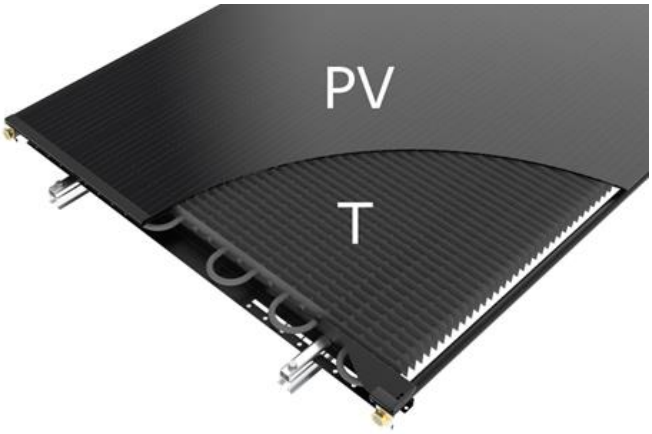
triple solar

heat pump panels

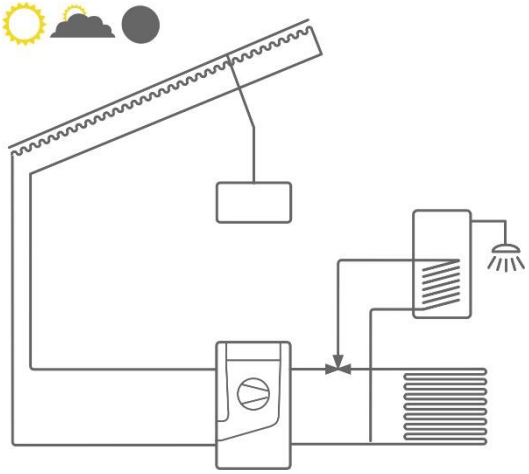
product information
heat pump panels **M4**

What is a PVT panel?

The top side of a PVT heat pump panel (abbreviated PVT panel) consists of solar cells (PV) which convert sunlight into electricity. The rear side is a thermal heat exchanger (T) generating the source energy for a water-to-water heat pump.
The PVT panel gets its energy from the outside air, from sunlight and from daylight. During all seasons, 24 hours a day, even when it is cloudy or freezing.



Why use a PVT system?



- No outdoor unit, as with the traditional heat pump, and therefore no noise pollution
- No expensive borehole and therefore no environmental impact
- High efficiency and therefore low electricity costs
- Durable, with a 10-year warranty
- An expected lifespan of at least 25 years
- Operates 24 hours a day, including at night and when cloudy
- Suitable for both new and existing buildings
- Suitable for any type of roof
- Low maintenance
- Fully recyclable
- Low environmental cost (ECI)

Application

The Triple Solar system finds its application in existing or new buildings, apartment blocks, care centres, swimming pools and other utility buildings.

In particular when:

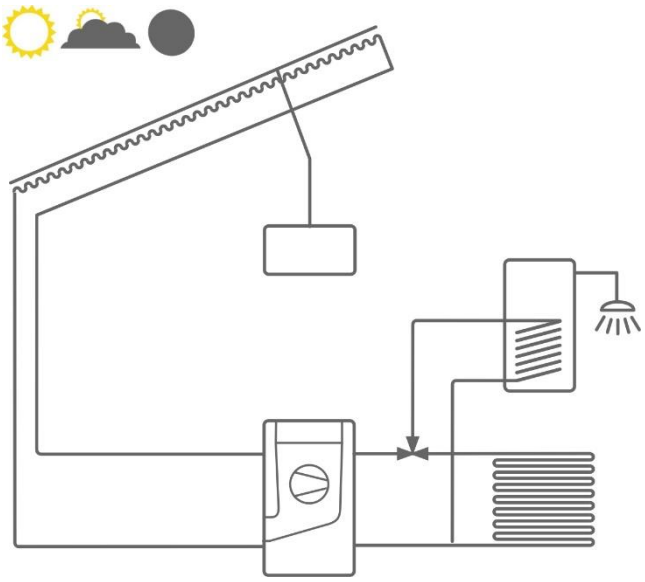
- The house has to become energy efficient
- The BENG requirements must be met
- No drilling is allowed
- Nuisance from the air/water heat pump outdoor unit heat pump is undesirable

Also suitable for:

- Regeneration of an Aquifer Thermal Energy Storage (ATES)
- Combination with a ground source
- Under-dimensioned ground sources

Connecting a heat pump

Triple Solar PVT heat pump panels are connected to the Triple Solar PVT heat pump 3.5 or to another suitable water-to-water heat pump. This is done in a similar way as connecting a ground heat exchanger for geothermal heat.
The orientation of the panels (north-east-south-west) is less important for its thermal performance. The declaration of conformity provides a wide margin in this area.



SUITABLE HEAT PUMPS

Triple Solar PVT heat pump panels can only be installed in combination with the PVT heat pump 3.5 or another water-to-water heat pump specified by Triple Solar.

For high efficiency, it is important to use a heat pump with a low allowable source temperature of at least -12 °C. In this case, the use of the built-in electrical element is as limited as possible.

LIMITATION OF THE BRINE TEMPERATURE

The temperature of the outgoing flow from the PVT panels (to the heat pump) must be limited by a thermostatic mixing valve. The maximum temperature setting (usually 25-30 °C) depends on the heat pump selected.

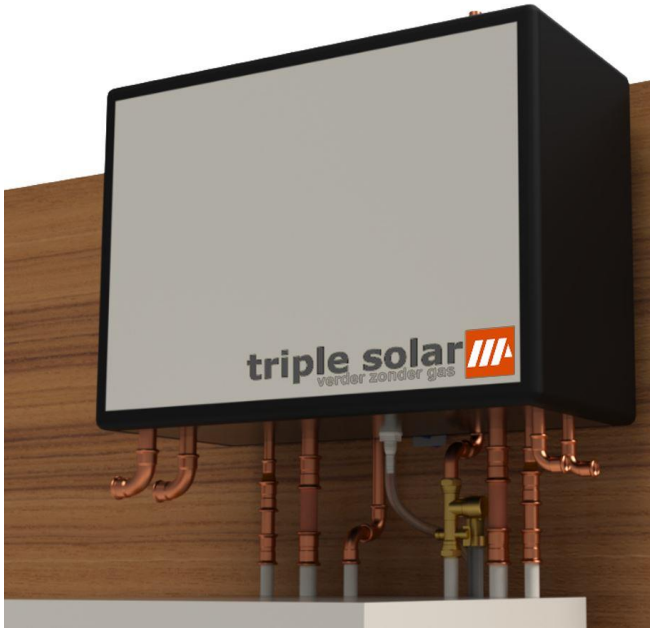
Triple Solar supplies the mixing valve as an accessory with the heat pump. The PVT heat pump 3.5 has this mixing valve built in.

ACTIVE COOLING

The Triple Solar heat pump system also provides building cooling. Here, space cooling is done via the floor heating, a convector or a separate heat exchanger in the ventilation system.

- The PVT heat pump 3.5 has a built-in cooling option.
- Other heat pumps can be equipped with the Triple Solar cooling module placed above the heat pump.

See the image on the right



Mounting material

CONNECTING MATERIALS

The Triple Solar PVT heat pump panels are supplied with the following accessories:

Mounting & hydraulics:

- Mounting rails with clamps
- Roof hooks or flat roof frames
- Mounting material 1st panel in a row
- Mounting material for next panel in a row
- Roof gland set, including hoses
- Accessories for the heat pump
- Glycol
- Cooling module (optional)

Adjustable "hook roof hooks" and roof hooks for an EPDM roof are also available.

Example of a PVT heat pump package with mounting material and accessories for flat roof

PIPING

Triple Solar supplies flexible ribbed hoses with each row. These consist of two expandable stainless steel hoses. The length of the hoses is longer for flat roofs as compared to those for sloped roofs. On one end, the hoses have a plug with a double o-ring which is pushed into the panel. On the other end, the hoses have either a 22 mm spigot end or ¾ swivel. This allows the hoses to be pressed on a 22 mm pipe, or connected to a ¾-point connection.

Example of a PVT heat pump package with mounting material and accessories for a sloped roof

DESIGN MANUAL

The design manual helps you to design the entire heat pump system and provides you with enough information to be able to make a quotation.

CALCULATION TOOL

With the Triple Solar calculation tool, you plan the layout of the PVT and PV panels on the roof. The result is a list of the required components which you can order at wholesalers.

INSTALLATION MANUAL

You will need the installation manual when you actually start installing. It also contains all the settings you need to properly connect the PVT source to the heat pump.

TRIPLE SOLAR ACADEMY

On the website www.triplesolar.academy
You will find all instruction video's, tips- and tricks for a perfect installation.
In case you still have questions, please don't hesitate to call us or send an e-mail to info@triplesolar.eu.

Technical Specifications

PVT heat pump panel	unity	M4 500 XL	M4 410 L	M4 410 P
Orientation		Landscape	Landscape	Portrait
Overall dimensions	mm	2115x1143x53	1743x1143x53	1156x1730x53
Aperture dimensions (T)	mm	2115x1128	1743x1128	1156x1715
Weight (empty)	kg	39	32	32
Aperture surface (T)	m^2	2,4	2,0	2,0
Materials	-			
PV-laminate on top	-	Glass 3,2 mm tempered anti-reflection		
Heat exchanger tubes	-	Copper		
Heat exchanger fins	-		Aluminium	
Surface treatment	-		Black powder coating	

* Length tolerance +/-10mm

Electric

PV-laminate on top of PVT panel	unity	M4 500 XL	M4 410 L	M4 410 P
Manufacturer	-	BISOL (EU)		
Type	-	132 (XL) en 108 (L en P) Half-cut mono PERC c-Si / 182 x 91 mm		
Nominal power[1)]	W_p	500	410	410
Short circuit current[1)]	A	13,85	13,90	13,90
Short circuit voltage [1)]	V	45,5	37,2	37,2
MPP current[1)]	A	13,16	13,19	13,19
MPP voltage [1)]	V	38,0	31,1	31,1
Cable length	mm	1400	1200	1200
Efficiency panel [1)]	%	21,0	21,0	21,0
Power output tolerance [1)]	W	0/+5 W	0/+5 W	0/+5 W
Temperature range	°C		-40 tot 85	
Impact resistance		Hailstone / Ø 25mm / 83 km/u		

1) At AM1,5 with 1000W/m^2 and 25°C |

2) All non-specified tolerances are ± 3 %. Unspecified product characteristics remain under full discretion of BISOL.

Thermal

Heat exchanger under the PVT panel	unity	M4 500 XL	M4 410 L	M4 410 P
Meander tube	mm		12 x 0,3	
Header tube	mm		22 x 0,75	
Volume fluid	l	4,2	3,4	3,4
Surface heat exchanger	m^2	ca. 18	ca. 15	ca. 15
Connectors	-	Plug-in with double O-ring		
Maximum pressure allowed	bar		6	
Pressure loss water-glycol mix 40 % [1)]	mbar	2,3 kPa (depending on how it is connected)		
Specific flow	l/u/m2	60 (depending on type of heat pump)		
Heat exchange factor air-fluid, a1 [2)]	W/(m^2 K)	46.34		
Stagnation temperature	°C	70 °C		

1) At 120 l/h, -15 °C

2) Solar Keymark, measured according to ISO 9806:2017

Quality marks and subsidies

SOLAR KEYMARK

Triple Solar PVT heat pump panels have the Solar Keymark certificate, the highest European quality level. All tests (wind load, snow load and yield) were carried out at the University of Stuttgart and certified by TÜV Rheinland and Dincerto.

TNO-TEST

TNO Delft has tested the Triple Solar PVT heat Pump panel according to the quasi-dynamic test method, described in NEN 12975-2 (report No. 2017 R10903).
To measure the entire operating range, a panel area of 10m2 was tested for this purpose during several months in a live setup with the heat pump.

DECLARATION OF CONFORMITY

Triple Solar has multiple declarations of conformity that have been reviewed by independent committees.

The declarations can be downloaded at the Central Registration Office of Conformity declarations (BCRG) (multiple declarations available, with and without cooling):
https://mijn.bcrg.nl/media/20220304GG_VKL_Triple_Solar_220811.pdf

PATENT

Triple Solar has a global patent on the PVT heat pump panel under No WO-2018/033409.

SUBSIDIES

The government is encouraging Dutch homes and companies to use less gas and apply more sustainable heat. It is therefore possible for both companies and individuals to get a subsidy for a heat pump with heat pump panels. For the PVT heat pump 3.5, the homeowner receives an ISDE subsidy of €4,200. More information is available via https://triplesolar.eu/kosten-en-financiering/

Example of a flat-roof lay-out on an apartment complex in Delft.

Example of a pitched roof layout on a residential block in Ridderkerk.

The Triple Solar-team, november 2022.

triple solar
verder zonder gas

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