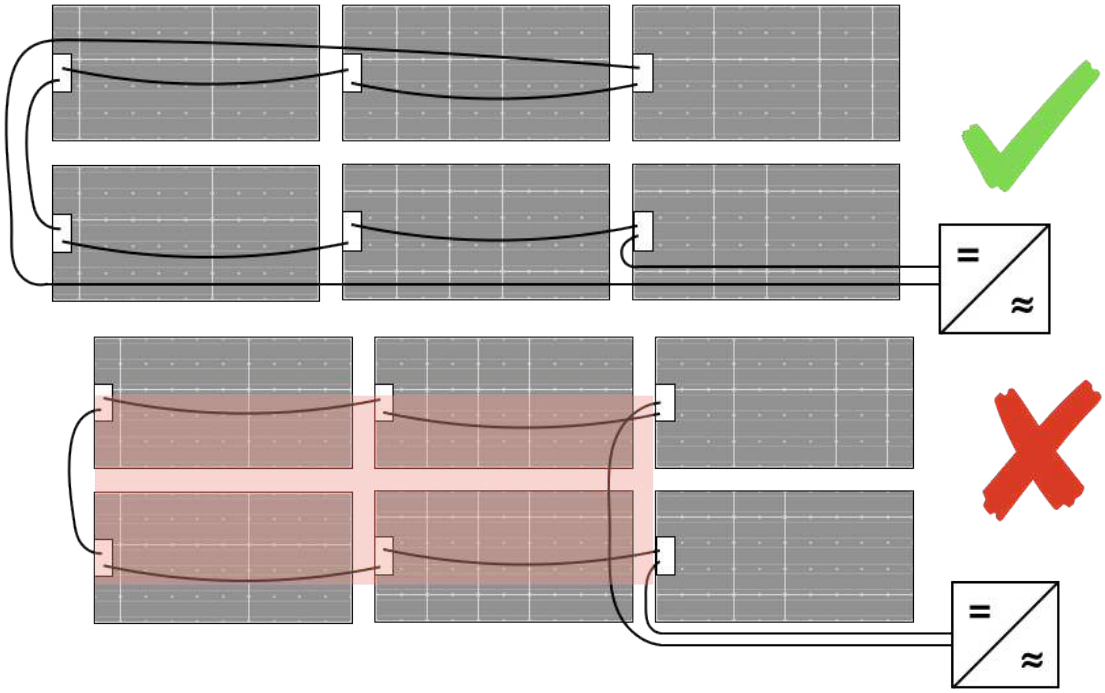


Figure 7.5-b Correct and incorrect connection of PV cables

8. Connecting the pipes

8.1. Material and position

In general:

- Make sure that the flow in the source circuit is limited as little as possible, e.g. by using knees and/or pipes with an inner diameter that is too small.
- Do not install any piping under the panels. It blocks the air flow underneath the panels and makes maintenance difficult.
- When connecting the heat pump to the heating circuit, always use a bronze connector between the copper pipes of the heat pump and the c steel of the heating circuit.
- The piping between the heat pump panel and the heat pump can be realized in different ways: Stainless steel pipe, copper pipe, plastic multilayer pipe (PEX) or plastic PP-R pipe. **(do not use C steel)**
- Plastic pipes lying in the sun should always be protected against UV light by means of a UV-resistant sheath or UV-resistant paint. The plastic pipes must be suitable for the source fluid.
- Indoors, keep enough distance between the pipes and the wall so that the insulation can still go between them.

When connecting several heat pump panels, consideration should be given to limiting pressure loss. The advice is a connection according to Tichelmann. For a pitched roof installation see figure 8.1-a.

Tichelmann is not always necessary for smaller fields.

For a pitched roof connecting Tichelmann is mandatory:

- ≥5 rows of panels
- ≥5 panels per row

When **propylene glycol** is used, Tichelmann is required:

- ≥4 rows of panels
- ≥4 panels per row

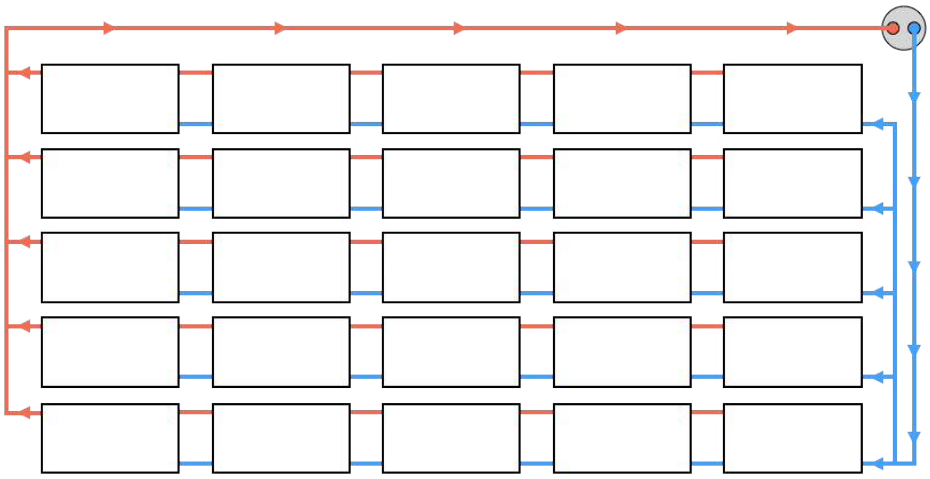


Figure 8.1-a Pitched roof – double sided Tichelmann connection

A single-sided Tichelman connection is a possibility if it is difficult to fit in with a pitched roof. See figure 8.1-b.

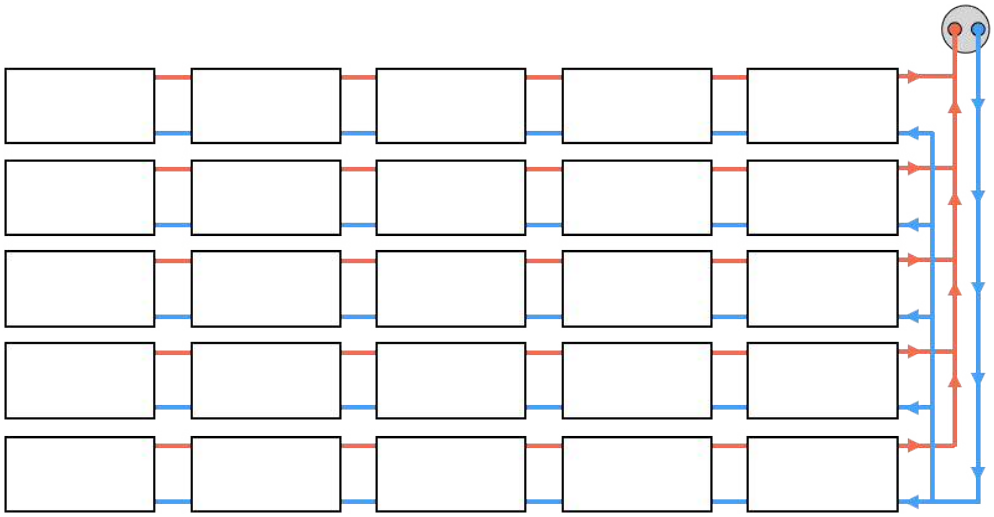


Figure 8.1-b Pitched roof – single sided Tichelmann connection

With a flat roof installation in rows of 2 panels, the return pipe is always at the highest point of the panels.

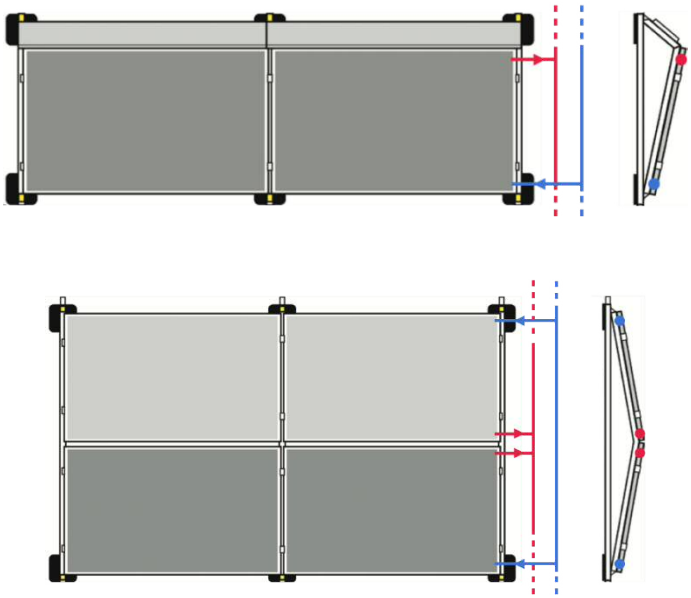


Figure 8.1-c Flat roof – connection with single or double row

Attention:

Preferably connect the panel according to the Tichelmann principle;

- connect the **cold pipe** at the bottom of the panels,
- the **hot return pipe** at the top.

Make sure the air vents remain accessible, also for maintenance

8.2. Pipe diameters of source pipes

The pipe diameter is largely dependent on the power of the heat pump. In addition, the total length of the pipework, the number of bends and the height difference between the heat pump and the panel field are important. The table below provides a guideline for sizing the pipe diameters of source pipes. This concerns the minimum diameters of the pipes running to and from the panel field, including the fittings.

After the junctions in the panel field, pipe diameters can be reduced.

Power heat pump	minimum internal diameter of the pipes running to and from the panel field
6 kW to 8kW	26 mm (inside)
8 kW to 15kW	32 mm (inside)
15kW to 28kW	41 mm (inside)
28kW to 50kW	51 mm (inside)

8.3. Hydraulic plan

- See the general hydraulic plan Triple Solar system, Figure 8.3-a
- Fit a 3 bar pressure relief valve or use the supplied expansion vessel connection group (3 bar pressure relief valve with automatic air vent).
- The filter valve (supplied with Nibe heat pumps) must always be placed in front of the thermostatic mixing valve (Esbe mixing valve) to prevent the valve from becoming dirty.
- The filter valve (supplied with Nibe heat pumps) with the smaller diameter must be placed in the cold side of the central heating circuit.
- Preferably do not place taps between the roof and the expansion vessel. This to avoid mistakes during maintenance.
- For larger fields it is wise to place a valve per row so that each row can be vented.

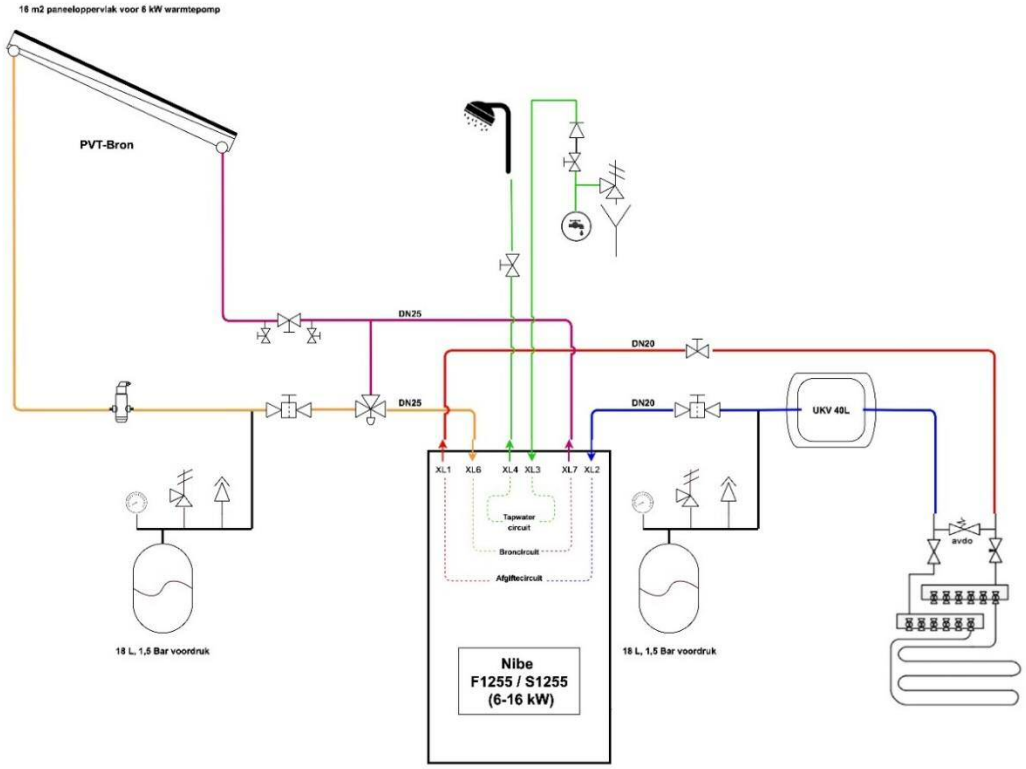


Figure 8.3-a general hydraulic plan Triple Solar system

Attention:

Always place the expansion vessel in the source circuit on the suction side of the pump, and as close to the pump as possible.

Attention:

It is not recommended to use automatic air vents in the source circuit, as these become unreliable in the long run when the condensate freezes and may leak. However, there is an automatic air vent in the expansion vessel connection group. Here there is less variation in temperature. **And a micro air bubble separator is included that is placed in-house in the source circuit.**

8.4. Filling medium

- The source liquid must have a freezing point of -20 °C. A safety margin has been taken into account. The maximum operating temperatures of the Triple Solar system are -12 °C and +30 °C
- The heat pump switches off automatically outside this temperature range.
- Triple Solar supplies a water antifreeze mixture consisting of 35% ethylene glycol (TYFOCOR from Tyfo).
- Triple Solar supplies a water-antifreeze mixture consisting of 40% propylene glycol when connected to a cooling module. (regarding KIWA requirements)
- Mono-propylene or bio-glycol is also possible, but these types of glycol work less well at lower temperatures due to a higher viscosity.
- Observe the supplier's instructions regarding concentration ratio, toxicity and safety.
- Check the mixing ratio of the glycol with a refractor device. Make sure the refractor device is suitable for ethylene or propylene glycol.

☞ **Attention:**

In case of doubt about the mixing ratio of the glycol, check with a refractor device. Make sure that the refractor device is suitable for ethylene or propylene glycol.

8.5. Installing the expansion vessel

Mounting the expansion vessel:

- In the suction side of the system. This is in the warm side of the well! (see diagram in figure 8.3-a). (This is different from continuous heating installations where the expansion vessel is also placed in the suction side, but in the cold side).
- As close as possible to the pump

Note that the type of expansion vessel is suitable for ethylene glycol. Often referred to with the addition "solar".

For installations with a heat pump of 12kW or more, it is advisable to have the size of the expansion vessel determined in consultation with the supplier. In addition to the capacity of the heat pump, location, water content and temperature also play a role.

8.6. Connecting thermostatic mixing valve

- The thermostatic mixing valve must be set to 25 °C or setting 4 on the Esbe mixing valve (this applies to NIBE heat pumps).
- The supplied thermostatic mixing valve is designed to prevent too high a fluid temperature from entering the heat pump from the source. NIBE heat pumps can operate with a maximum fluid temperature of 30 °C. Higher temperatures will cause the heat pump to malfunction and may even damage it.
- If another heat pump is used, please consult with Triple Solar's technical department beforehand.

8.7. Insulation

Switch off the heat pump to exclude the formation of condensation on the piping.

Insulate any source pipe, including the one in the roof gland. Do not insulate pipes above the roof.

Insulate with the following insulation properties:

- Vapour-tight
- 19mm thick
- Minimum thermal conductivity 0.033 W/(mK)

For fixing the piping to the wall, the following support is recommended to prevent cold bridges:

Flamco CB cold bridge free pipe support 28mm | 39888

Figure 8.7-a Flamco support – preventing cold bridges

8.8. Micro air bubble separator

Installing a micro air bubble separator removes all air bubbles in your installation. Air bubbles limit the heat exchange capacity of the panels.

A micro air bubble separator must be installed in the main return line of the panel field. This is the pipe with the highest temperature. The warmer the liquid, the less air can be dissolved in it, the more the air will go with the liquid flow in the form of micro-bubbles.

9. Finishing

9.1. Pitched roof – pipe clamps and cover plate

1. Where the pipe clamps are to be installed, loosen the end clamps and the hammer head bolt used. Slide the hammer head bolt into the pipe clamp.
2. Slide the tube clamp over the end of the mounting rails.

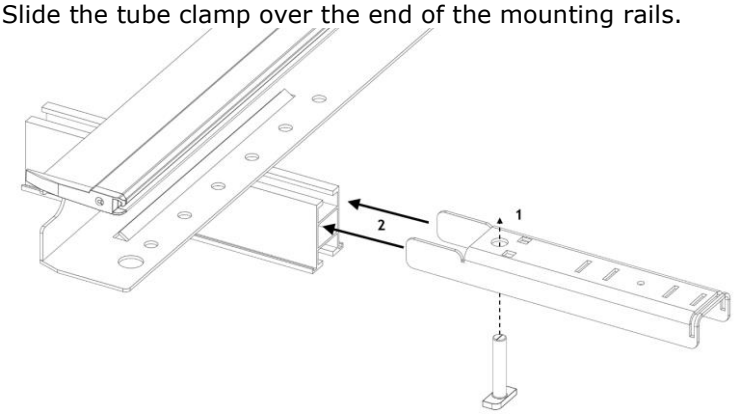


Figure 9.1-a Mounting the pipe clamp

3. Reinstall the end clamp in combination with the pipe clamp holder and the mounting rail. The cut-out should again fall over the ridge in the panel.

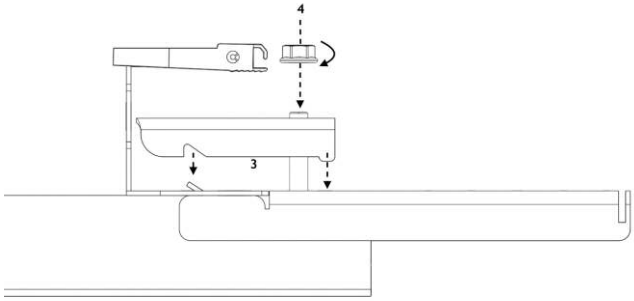


Figure 9.1-b Mounting the end clamps on the pipe clamps

4. Once the pipes are resting on the lower part of the pipe clamps, they are clamped with the top of the pipe clamp and the supplied self-tapping screw 6.5x75 Stainless steel.

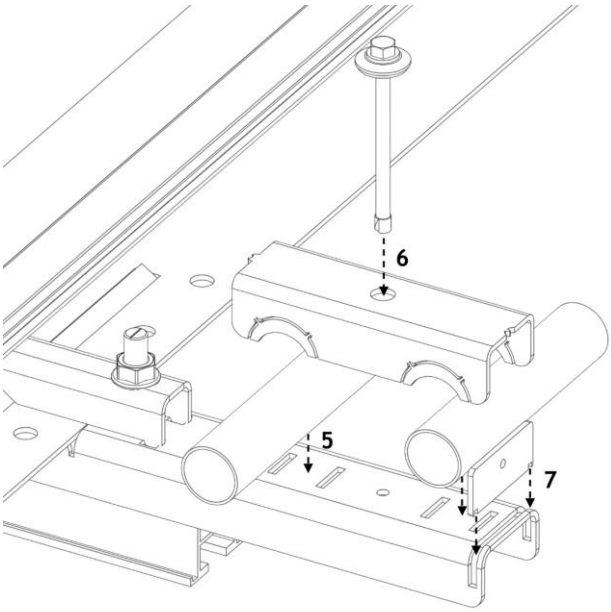


Figure 9.1-c Clamping the pipes

5. The cover plate is inserted into the side frame of the panel and is secured on the other side at the end of the pipe clamp by the self-tapping screw 6.5x16 Stainless steel.

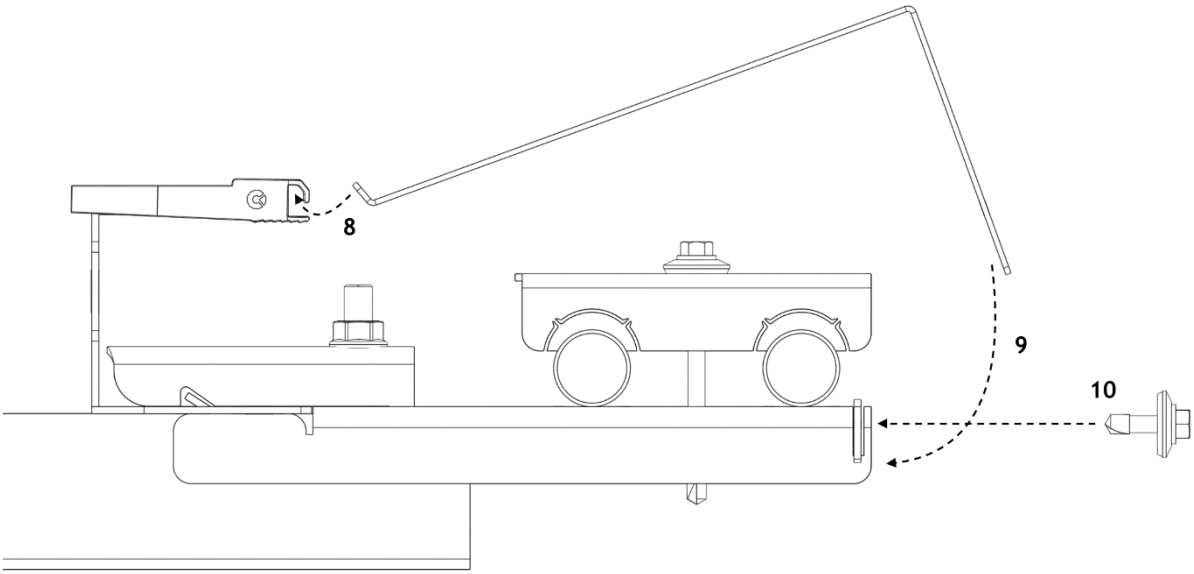


Figure 9.1-d Cover plate mounting

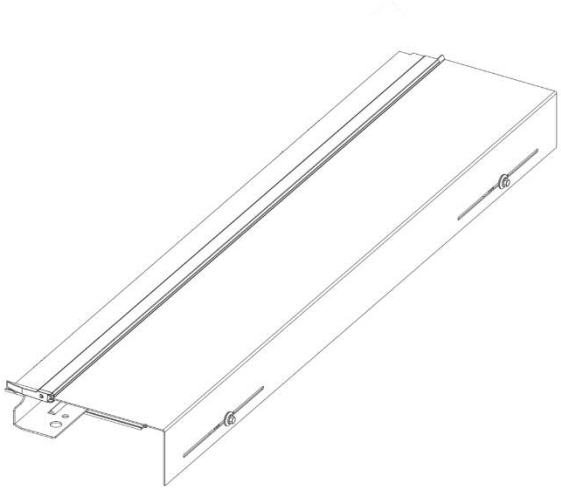


Figure 9.1-e Cover plate in position

9.2. Mounting rail covers

- Slightly bend the mounting rail cover by squeezing the sides together.
- Slide the cover over the mounting rail.

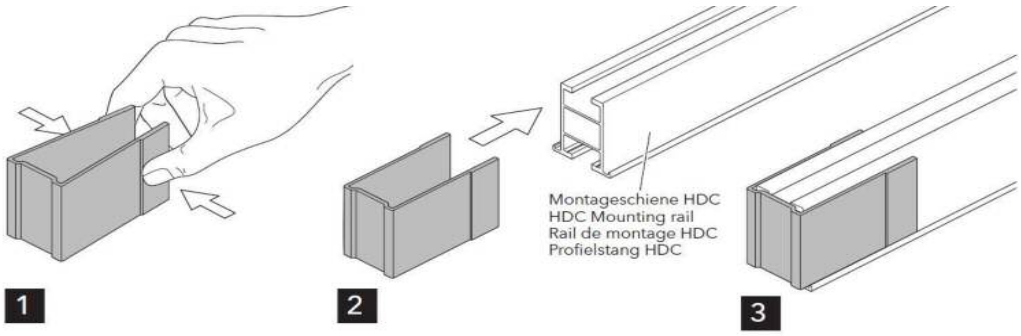


Figure 9.2-a Covering the ends of the mounting rails

10. Activating the system

10.1. Testing leak tightness, filling and system pressure

Leak tightness test

- Always first pressurize the installation with air to detect leaks.
- Check all gaskets and hydraulic connections for fluid tightness.

☞ **Attention:**

Never pressurize the system with drinking water. You will never empty the system 100% and the remaining drinking water will affect the glycol ratio in the system. The warranty provided by Triple Solar (and Nibe) expires with immediate effect.

Flushing

- Flush the installation with the same liquid medium as will be used when the installation is in operation (i.e. not with water or another type of glycol).
- Use a flushing pump/filling station for this purpose (See figure 10.1-a).
- The filling station is connected downstream to the flushing unit installed near the heat pump
- Each individual loop is flushed with at least 1m3/h flow rate. Dirt particles are carried along and removed from the pipe system.

☞ **Attention:**

Check the filter of the filling machine and the filter in the pipework. Clogging can cause too low a flow.

Filling and venting

- After flushing, the field is completely filled and pressurized with glycol.
- Venting has to be done properly

Figure 10.1-a Filling station

System pressure at heat pump	2,4 bar
System pressure on the roof	Pressure on the roof relative to the pressure at the heat pump is 0.1 bar per altimeter lower.
Pre-pressure expansion vessel	0.5 bar below the working pressure on site

10.2. Commissioning the heat pump (IBS)

The commissioning (IBS) of the heat pump is carried out by the heat pump supplier or by Triple Solar. This is only possible after the heat pump has run for a sufficient number of hours, including a number of starts, so that the operation can be checked. This is usually after 2 to 3 weeks.

Triple Solar carries out the IBS and makes the correct settings in the heat pump. Make an appointment with our engineer via info@triplesolar.eu.

Provide an internet connection with the heat pump for remote monitoring of the system.

11. Warranty conditions and maintenance

For our terms and conditions, see www.triplesolar.eu. Points of attention here:

Warranty conditions products

- Triple Solar gives a product warranty on the heat pump panels for a period of 10 years.
- PV panels, heat pumps and other components are supplied in accordance with the manufacturer's warranty (e.g. Bisol guarantees a 10-year product warranty and a 25-year performance guarantee of >85% of the initial capacity).
- Product warranty is excluded at:
  1. Damage caused by improper assembly, maintenance or repairs in which non-original parts have been used.
  2. Defects caused by improper use or use of products other than those for which they were manufactured and intended.
  3. Damage caused by external causes.
  4. Discolouration due to UV radiation and lacquer corrosion.
  5. A removed or illegible type plate.

Entrance control:

- Please check the delivered products for any damage immediately upon delivery. In the case of obvious defects or incorrect deliveries, this must be reported to Triple Solar in writing by e-mail to order@triplesolar.eu at the latest 2 working days after receipt of the products. Please state your order number.

Maintenance:

- The heat pump panels are generally maintenance free.
- It is advisable to check the connections every two years for liquid-tightness and corrosion due to external factors such as weather or other conditions.
- If necessary, you can clean the top of the heat pump panels with water after a few years so that the electrical output remains optimal.
- You can regularly check the operation of the system including the heat pump panels as the heat pump source by checking the data from the heat pump annually.

No rights can be derived from the information and instructions in these assembly instructions.

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triple solar verder zonder gas