

# manual heat pump panels

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# 1. General information

### 1.1. Safety instructions

Your basic equipment should consist of at least:

- safety shoes
- helmet
- safety goggles
- cut-resistant gloves

Attach ladders at an angle of 65 - 75 ° only to safe supports and also secure them against sinking, slipping or falling over. Use ladders only to bridge a maximum difference in height of 5m. Do not use damaged or repaired ladders. The ladder must protrude 1 metre above the roof edge.

In the traffic zone, secure the site with barriers, especially below the installation location.

Use impact or fall protection on the roof or ropes with harnesses attached to a fixed anchor point.

Electrical wires that can be touched by heat pump panels must be disconnected or covered by the responsible electricity company.

Necessary safety distances from power cables to the worker's working area:

- safety beam 1 m to 1 kV voltage
- safety beam 3 m to 110 kV voltage
- safety beam 4 m to 220 kV voltage
- safety beam 5 m to 380 kV voltage

Note the large wind surface area of heat pump panels and accessories. Provide a stable surface during installation. Stop the installation in case of strong gusts of wind.

Provide lightning protection during assembly in accordance with building regulations.

### 1.2. Legal requirements, standards and regulations

The installation must comply with local conditions, local regulations and, last but not least, technical rules.

The relevant safety regulations (e.g. NEN1010) must be observed.

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 make a warranty claim.

### 1.3. Permitted load of the panels

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

- Pressure load (Snow, Wind): 5400 Pa
- Tensile load (Wind): 2400 Pa

When using third-party mounting systems, these values must be observed.

When using the mounting materials supplied by Triple Solar, the above values apply.

### 1.4. Transport reguations

The heat pump panels may only be supported on the frame via the profiles on the short side of the panel.

The hydraulic connections as well as the collection tubes and fin packages may not be used to lift the heat pump panel. Aids such as lifting straps, etc. may not be attached to the pipes.

As long as the heat pump panels are stored, the caps remain on the connections to prevent dirt from getting into the pipes.

# 2. Technical information

# 2.1. Measures

#### Model: M2 360 200 landscape





Figure 2.1-a heat pump panel type M2 360 200 landscape

#### Model: M2 300 165 landscape



Figure 2.1-b heat pump panel type M2 300 200 landscape

### 2.2. Size, weight and material

size	unity	M2 360 200 landscape	M2 300 165 landscape	
Outside dimensions	mm	1987 x 995	1668 x 995	
Height	mm	65	65	
PV size	mm	1945 x 984	1648 x 984	
Weight (empty / full)	kg	28 / 32	23 / 27	
PV power	Wp	360	300	
Gross surface	m²	1,98	1,65	
materials				
PV-panel		GI	ass	
Heat exchanger tubes		Copper		
Heat exchanger fins		Aluminium		
Finishing		Kata	forese	

# 3. Placement of the panel field

3.1. Inclination angle on flat roof

Mount heat pump panels at an angle between 10° and 30°.

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

### 3.2. Space between rows on flat roof

The greater the row spacing, the less shadow there is. For the electrical output of the installation it is important to have as little shading as possible, see figure 3.2-a.



Sufficient distance between rows is also important in relation to walking space during installation and repairs. Also take into account the space required for pipe work.

# 4. Assembly parts

4.1. Standard components

Art.nr.	Description	Specification	Image
322101 324201	Mounting rail	2120 mm 4200 mm	
330101	Mounting rail connector	Aluminium with M8 flange nuts	a

310300	TS clamping profile slide connector	Assembly of plastic and stainless steel parts	
310101	TS end clamp	Aluminium	
310200	TS middle clamp	Aluminium	
331240	Hammerhead bolt	M8x40 stainless steel	L
331600	Flange nut	M8 stainless steel	
311000	TS clamping profile	Aluminium	



# 4.2. Pitched roof mounting parts, tiled roof

Additional components required for pitched roof installation

Art.nr	Description	Specification	Aantal	Image
300231	Roof bracket with foot	Multi-adjustable, incl. cross-connector	4x per panel	
336200	Screw	7,0x50 stainless steel (TX30)	2x per roof bracket	

# 4.3. Flat roof mounting parts

Additional components required for flat roof installation:

Art.nr	Description	Specification	Aantal	Image
300510	Flat roof frames first panel south, per row	Sunbeam Universal	1x per panel	Zie figure 4.3-a
300520	Flat roof frames supplementary panel south, per row	Sunbeam Universal	1x per panel	-
300530	Flat roof frames first panel east/west, per row	Sunbeam Symmetrical	1x per panel	-
300540	Flat roof frames supplementary panel east/west, per row	Sunbeam Symmetrical	1x per panel	-
330250	Cross connector	Aluminium For fastening mounting rail on Sunbeam flat roof frames	4x per #300510 2x per #300520 4x per #300530 2x per #300540	



Triple Solar assembly in

Figure 4.3-a Sunbeam frame for flat roof

# 4.4. Hydraulic, electrical and other components

430010	Valve	3/4" inside/outside	2
50000	Thermostatic mixing valve	1″ outside DN25	Ceser Ceser
500200	Flush and fill connection set	1″ inside DN25	
500100	Expansion vessel	18 L	
500150	Expansion vessel connection group	Including automatic air vent, pressure gauge and pressure relief valve 3 bar	
800010	TS crane grease	25 gram	Disc Dear -
610015	PV cable	0,4 meter	
411000	TS connecting hose	Stainless steel, with double o-ring	Children
410300	TS connection plug	¾" outside with double o-ring	
410200	TS end plug with air vent	With double o-ring	Cerc.

# 5. Preparation for pitched roof, tiled roof

#### Attention:

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See also the Wagner assembly instruction film on the Triple Solar website.

### 5.1. Aligning panels and installing roof brackets

Each panel is supported by two horizontal mounting rails. These are positioned parallel to each other, see figure 5.1-a. It is recommended to plan the configuration of panels, pipes and hoses before starting the installation.

Four roof brackets are required per panel. 2 Screws are included per roof bracket; 7,0x50 stainless steel



Figure 5.1-a sloping roof alignment diagram (dimensions in mm) The lengths can differ per type of panel.



• Start with the lower rail of the lower row of panels. Place the outermost roof bracket at 450 mm from the edge of the panel field. Spread the rest of the roof brackets evenly with 1000 mm distance between them. Maximum distance is 1600mm depending on the size of the field, see figure 5.1-b.



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
$\begin{array}{c c c c c c c c c c c c c c c c c c c $								
Charge de neige sur le sol $S_0 = 0.89 \text{ kN/m}^2$ ; la charge de neige à une inclinaison de toit > 60° n'est pas importante, charges plus élevées voir documentation technique								
Bodem sneeuwlast S <sub>0</sub> = 0,89 kN/m <sup>2</sup> ; 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 5.1-b Pitched roof alignment diagram (dimensions in mm) The lengths can differ per type of panel.* 

• Attach the roof brackets if necessary with extra underlayment wood to get the correct height and/or for a more solid mounting.



Figure 5.1-c Pitched roof mounting instruction roof brackets (dimensions in mm)

- Place the first mounting rail on the roof brackets and slide the cross connector into the groove on the side of the mounting rail. Tighten the mounting rail by tightening the flange nut of the cross connector to 26Nm (drive SW13). See also figure 5.1-d as an example.
- If more than one rail is to be connected, insert the mounting rail connector into the next rail and repeat step 4.
- For the next row, consider the vertical distance between the rows of heat pump panels. Distance between panels at least 40mm.
- With some roof tiles it is necessary to slightly grind the tiles at the bottom as a recess for the roof brackets.



Figure 5.1-d Pitched roof mounting instruction roof brackets (dimensions in mm).

Position the heat pump panels so that sufficient air flow (wind/convection) runs underneath them. This has an effect on the heat exchange capacity of the heat pump panels.

The minimum distance between the roof and the underside of the heat pump panels is 90mm. To do this, slide the roof brackets to the highest position.

# 6. Preparation for a flat roof

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

#### Attention:

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

1) After assembling the Sunbeam mounting system, the Triple Solar mounting rails (#324200) must be fixed to the Sunbeam triangles by means of cross connectors (#330250), see figure 5.1-a.



Figure 5.1-a cross connector which clamps the mounting rail to the Sunbeam mounting system

2) From here on, follow the general instructions for installing the panels, see chapter 7.

# 7. Installation of the panels

### 7.1. Placing the TS clamping profile

The TS clamping profile must be prepared on the mounting rails before the heat pump panels are laid on them. The TS clamping profile is mounted in the middle behind the heat pump panel and is only pushed into place over the panel profile after the panels have been installed. The panel profile is located at the back side of the heat pump panels. This TS clamping profile is required due to wind and tensile loads at the centre of the heat pump panel. (The aluminium frame that surrounds PV panels and provides this rigidity is missing in the heat pump panels).

• Insert the clamping profile connector into the rail and turn it a quarter turn.



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

Slide the TS clamping profile over the connector. Make sure it is placed in the right direction to fit later in the panel profile.



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

• The heat pump panel is now first attached to the rails, see 7.2 and 7.3. The TS clamping profile is only later on pushed into the panel profile, see 7.4. Until then, the TS clamping profile lies loose at some distance from the panel profile.



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

- 7.2. Mounting of the panels
  - 1) Insert a long M8 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.

- Lay down the outer heat pump panel and align it (take into account the installation of any accessories such as a cover plate for the piping, this requires 115 mm mounting rail, see chapter 9.
- 3) Secure the outside of the panel with the TS end clamp (#310100) and socket head screw M8x40 (#331150), see figure 7.2-b



Figure 7.2-b panel with end clamp.

4) Grease two connecting hoses (#411000) with acid-free silicone grease.

#### Attention:

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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) Place the next panel on the rails and secure with the M8 bolts against slipping. Carefully push the entire panel sideways in one controlled movement to allow the headers to slide over the connecting hoses.



- 8) Repeat steps 1 through 7 until the entire row of panels is in place.
- 9) When all end clamps and middle clamps are tight, the M8 bolts which were mounted to prevent slipping, can be removed.





*Figure 7.2-e middle clamp prepared* 

Figure 7.2-d middle clamp fixed

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The cut-outs on both sides of the middle clamp must fall over the upright ridges of the panels! This is to ensure the locking of the connecting hoses, see figure 7.3d + 7.3e.



*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 (#311000) sideways (in the longitudinal direction of the mounting rails) over the middle support of the panel until it clicks into the panel profile, see figure 7.4-a.
- 2) Secure the TS clamping profile by bending the ridge upwards, indicated by a C. in figure 7.4-b.



*Figure 7.3-a bend the ridge upwards* 

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Attention:

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

### 7.4. Mounting connecting hoses and/or connection plugs

- 1) Grease connecting hoses and/or connecting plugs (use silicone grease only, see also the instructions for the connecting hoses in chapter 7.2).
- 2) Slide connecting hoses and plugs into the header at the intended location.
- 3) Place retaining clips over the header and the slot in the connecting hose/plug. See figure 7.4-a, location indicated with a 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.
- The electrical connection may only be carried out by qualified electricians. We therefore recommend that you accept invitations from your inverter supplier to attend the free certification courses.
- Depending on the situation and requirements of the customer, the choice can be made to use optimizers or string inverters.

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)



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

- 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 UVresistant sheath or UV-resistant paint. The plastic pipes must be suitable for the source fluid.
- 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 several heat pump panels, consideration should be given to limiting pressure loss. The advice is a connection according to Tichelman.

- For a pitched roof installation see figure 8.1-a.
- Tichelman is not always necessary for smaller fields.
- With a flat roof installation in rows of 2 panels, the return pipe is always at the highest point of the panels.

Connecting Tichelman is mandatory:

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

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

- $\geq$ 4 rows of panels
- ≥4 panels per row



Figure 8.1-a Double-sided Tichelman 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 single sided Tichelman connection



# 8.2. Fittings

Preferably use squeezed pipe connections.

If swivel connectors are used, you can use the hose package supplied by us.

- Prepare the swivel connectors with the supplied blue graphite gasket (glycol resistant).
- Figure 8.2-a shows the connection diagram.



Figure 8.2-a Hydraulic connection diagram of the tilted roof hose package

- 6x connection plug ¾" outside
   3x valve ¾"inside/outside
- 3.) 2x ribbed hose ¾" inside/outside 900-1300mm
  4.) 2x adapter ¾"x1" inside/outside
- 5.) 4x T- adapter 1"x34"x1" inside

- 6.) 2x ribbed hose 1" inside/outside 900-1300mm
  7.) 2x double nipple 1" solar
  8.) 2x ribbed hose ¾" inside/outside 110-210mm 8x ¾" swivel gasket blue 2x 1" swivel gasket blue

### 8.3. 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
8 kW to 15kW	32 mm
15kW to 28kW	41 mm
28kW to 50kW	51 mm

### 8.4. Hydraulic plan

- 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 (See chapter 'Maintenance' for an explanation).
- For larger fields it is wise to place a valve per row so that each row can be vented.



*Figure 8.4-a general hydraulic plan Triple Solar system* 

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#### 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.

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#### 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

### 8.5. 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.



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.

### 8.6. 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 8.4a). (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.

### 8.7. 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 the technical department of Triple Solar in advance.

#### 8.8. 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:

Fischer 34-35/13 Articlenumber: 506491



#### Figure 8.8-a Fischer support – preventing cold bridges

#### 8.9. 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.

Triple Solar recommends the Spirotech microaerator (Deaerator AA100 1").



SPIROVENT-DEAERATOR-



# 9. Finishing a pitched roof

For pitched roof installations Triple Solar supplies a cover plate to cover the piping along the heat pump panels. This cover plate cannot be mounted on PV panels.

art. nr.	product	specification	number
360402	piping cover plate	aluminium, black coating	1x
320101	mounting rail cover	aluminium, black anodising	2x
336101	Self-drilling screw with EPDM ring	4,8x25mm stainless steel (SW8)	4x

**Instructions**: (see corresponding images below)

- Slightly bend the mounting rail cover by squeezing the sides together. 1.
- Slide the cover over the mounting rail. 2.
- Secure the cover to the rail using a self-drilling screw (SW8). 3.
- Fix the set edge of the cover plate in the recess of the heat pump panel side frame.
   Secure the cover plate to the head of the mounting rail using a self-drilling screw (SW8).
- 6. Repeat steps 1 through 5.







# 10. Activating the system

10.1. Testing leak tightness, filling and system pressure

### 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.

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



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Tip: Use a filling machine to obtain sufficient pressure and fluid velocity (flow). A filling machine can also be used to remove all air from the system (see figure 7.10-a).

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#### Attention:

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

- 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, a discharge pipe to the buffer tank is connected upstream and an intermediate shut-off valve is closed. Each individual loop is flushed with at least 1m3/h flow rate. Due to the high velocity in the pipe, dirt particles are carried along and removed from the pipe system. All loops are flushed sequentially.
- After flushing, the field is filled.
- Careful venting.



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. Maintenance

The heat pump panels are basically maintenance-free. However, there are a few recommendations in this area:

It is recommended to check the connections annually for fluid tightness and corrosion due to external factors such as the weather or other conditions.

In the case of vertical installation (90°) against a facade, it is recommended to clean the heat pump panels regularly with water if they are not exposed to rain.

Check the fins on the underside of the heat pump panels annually for leaves or insects to maximize the performance of the panels.

In case of a system conversion, it is recommended to replace the new glycol resistant O-rings and/or gaskets at the disconnected connection hoses.

If the pipes on the roof have to be closed for maintenance, make sure that the expansion tank of the source can remain active. After all, the source can heat up and cause the fluid to expand. Close the filter valve (supplied with Nibe heat pumps) and the valve of the flush and fill connection set.

# 12. Warranty conditions

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.

  - Damage caused by external causes.
     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

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

Triple Solar BV Programmeurstraat 6-B 1033 MT Amsterdam Tel +31 (0)20 435 7555 info@triplesolar.eu

www.triplesolar.eu



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