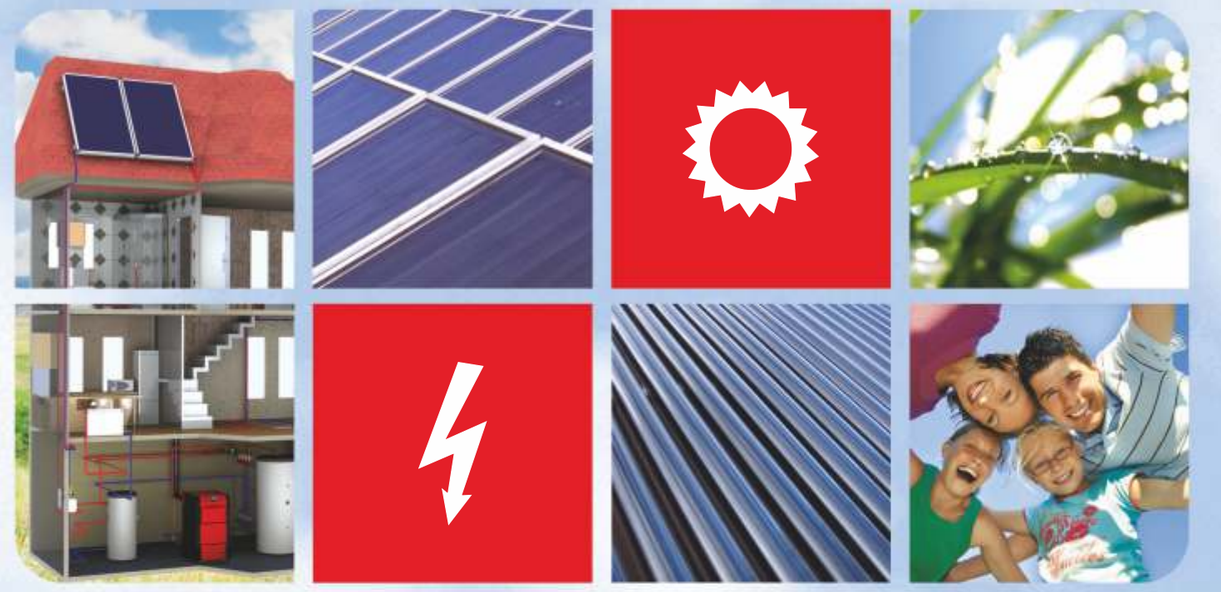

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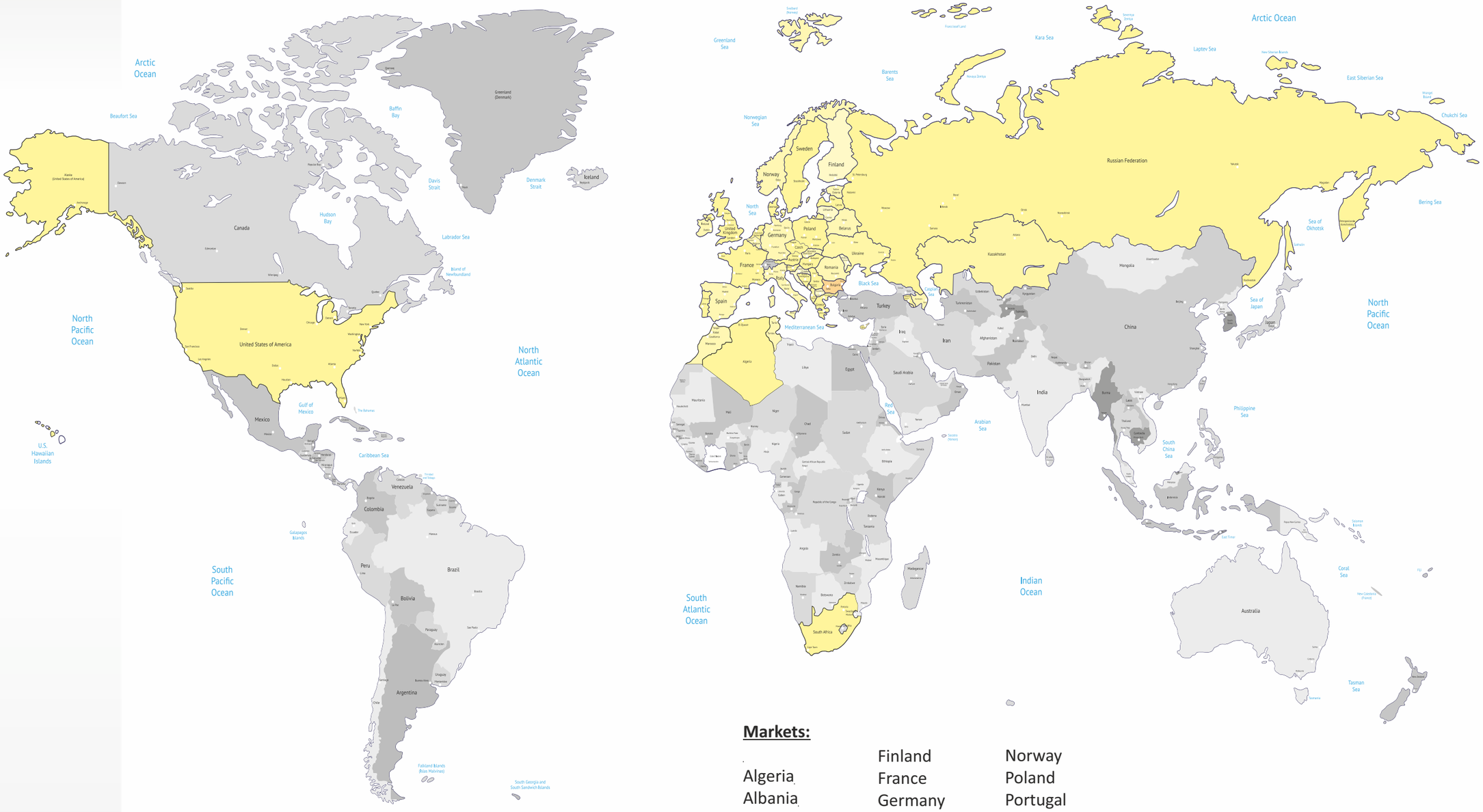
SOLAR THERMAL SYSTEMS

catalogue 2014



Markets:

Algeria
Albania
Armenia
Austria
Belarus
Belgium
Bulgaria
Bosnia and Herzegovina
Croatia
Kosovo
Czech Republic
Denmark
Estonia
Finland
France
Germany
Great Britain
Greece
Hungary
Ireland
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Netherlands
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office@sunsystem.bg
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NES
new energy systems

SUNSYSTEM®
Energy from the sun

BURNiT by SUNSYSTEM

new energy systems

THE COMPANY

NES - NEW ENERGY SYSTEMS LTD is producer of appliances utilizing alternative energy sources.

The company was established in 2002 in Shumen, Bulgaria. Today, the staff amounts to 330 qualified professionals working in facilities of 30 000 sq. m. built up area. All process are governed by QMS ISO 9001:2008.

The production is marketed across Europe, Africa, and South America, and other marketplaces are in the scope of near-future activities.

Most products of NES are designed to utilize alternative energy sources like solar thermal energy, biomass energy and aerothermal energy. These products contribute to sparing the energy reserves of the planet and minimizing the carbon emissions.

SUNSYSTEM®
Energy from the sun

- **SOLAR THERMAL**
  Solar collectors
  Domestic / Storage / Combi water tanks
  Buffer tank
  Heat pump water heaters
- **PHOTOVOLTAIC**
  Photovoltaic modules, accessories
  Engineering, Procurement and Construction of photovoltaic plants

BURNiT by SUNSYSTEM

- **BIOMASS HEATING**
  Solid fuel boilers
  Wood gasifying boilers
  Pellet boilers
  Combi boilers: wood-pellets/chips or solid fuel
  Pellet burners
  Pellet/Wood Stoves

SOLAR water heating is a smart way to cut down on your monthly expenses for water heating and do your part to help reduce your output of carbon dioxide. Solar water heating is probably the most cost effective way to generate hot water because it employs the free energy of the sun. The sun is responsible for all life on Earth, and generates a tremendous amount of clean, renewable energy that largely goes unharnessed. The better we manage to utilize this free energy, the higher our independency from fossil fuels, and the lower our emissions of greenhouse gases.
Solar means green!

CONTENTS

Cost effective

The technology employed in the production of PK Standard has been carefully selected to achieve the optimum balance between functionality and reasonable price.

High grade materials

Copper is irreplaceable when it comes to heat transfer. The liquid tight harp of copper tubing ensures high efficiency and reliability.

Solar-grade heat tempered glass Durasolar® P+. The glass used in SUNSYSTEM flat-plate collectors is distinguished by decreased iron content providing for better transparency to the sun rays. Durasolar® P+ has prism textured surface, which directs even the rays reaching the glass in unfavorable angle straight to the absorber.

Insulation of rock wool keeps the heat from leaving the collector body.

Durable construction

The collector case is made of robust aluminum frame, and the bottom is made of embossed aluminum sheet. This way the collector body has the necessary constructive strength to withstand the year-round whims of weather not sacrificing on light-weight

Versatile mounting options

Portrait and landscape modifications are available; two types of sleeves; options for installation on flat or inclined roof.

SUNSYSTEM®

Solar flat-plate collectors SUNSYSTEM Standard

SUNSYSTEM Standard collectors are an ecological and cost effective solution for domestic hot water supply during the warm season. The collector absorbs solar heat and emits it to the heat carrier circulating in the pipe harp.

PK Standard

flat-plate solar collectors

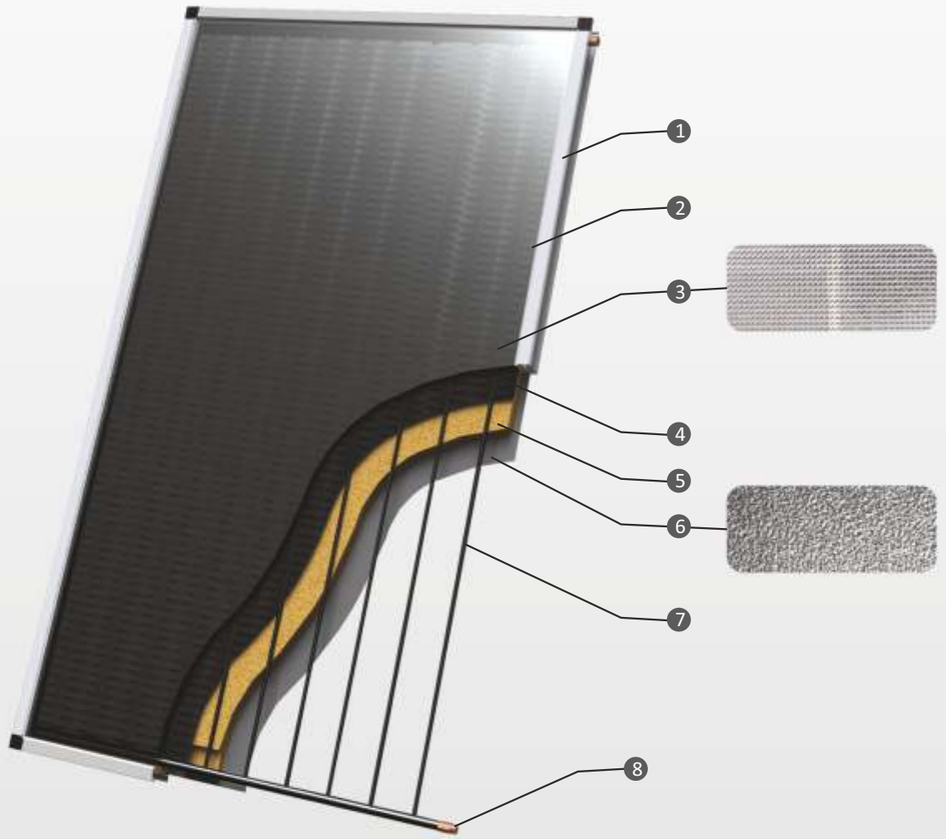
Product features:

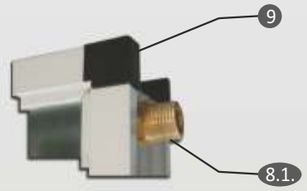
- Weatherproof aluminum frame colored in RAL 9006; installable in multiple positions.
- Rock-wool insulation keeps heat from escaping the collector case.
- Absorber harp of copper fins welded by ultrasonic technology. Ultrasonic welding provides for even and solid seam between the piping and the fins which withstands mechanical and thermal deformation.
- Pipe harp with low flow resistance. 100% tested for liquid tightness.
- Protective glass Durasolar® P+
  - Prism-patterned surface ;
  - Low ferrous content (FeO ≤0.02 %);
  - Heat-tempered;
  - Weatherproof – withstands severe wind, snow and hail.
- UV-proof silicone seal.

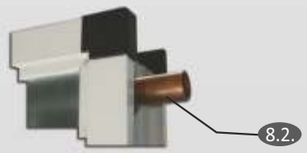
Available in modifications:

PK Standard Connections thread ½“	m^2	V	2,15	2,7
	m^2	H	2,15	2,7
PK Standard NL Connection „New Line“ Cu Ø22	m^2	V	2,15	2,7
	m^2	H	2,15	2,7

SUNSYSTEM®







1. Aluminum casing
2. Silicon seal
3. Protective solar glass
4. Absorber with black solar coating
5. High efficiency insulation
6. Bottom of the collector
7. Absorber pipe harp with black solar coating
8. Inlet/Outlet sleeve

8.1. Connection thread R ½”

8.2. Connection „New Line“ Cu ø 22 (NLmodel)

9. Corner protector

PK Standard

technical specifications

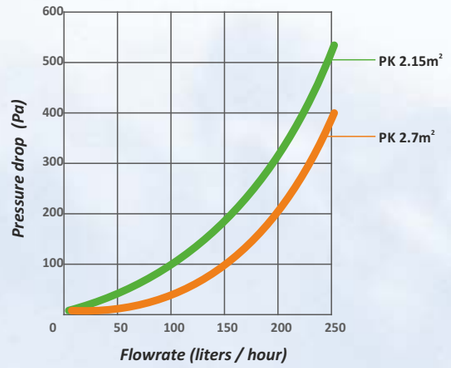


Diagram
Pressure drop in the PK Standard - type solar collectors

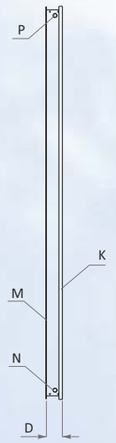
SUNSYSTEM®

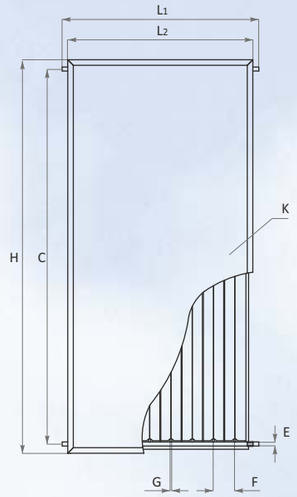
		PK ST 2,15	PK ST NL 2,15	PK ST 2,7	PK ST NL 2,7
Overall surface	m^2	2,141	2,141	2,619	2,619
Absorber surface	m^2	1,865	1,865	2,36	2,36
Aperture surface	m^2	1,897	1,897	2,39	2,39
Height H	mm	2125	2125	2125	2125
Width L / Thickness D	mm	1000/90	1000/90	1248/90	1248/90
Heat carrier fluid		PG 50% (freezing point -34°C)		PG 50% (freezing point -34°C)	
Volume of heat carrier	l	1,6	1,6	2,0	2,0
Flow rate of heat carrier	l/m^2h	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50
Insulation		rock wool λ = 0,0374 W/m.K (DIN 18165); g = 30 kg/m^3; δ = 40 mm		rock wool λ = 0,0374 W/m.K (DIN 18165); g = 30 kg/m^3; δ = 40 mm	
Solar glass		heat tempered prismatic glass Durasolar®P+		heat tempered prismatic glass Durasolar®P+	
Collector case		powder coated Aluminum (RAL 9006)		powder coated Aluminum (RAL 9006)	
Collector bottom		embossed aluminum sheet		embossed aluminum sheet	
Absorber material / Absorber surface		Copper(Cu) / Black solar coating		Copper(Cu) / Black solar coating	
Welding method		ultrasonic welding		ultrasonic welding	
Efficiency η_o in relation to aperture	%	72,3	72,3	72,3	72,3
Thermal loss coefficient K_1	W/m^2K	6,18	6,18	6,18	6,18
Thermal loss coefficient K_2	W/m^2K^2	0,0227	0,0227	0,0227	0,0227
Stagnation temperature	°C	170	170	170	170
Test pressure / Operating pressure	bar	25/6	25/6	25/6	25/6
Weight	kg	33	33	38	38

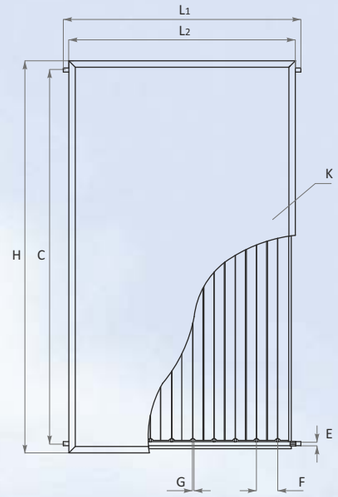
PK Standard

technical specifications

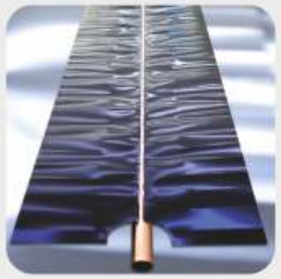
SUNSYSTEM®







		PK ST 2,15	PK ST NL 2,15	PK ST 2,7	PK ST NL 2,7
Collector case dimensions – height	H, mm	2125	2125	2125	2125
Collector case dimensions – width	L2, mm	1020	1020	1248	1248
Collector case dimensions – thickness	D, mm	90	90	90	90
Distance between collecting pipes	C, mm	2025	2025	2025	2025
Collecting pipes	E, ø, mm	22	22	22	22
Number of collecting pipes	pcs.	2	2	2	2
Distance between absorber pipes	F, mm	114	114	114	114
Absorber pipes	G, ø, mm	10	10	10	10
Number of absorber pipes	pcs.	8	8	10	10
Thickness of solar glass	K, mm	4,2	4,2	4,2	4,2
Thickness of collector bottom	M, mm	0,6	0,6	0,6	0,6
Heat carrier inlet	N, mm	R ½"	ø 22	R ½"	ø 22
Heat carrier outlet	P, mm	R ½"	ø 22	R ½"	ø 22
Number of terminals	pcs.	4	4	4	4
Maximum number of collectors in one array (20 m^2 absorber surface)	pcs.	10	10	8	8



State-of-the-art selective absorber coating

The heart of each solar collector – the absorber – is the key factor for the overall performance of the unit. The PK Select collector is furnished by high efficiency absorber coating of cermet technology. This coating technology represents a structure in which metallic particles are arranged in a ceramic grid. This special coating is temperature- and wear-proof. Its absorptance rate is 95%, while its thermal loss is barely 5%.

High grade materials

Copper is irreplaceable when it comes to heat transfer. The liquid tight harp of copper tubing ensures high efficiency and reliability.

Solar-grade heat tempered glass Durasolar® P+. The glass used in SUNSYSTEM flat-plate collectors is distinguished by decreased iron content providing for better transparency to the sun rays. Durasolar® P+ has prism textured surface, which directs even the rays reaching the glass in unfavorable angle straight to the absorber.

Insulation of rock wool keeps the heat from leaving the collector body.

Durable construction

The collector case is made of robust aluminum frame, and the bottom is made of embossed aluminum sheet. This way the collector body has the necessary constructive strength to withstand the year-round whims of weather not sacrificing on light-weight

Versatile mounting options

Portrait and landscape modifications are available; two types of sleeves; options for installation on flat or inclined roof.

SUNSYSTEM®

Solar flat-plate collectors SUNSYSTEM Select

Due to their excellent absorptance rate of 95% the flat-plate collectors SUNSYSTEM Select are the ultimate choice for domestic hot water supply and central heating support throughout the year.

DIN Geprüft

PK Select

flat-plate solar collectors

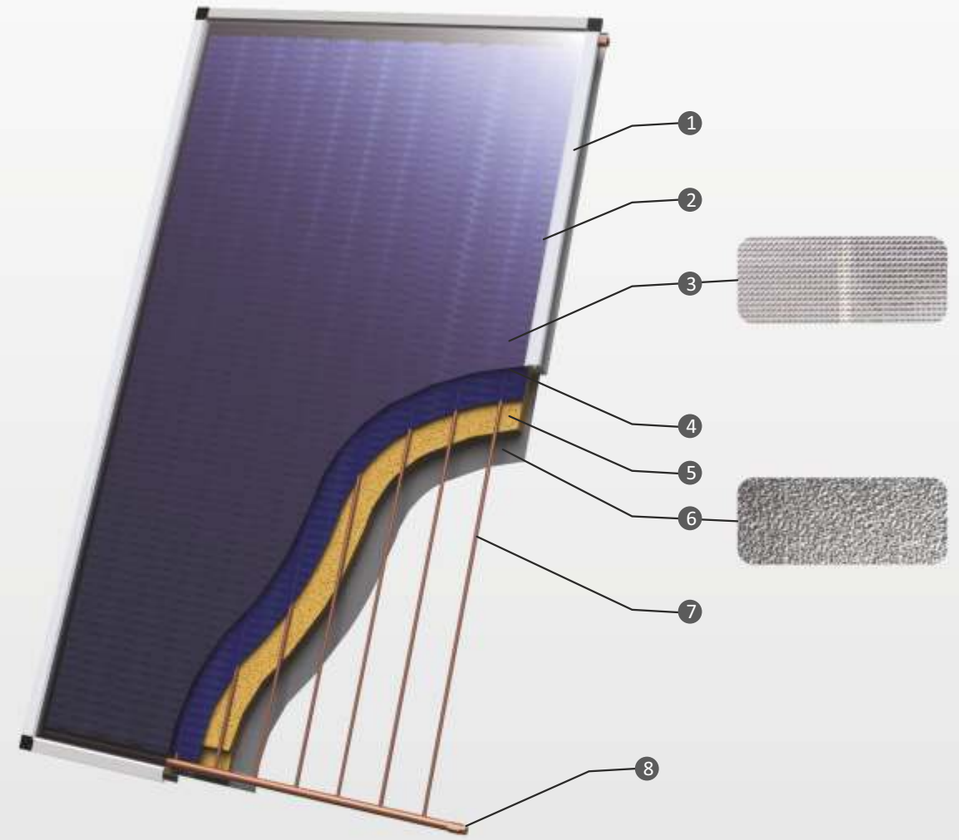
Product features:

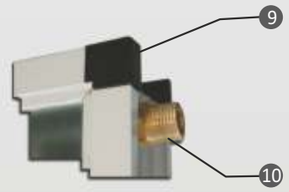
- State-of-the-art selective coating of cermet technology boosts efficiency and protects the absorber from wear.
- Weatherproof aluminum frame colored in RAL 9006; installable in multiple positions.
- Rock-wool insulation keeps heat from escaping the collector case.
- Absorber harp of copper fins welded by ultrasonic technology. Ultrasonic welding provides for even and solid seam between the piping and the fins which withstands mechanical and thermal deformation.
- Pipe harp with low flow resistance. 100% tested for liquid tightness.
- Protective glass Durasolar® P+
  - Prismatic surface patterned;
  - Low ferrous content (FeO ≤0.02 %);
  - Heat-tempered;
  - Weatherproof – withstands severe wind, snow and hail.
- UV-proof silicone seal.
- Certificates: EN 12975:2006-06; CEN -Keymark.

Available in modifications:

PK Select Connections thread ½“	m^2	V	2,0	2,15	2,5	2,7
	m^2	H	2,0	2,15	2,5	2,7
PK Select NL Connection „New Line“ Cu Ø22	m^2	V	2,0	2,15	2,5	2,7
	m^2	H	2,0	2,15	2,5	2,7

SUNSYSTEM®





1. Aluminum casing
2. Silicon seal
3. Protective solar glass
4. Absorber with selective coating
5. High efficiency insulation
6. Bottom of the collector
7. Absorber pipe harp
8. Inlet/Outlet sleeve

8.1. Connection thread R ½”

8.2. Connection „New Line“ Cu ø 22 (NL model)

9. Corner protector

PK Select

technical specifications

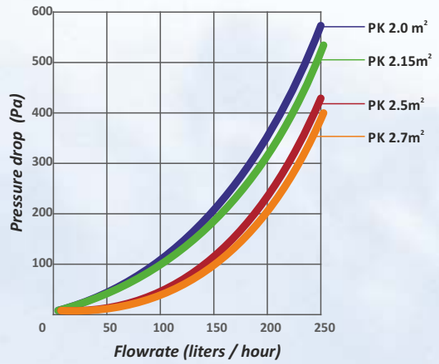


Diagram
Pressure drop in the PK Select - type solar collectors

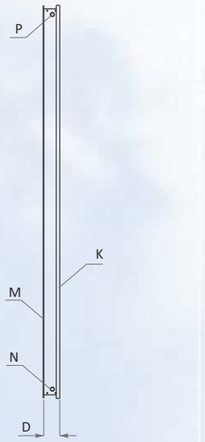
SUNSYSTEM®

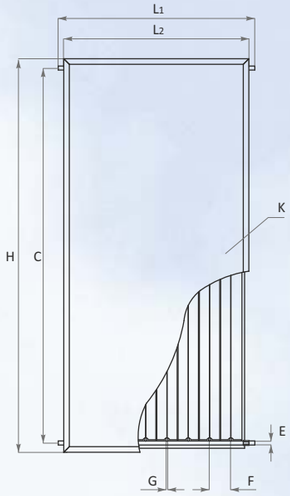
		PK SL 2,0	PK SL NL 2,0	PK SL 2,15	PK SL NL 2,15	PK SL 2,5	PK SL NL 2,5	PK SL 2,7	PK SL NL 2,7
Overall surface	m^2	2,0	2,0	2,141	2,141	2,45	2,45	2,619	2,619
Absorber surface	m^2	1,78	1,78	1,865	1,865	2,22	2.22	2,36	2,36
Aperture surface	m^2	1,8	1,8	1,897	1,897	2,25	2,25	2,39	2,39
Height H	mm	2000	2000	2125	2125	2000	2000	2125	2125
Width L / Thickness D	mm	1000/90	1000/90	1000/90	1000/90	1248/90	1248/90	1248/90	1248/90
Heat carrier fluid		PG 50% (freezing point -34°C)				PG 50% (freezing point -34°C)			
Volume of heat carrier	l	1,4	1,4	1,6	1,6	1,8	1,8	2,0	2,0
Flow rate of heat carrier	l/m^2h	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50	20 ÷ 50
Insulation		rock wool λ = 0,0374 W/m.K (DIN 18165); g = 30 kg/m^3; δ = 40 mm				rock wool λ = 0,0374 W/m.K (DIN 18165); g = 30 kg/m^3; δ = 40 mm			
Solar glass		heat tempered prismatic glass Durasolar®P+				heat tempered prismatic glass Durasolar®P+			
Collector case		powder coated Aluminum (RAL 9006)				powder coated Aluminum (RAL 9006)			
Collector bottom		embossed aluminum sheet				embossed aluminum sheet			
Absorber material / Absorber surface		Copper (Cu) / Selective coating				Copper (Cu) / Selective coating			
Welding method		ultrasonic welding				ultrasonic welding			
Efficiency η_o in relation to aperture	%	76,4	76,4	76,4	76,4	77	77	77	77
Thermal loss coefficient K_1	W/m^2K	3,83	3,83	3,83	3,83	4,23	4,23	4,23	4,23
Thermal loss coefficient K_2	W/m^2K^2	0,0080	0,0080	0,0080	0,0080	0,0035	0,0035	0,0035	0,0035
Stagnation temperature	°C	200	200	200	200	200	200	200	200
Test pressure / Operating pressure	bar	25/6	25/6	25/6	25/6	25/6	25/6	25/6	25/6
Weight	kg	31	31	33	33	36	36	38	38

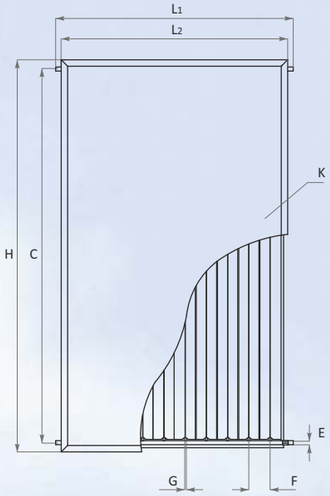
PK Select

technical specifications

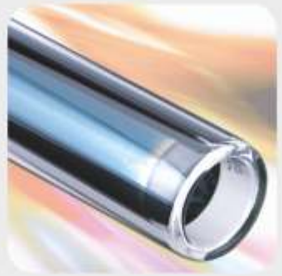
SUNSYSTEM®







		PK SL 2,0	PK SL NL 2,0	PK SL 2,15	PK SL NL 2,15	PK SL 2,5	PK SL NL 2,5	PK SL 2,7	PK SL NL 2,7
Collector case dimensions height	H, mm	2000	2000	2125	2125	2000	2000	2125	2125
Collector case dimensions width	L2, mm	1020	1020	1020	1020	1248	1248	1248	1248
Collector case dimensions thickness	D, mm	90	90	90	90	90	90	90	90
Distance b/n collecting pipes	C, mm	1900	1900	2025	2025	1900	1900	2025	2025
Collecting pipes	E, ø, mm	22	22	22	22	22	22	22	22
Number of collecting pipes	pcs.	2	2	2	2	2	2	2	2
Distance b/n absorber pipes	F, mm	114	114	114	114	114	114	114	114
Absorber pipes	G, ø, mm	10	10	10	10	10	10	10	10
Number of absorber pipes	pcs.	8	8	8	8	10	10	10	10
Thickness of solar glass	K, mm	4,2	4,2	4,2	4,2	4,2	4,2	4,2	4,2
Thickness of collector bottom	M, mm	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Heat carrier inlet	N, mm	R ½"	ø 22	R ½"	ø 22	R ½"	ø 22	R ½"	ø 22
Heat carrier outlet	P, mm	R ½"	ø 22	R ½"	ø 22	R ½"	ø 22	R ½"	ø 22
Number of sleeves	pcs.	4	4	4	4	4	4	4	4
Maximum number of collectors in one array (20 m^2 absorber surface)	pcs.	10	10	10	10	8	8	8	8



Evacuated tubes

Evacuated tubes are two concentrically positioned glass tubes enclosing a gap of evacuated air. The internal glass tube is coated on its external surface with an environmentally friendly, highly selective layer and thus functioning as an efficient absorber. The reliability of SUNSYSTEM tubes was confirmed by positive test results in the impact-from-hail test according to DIN EN 12975-2 and thermal shock test.

Heat Pipe Technology

Dry evacuated tube solar collectors made by Heat Pipe technology are characterized by their high efficiency: improved heat-absorbing capacity of collector, low heat losses and stable performance in harsh climate conditions.

Piping

The piping is produced with just a minimum number of soldering points. This result in high leakage-safety and reduced internal scaling.
Both outlets of Manifold pipe can be connected as heat-carrier input or output in any direction.

Versatile mounting options

Options for installation on flat, inclined roof or façade
Easy for transportation, installation and maintenance.
Evacuated tube collectors continue to perform even in case of one or more broken tubes.

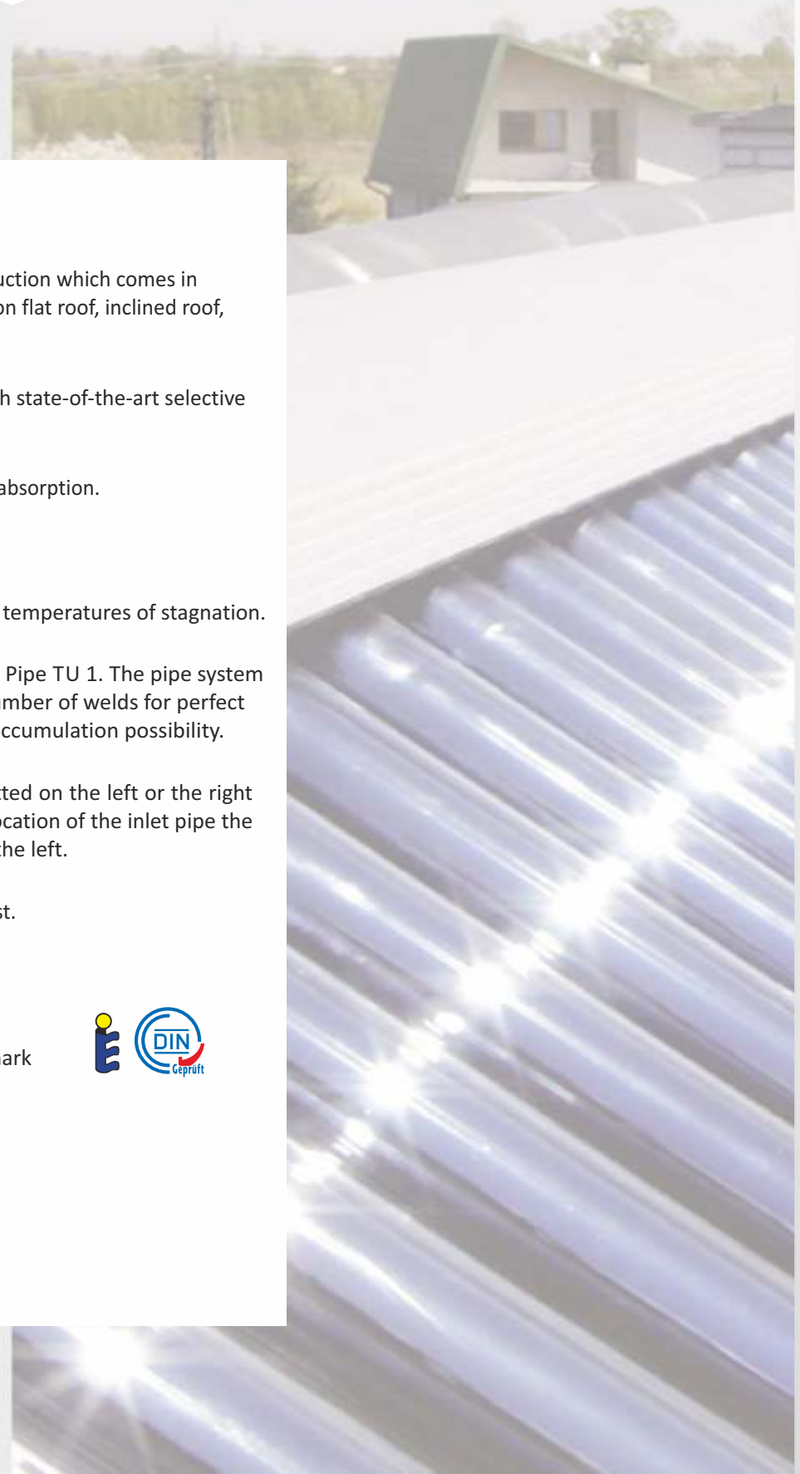
SUNSYSTEM®

Evacuated tube collectors SUNSYSTEM VTC

Designed for domestic water heating and support of space heating. Their outstanding design, professional finishing, top quality and high energy yield, as well as their excellent price/performance ratio make them stand out. High-quality corrosion resistant materials ensure smooth operation over a long useful life.

Heat Pipe technology, excellent insulation performance of vacuum and maximum capture of solar radiation makes evacuated tube collectors cost-effective solution for any solar installation.

Evacuated tube collectors VTC



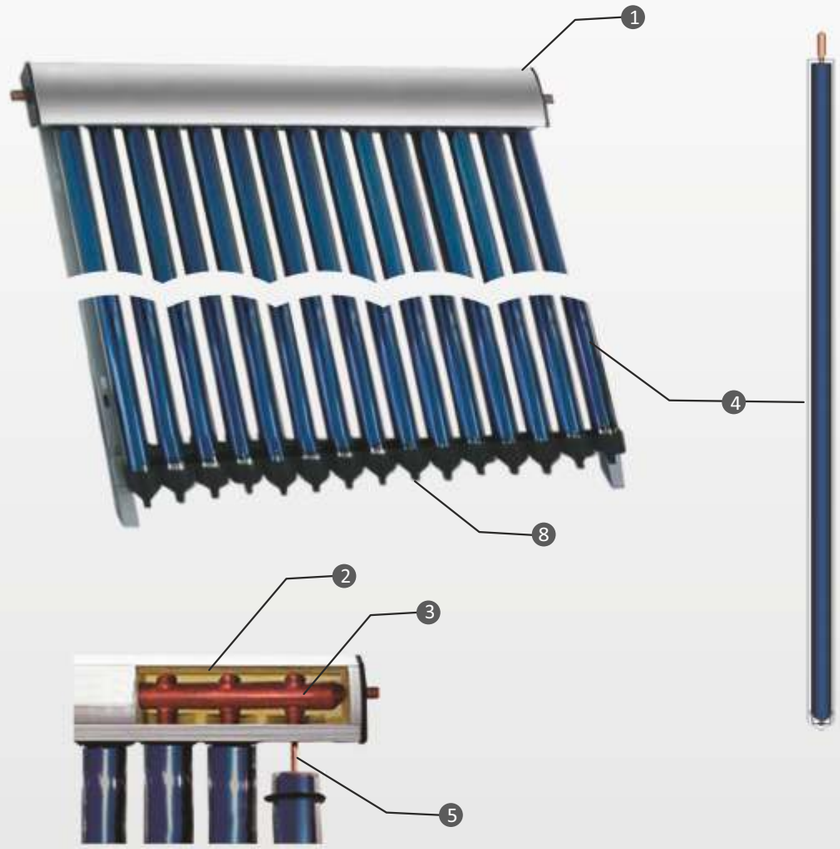
Product features:

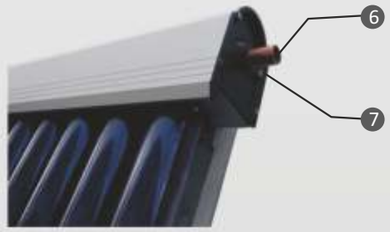
- Weatherproof and lightweight construction which comes in different modifications for mounting on flat roof, inclined roof, and façade.
- Tubes of borosilicate glass coated with state-of-the-art selective coating.
- Selective coating for efficient sunlight absorption.
- High-efficiency insulation of manifold
- Heat transfer plates resistant to high temperatures of stagnation.
- Copper heat-carrier tubes type Heat Pipe TU 1. The pipe system is manufactured with a minimum number of welds for perfect air-tightness and reduced deposits accumulation possibility.
- The inlet and outlet pipes may be fitted on the left or the right of the manifold. Depending on the location of the inlet pipe the sensor is also placed on the right or the left.
- Resistance to wind, hail, snow and dust.
- Certificates and tests:
  - Thermal shock test
  - Hailstone test according
  - DIN EN 12975: 2006-06 Solar Keymark

Available in modifications:

m^2	2,36	3,11	4,55
VTC tubes	15	20	30

SUNSYSTEM®





1. Manifold unit
2. High efficiency insulation
3. Collector pipe
4. Evacuated tube with selective coating
5. Heat pipe TU 1 type heat carrier pipes
6. Inlet/outlet
7. Sensor sleeve
8. Evacuated tube holder

Evacuated tube collectors VTC

technical specifications

Heat Pipe technology

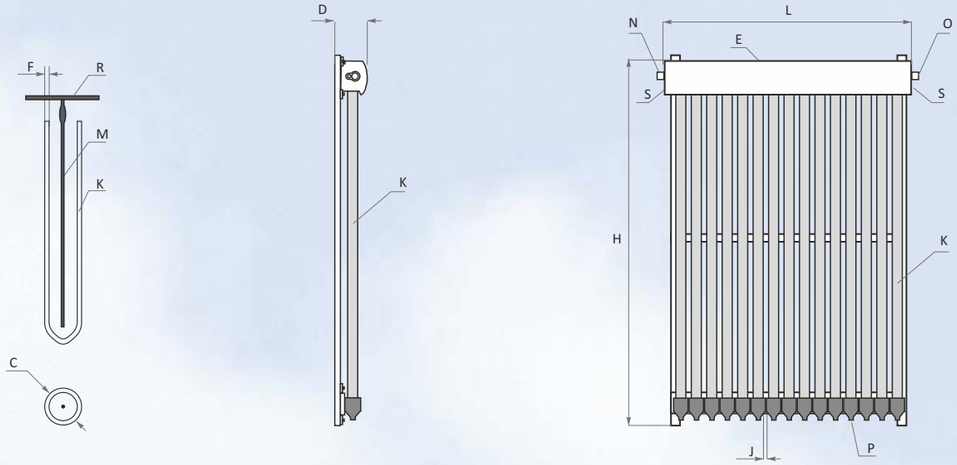
The Heat Pipe itself is a compound of two concentric glass tubes with evacuated space between them. The inner tube surface is covered with selective coating allowing maximum absorption of sunlight and high performance efficiency. Through the center of the heat pipe runs a hollow copper tube, inside which begins the process of evaporation of non-toxic fluid that transfers the heat to the tube top and then releases it to the collector pipe to heat up the heat-carrier inside. Then the process repeats over and over again.

SUNSYSTEM®

		SUNSYSTEM VTC 15	SUNSYSTEM VTC 20	SUNSYSTEM VTC 30
Overall surface	m^2	2,36	3,41	4,55
Aperture surface	m^2	1.412	1.882	2.824
Absorber surface	m^2	1.215	1.62	2.429
Height H	mm	1980	1640	1980
Width L / Thickness D	mm	1190/125	1570/125	2300/125
Heat carrier fluid		PG 50% (freezing point -34°C)	PG 50% (freezing point -34°C)	PG 50% (freezing point -34°C)
Volume of heat carrier	l	0,94	1,24	1,82
Flow rate of heat carrier	l/m^2h	60 ÷80	60 ÷80	60 ÷80
Material of evacuated tubes		Heat-tempered borosilicate glass SU-SS-ALN/AIN	Heat-tempered borosilicate glass SU-SS-ALN/AIN	Heat-tempered borosilicate glass SU-SS-ALN/AIN
Material/type of frame		Galvanized / Adjustable	Galvanized / Adjustable	Galvanized / Adjustable
Material of plastic parts		UV resistant plastic (RAL 9005)	UV resistant plastic (RAL 9005)	UV resistant plastic (RAL 9005)
Type/material of heat carrier pipes		Heat pipe TU 1 / Copper	Heat pipe TU 1 / Copper	Heat pipe TU 1 / Copper
Coating of absorber		Selective coating	Selective coating	Selective coating
Manifold unit - box material/insulation		Anodized aluminum / Polyurethane foam 30 mm	Anodized aluminum / Polyurethane foam 30 mm	Anodized aluminum / Polyurethane foam 30 mm
Efficiency η_o in relation to aperture	%	66	66	66
Thermal loss coefficient a_1	W/m^2K	1.500	1.500	1.500
Thermal loss coefficient a_2	W/m^2K^2	0,020	0,020	0,020
$K\theta,trans$ /$K\theta,trans$ (50°) coefficients in relation to aperture		0.92/1.43	0.92/1.43	0.92/1.43
Max. operating temperature/Stagnation temperature	°C	180/221	180/221	180/221
Test pressure / Max. operating pressure	bar	25/12	25/12	25/12
Pressure drop Δp	Pa	150	200	600
Weight	kg	43	57	86

Evacuated tube collectors VTC

technical specifications



			SUNSYSTEM VTC 15	SUNSYSTEM VTC 20	SUNSYSTEM VTC 30
Height of manifold unit		E, mm	140	140	140
Evacuated tube dimensions	diameter	C ø, mm	58	58	58
	wall thickness	F, mm	1,6	1,6	1,6
	length	G, mm	1800	1800	1800
Number of evacuated tubes		K, pcs.	15	20	30
Distance between evacuated tubes		J, mm	75	75	75
Diameter/number of heat carrier pipes		M, ø, mm/pcs.	14/15	14/20	14/30
Type / Diameter of collecting pipe		R, ø, mm	Copper / 22	Copper / 22	Copper / 22
Heat carrier inlet		N	ø 22	ø 22	ø 22
Heat carrier outlet		O	ø 22	ø 22	ø 22
Sensor sleeve		S	ø 8	ø 8	ø 8
Evacuated tube holder		P	15	20	30
Number of sleeves		pcs.	2	2	2
Maximum number of collectors in one array/ installed surface		pcs./m^2	8/20.14	7/22.85	6/28.2

Polycrystalline coating

Solar cells convert sunlight directly into electricity. This process of converting light (photons) to electricity (voltage) is called the photovoltaic (PV) effect. Solar cells are typically combined into modules and a number of these modules can be mounted in PV arrays. Polycrystalline (or multi-crystalline) cell based solar modules are now the most popular choice in residential installs. Recent improvements in polycrystalline module technology have resulted in the development in terms of size, efficiency and heat tolerance.

High grade materials

Copper is irreplaceable when it comes to heat transfer. The liquid tight harp of copper tubing ensures high efficiency and reliability.
Solar-grade heat tempered glass is distinguished by decreased iron content providing for better transparency to the sun rays.
The collector case is made of robust **aluminum frame.** This way the collector body has the necessary constructive strength to withstand the year-round whims of weather not sacrificing on light-weight

Two in one

PV cells need solar energy to generate electricity at their maximum capacity, however, they demand low ambient temperature to operate efficiently. As there are seldom such conditions in nature, regular PV modules can hardly be found to operate at their maximum capacity: High solar activity is normally available in the warm seasons when the surface of the regular PV modules heats up in result of being exposed to direct sunlight. Only 15-20% of the radiation that falls upon the surface of the module is utilized to produce electricity, and the remaining energy is wasted as emitted heat. The SUNSYSTEM PVT works around this issue as its cells are constantly cooled own by the thermal absorber passing behind the cell layer. The excess heat from the cells is utilized for production of domestic hot water.

Versatile mounting options

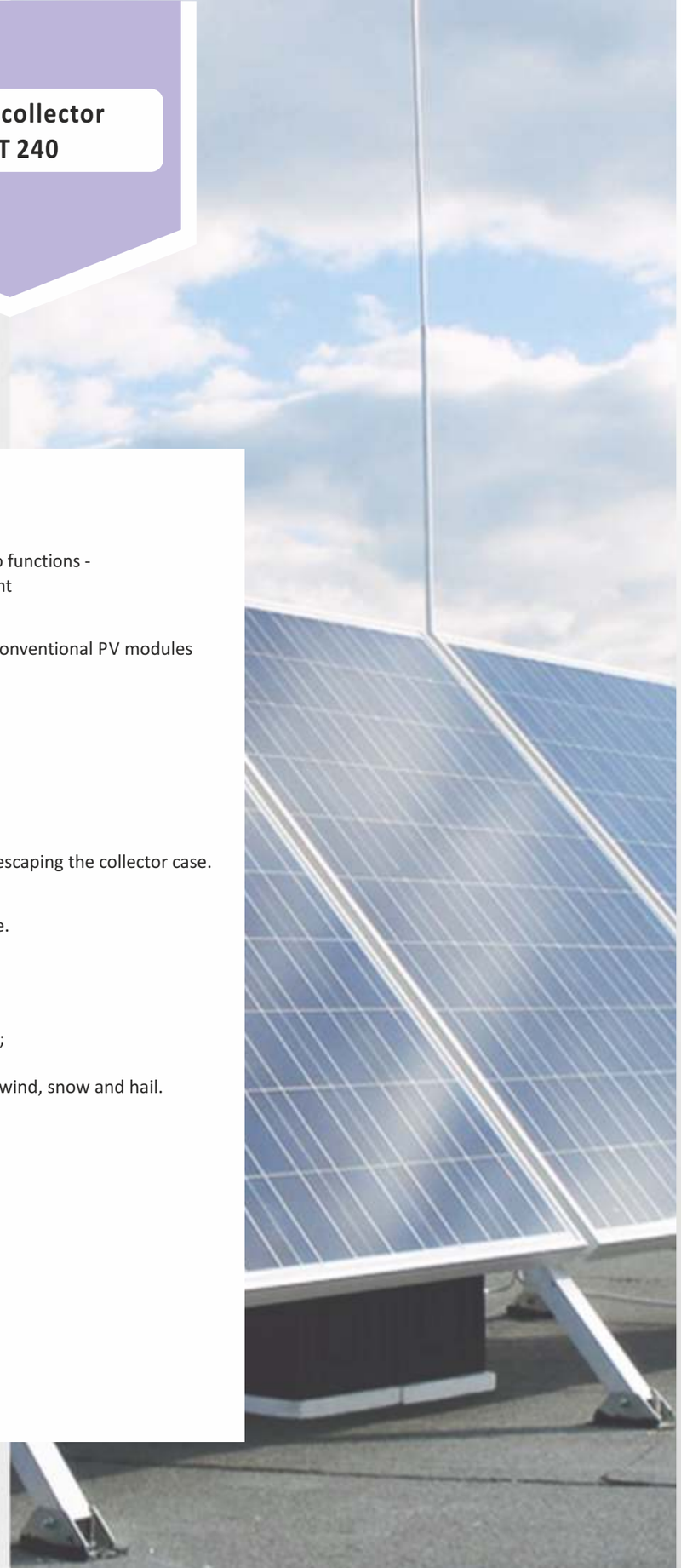
Options for installation on flat or inclined roof.

SUNSYSTEM®

Hybrid collector SUNSYSTEM PVT 240

The hybrid solar collector SUNSYSTEM PVT is a combination of a photovoltaic module and a solar thermal collector. This compact device converts solar radiation to electricity and heat simultaneously. High energy yield, small footprint and reduced installation costs are just some of the benefits.

Hybrid collector PVT 240



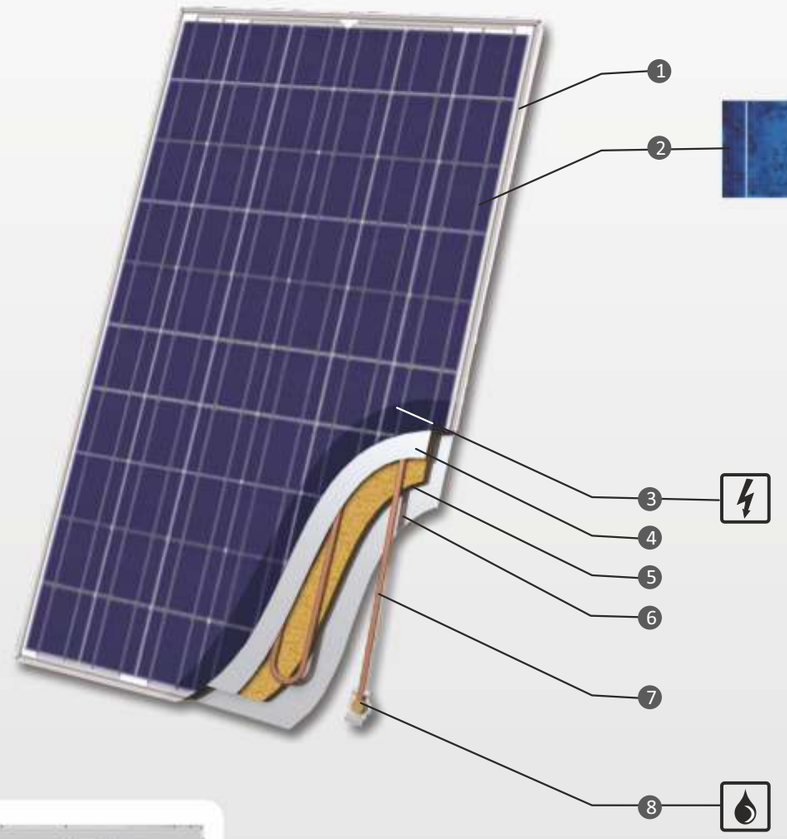
Product features:

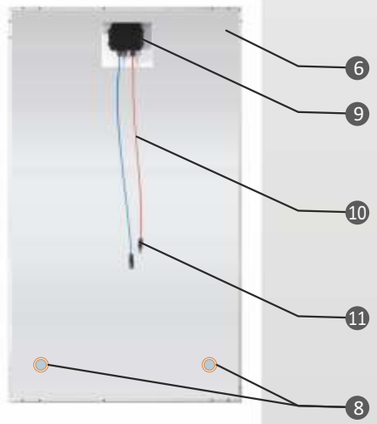
- Compact design. One device does two functions - reduced installation costs and footprint
- Higher energy yield as compared to conventional PV modules
- Powers a hot water system
- Weatherproof aluminum frame. Installable in multiple positions.
- Rigid-PU insulation keeps heat from escaping the collector case.
- Pipe system with low flow resistance. Tested for liquid tightness.
- Protective solar glass
  - Low ferrous content (FeO ≤0.02 %);
  - Heat-tempered;
  - Weatherproof – withstands severe wind, snow and hail.
- UV-proof silicone seal.

Available in modifications:

m^2	1,62
Pmax, Wp	240

SUNSYSTEM®





1. Aluminum casing
2. Polycrystalline PV module
3. Protective solar glass
4. Aluminum separator
5. High efficiency insulation
6. Collector back
7. Absorber pipe system
8. Heat carrier inlet/outlet
9. Solar junction box
10. Solar UV protected calbes
11. Solar connectors

Hybrid collector PVT 240

technical specifications

			SUNSYSTEM PVT 240
Overall dimensions	Height H	mm	1650
	Width L/ Thickness D	mm	990 / 40
	Weight	kg	28
	Frame		Aluminium
	Front side		Tempered solar glass 3,2 mm
	Back side		Aluminum panel

			SUNSYSTEM PVT 240
Photovoltaic module	Type of PV module cells	F	policristalline
	Number of cells for 1 PV module /Size of cell	pcs. /mm	60(6x10) /156x156
	Maximum power Pmax	Wp	240
	Cable lenght	K, mm	900
	Type of connector	M, N	MC 4
	Solar junction box	J	✓
	Electricity yield tolerance	%	+ 3 - 0
	Voltage at max power Vmp	V	30,6
	Current at max power Imp	A	7,84
	Open circuit voltage Voc	V	37,2
	Short circuit current Isc	A	8,52 A
	Cell/Module efficiency	%	16,4 /14,7
	NOCT	˚C	48 ± 2
	Temperature coefficient of Pmax		- 0,45 % / ˚C
	Temperature coefficient of Vmp		- 0,35 % / ˚C
	Temperature coefficient of Imp		+ 0,05 % / ˚C
	Temperature coefficient of Voc		- (0,3 ± 0,05) % / ˚C
	Temperature coefficient of Isc		+ 0,065 % / ˚C
	Max. system voltage	V DC	1000
	Temperature range	˚C	-40 ÷ +85
	Max. physical load	Pa	2400
	Nominal thermal capacity	W	900

* STC (Standard test conditions):
Irradiation 1000 W/m2, ambient temperature 25°C, Spectre AM 1.5

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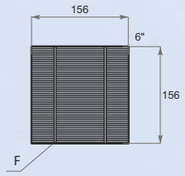
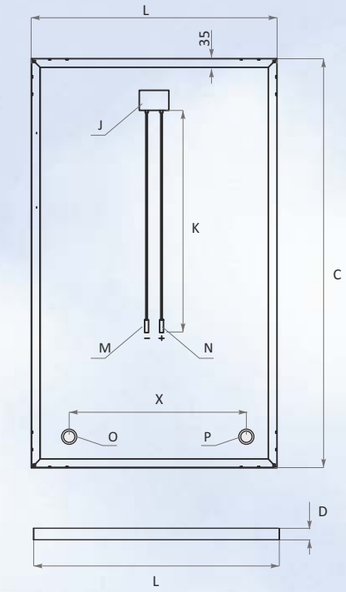
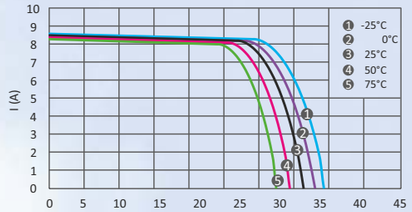
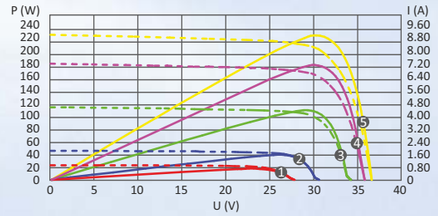




I-V characteristic of module temperature dependence



I-V and P-V characteristics with dependence on irradiance



1 100 W/m² 2 200 W/m² 3 500 W/m² 4 800 W/m² 5 1000 W/m²

			SUNSYSTEM PVT 240
Thermal absorber	Overall surface	m^2	1,62
	Heat carrier fluid		PG 50% (freezing point -34°C)
	Volume of heat carrier	l	1,17
	Flow rate of heat carrier	l/min	1,5 ÷ 2,5
	Efficiency η_o in relation to aperture	%	0,559
	Thermal loss coefficient K_1	W/m^2K	9,13
	Thermal loss coefficient K_2	W/m^2K^2	0,00
	Insulation	mm	20 / rigid PU
	Material of separator		Aluminium
	Material of absorber pipe system		Copper
	Heat carrier inlet/outlet	O, P	2 x G ½"
	Distance between heat carrier inlet/outlet	X, mm	840

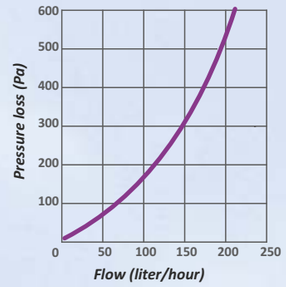
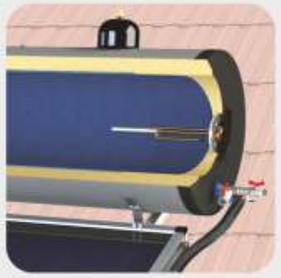


Diagram
Pressure drop in PVT hybrid collector



Flat-plate collector SUNSYSTEM PK

- Absorber: choice of two levels of efficiency – Standard and Select.
- Heat tempered solar glass Durasolar® P+ with prismatic surface pattern and low ferrous content (FeO ≤ 0.02 %) protects the absorber from the outer environment while letting the solar energy in.

Thermosyphon water heater SUNSYSTEM TSB

Like every SUNSYSTEM water heater, the TSB conforms to the strictest quality norms, its water tank is protected from corrosion by means of state of-the-art titanium enamel. Another protective device ensuring corrosion-free exploitation of the tank is the built-in magnesium anode protector.
The domestic hot water in the TSB keeps warm thanks to the rigid PU insulation of 50 mm thickness. Optional energy backup available – an electric heating element with thermostatic control acting as reserve heat source on occasions of cloudy weather or increased night water consumption.

Solar support system of hot galvanized steel

Solar support system of hot galvanized steel in modifications for flat and inclined roof. Designed to withstand the severe whims of weather. Simple and lightweight, a single mounting construction bears the entire thermosyphon system.

Entire out-of-the-building mounting concept

The whole system is installed outside the useful area of the building – on its roof.

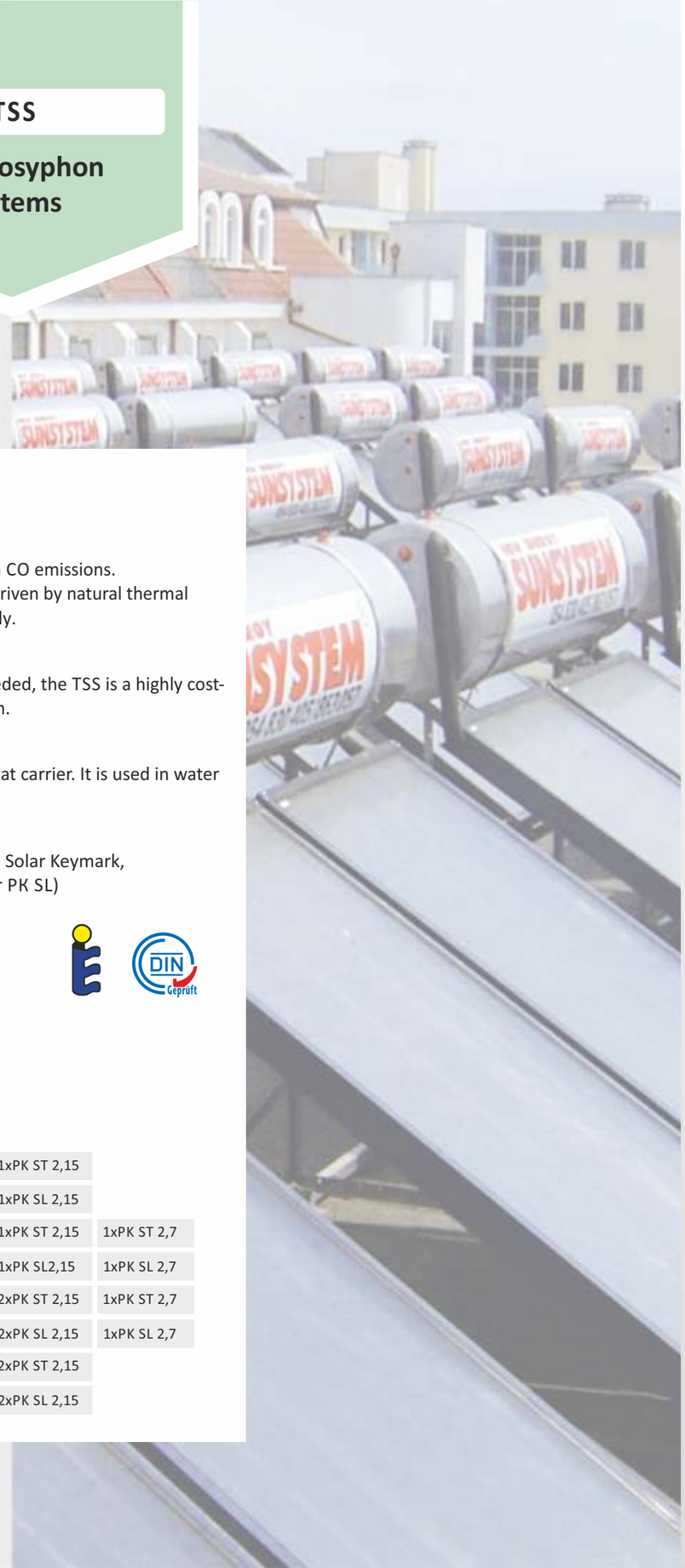
SUNSYSTEM®

Thermosyphon systems TSS

A thermosyphon system is a cost-effective way to heat water with solar energy. It makes use of the natural thermal convection of liquids to transfer the heat from the solar collectors to the water tank. The system is comprised of flat plate collector connected to a water tank with a cylinder-type heat exchanger. The circulation of the heat carrier liquid is driven by natural thermal convection. The heat carrier inside the absorber of the collector heats up by the solar energy and moves up along the piping to reach the water tank, positioned above the collector. There it passes through the heat exchanger and gives away its heat to the water inside the tank. As it cools down, the heat carrier then is returned to the collector to repeat the process.

TSS

thermosyphon systems



Product features:

- Energy-autonomous system free from CO emissions.
  The circulation of the heat-carrier is driven by natural thermal convection and needs no power supply.
- Since no circulation equipment is needed, the TSS is a highly cost-effective and energy-efficient solution.
- The set includes Propylene Glycol, heat carrier. It is used in water dilution of 1:1.
- Certificate EN 12976:2006-04; CEN - Solar Keymark, (only models with flat-plate collector PK SL)

Available in modifications:

TSS 100	TSB 100	1xPK ST 2,15		
		1xPK SL 2,15		
TSS 150	TSB 150	1xPK ST 2,15	1xPK ST 2,7	
		1xPK SL2,15	1xPK SL 2,7	
TSS 200	TSB 200	2xPK ST 2,15	1xPK ST 2,7	
		2xPK SL 2,15	1xPK SL 2,7	
TSS 300	TSB 300	2xPK ST 2,15		
		2xPK SL 2,15		

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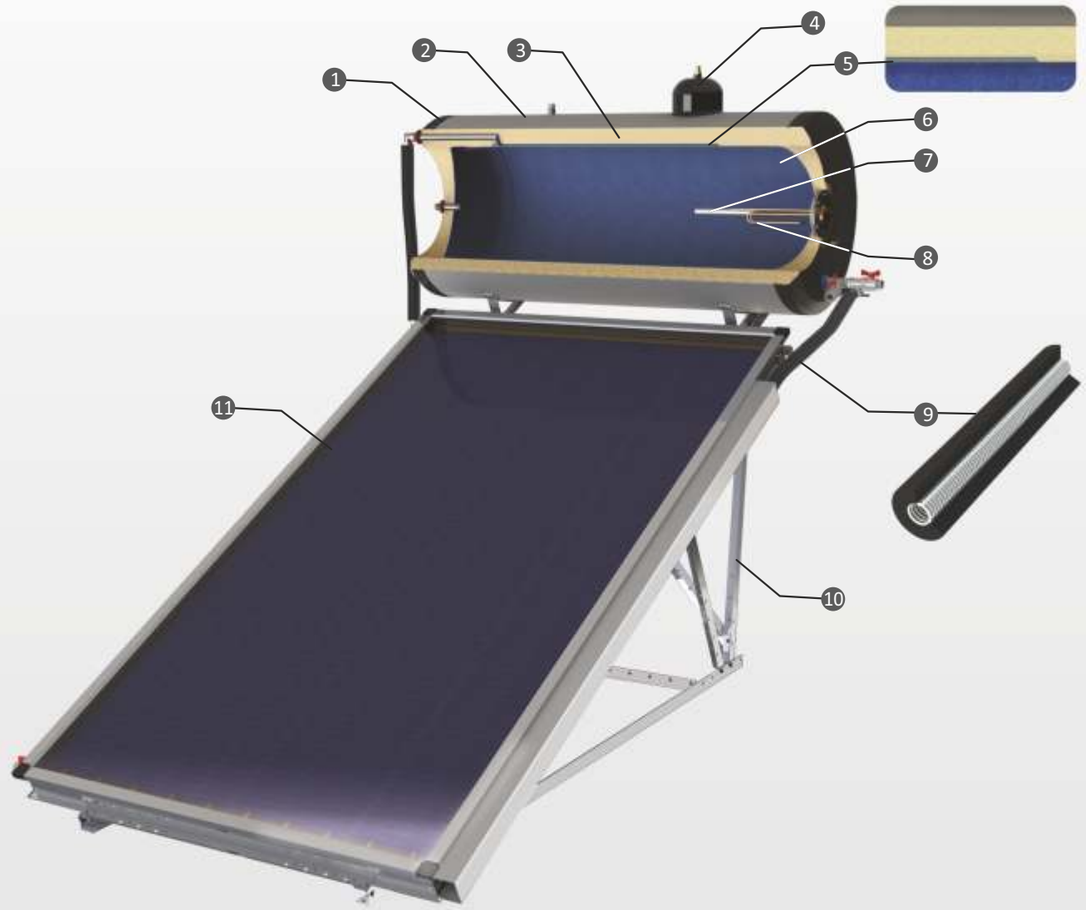
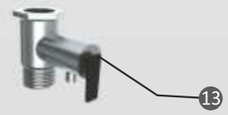




1. Water heater TSB
2. Aesthetic casing
3. High efficiency insulation
4. Expansion vessel
5. Mantle
6. Water tank made of low-carbon steel coated with titanium enamel (DIN 4753-3)
7. Anode protector (DIN 4753-6)
8. Electric heating element
9. Corrugated stainless steel pipe
10. Roof-top support system TSS
11. Flat-plate solar collector PK Select
12. Heat carrier fluid
13. Safety valve, 8 bar
14. Safety valve, 1,5 bar

TSS

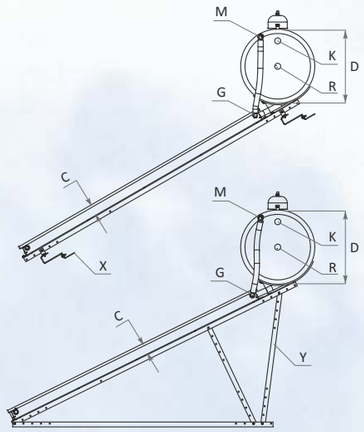
technical specifications

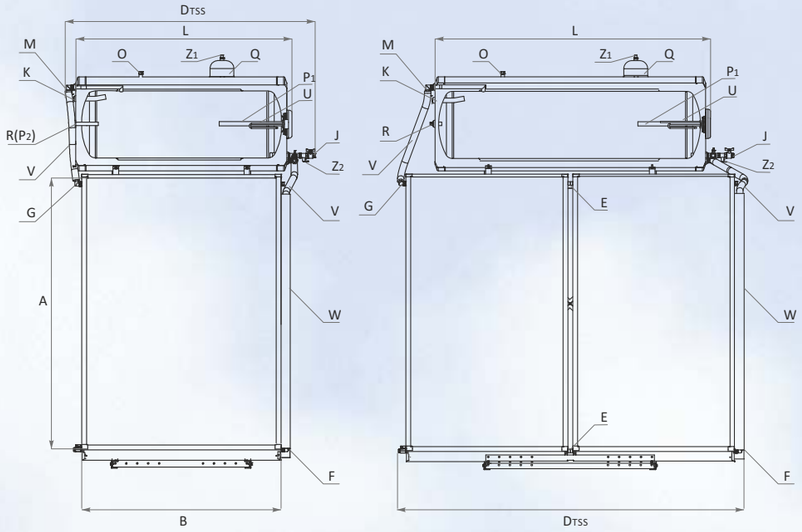
SUNSYSTEM®

		TSS 100 1xPK 2,15	TSS 150 1xPK 2,15	1xPK 2,7	TSS 200 2xPK 2,15	1xPK 2,7	TSS 300 2xPK 2,15
Overall dimensions: inclined roof mounting- height H /width D /length L flat roof mounting- height H /width D /length L	mm mm	1900/1300/2300 870/1300/2740	1900/1550/2300 870/1550/2740	1900/1550/2300 870/1550/2740	1950/2330/2300 920/2330/2740	1950/1630/2300 920/1630/2740	1950/2060/2300 920/2060/2740
Flat-plate solar collector: Flat-plate solar collector	type	PK Standard or PK Select	PK Standard or PK Select		PK Standard or PK Select		PK Standard or PK Select
Flat-plate solar collector: Number of collectors	pcs/size	1 x PK 2,15	1 x PK 2,15	1 x PK 2,7	2 x PK 2,15	1 x PK 2,7	2 x PK 2,15
Flat-plate solar collector: Overall surface	m^2	2,14	2,14	2,61	4,28	2,61	4,28
Flat-plate solar collector: Absorber / Aperture surface	m^2	1,865/1,897	1,865/1,897	2,23/2,34	3,73/3,79	2,23/2,34	3,73/3,79
Flat-plate solar collector: Flow rate of heat carrier	Liter/m^2h	50	50	50	50	50	50
Flat-plate solar collector: Collector case		Aluminum (RAL 9006)	Aluminum (RAL 9006)		Aluminum (RAL 9006)		Aluminum (RAL 9006)
Flat-plate solar collector: Stagnation temperature	°C	200	200	200	200	200	200
Flat-plate solar collector: Test pressure / Operating pressure of collector	bar	25/6	25/6	25/6	25/6	25/6	25/6
Water heater TSB: Capacity of tank	Liter	100	150	150	200	200	150
Water heater TSB: Tank material	type	Low-carbon steel coated with titanium enamel	Low-carbon steel coated with titanium enamel		Low-carbon steel coated with titanium enamel		Low-carbon steel coated with titanium enamel
Water heater TSB: Casing material	type	Stainless steel or Galvanized steel with polymer coating	Stainless steel or Galvanized steel with polymer coating		Stainless steel or Galvanized steel with polymer coating		Stainless steel or Galvanized steel with polymer coating
Water heater TSB: Insulation	type	50 mm rigid PU	50 mm rigid PU		50 mm rigid PU		50 mm rigid PU
Water heater TSB: Operating pressure/ Max. temperature of tank	bar/°C	8/95	8/95	8/95	8/95	8/95	8/95
Water heater TSB: Test pressure of tank	bar	13	13	13	13	13	13
Water heater TSB: Mantle capacity	Liter	5,1	6,9	6,9	8,1	8,1	11,2
Water heater TSB: Operating pressure/ Max. temperature of mantle	bar/°C	1,5/95	1,5/95	1,5/95	1,5/95	1,5/95	1,5/95
Water heater TSB: Test pressure of mantle	bar	3	3	3	3	3	3
Heat carrier capacity	Liter	17	17	17	30	25	30
Heat carrier		PG 50% (freezing point -34°C)	PG 50% (freezing point -34°C)		PG 50% (freezing point -34°C)		PG 50% (freezing point -34°C)
Roof-top support system TSS		Galvanized steel	Galvanized steel		Galvanized steel		Galvanized steel
Overall weight excl. water load, inclined/flat roof mounting	kg	115/125	125/140	130/145	175/190	145/155	220/235

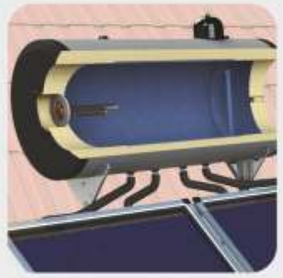
TSS

technical specifications





			TSS 100 1xPK 2,15	TSS 150 1xPK 2,15	TSS 150 1xPK 2,7	TSS 200 2xPK 2,15	TSS 200 1xPK 2,7	TSS 300 2xPK 2,15
Flat-plate collector	Collector case dimensions height	A, mm	2125	2125	2125	2125	2125	2125
	Collector case dimensions width	B, mm	1020	1020	1248	1020	1248	1020
	Collector case dimensions thickness	C, mm	90	90	90	90	90	90
	Collector connection	E	hollaender fitting 1/2"	hollaender fitting 1/2"		hollaender fitting 1/2"		hollaender fitting 1/2"
	Heat carrier inlet of collector	F	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Heat carrier outlet of collector	G	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
Water heater TSB	Water heater dimensions length	L, mm	1000	1250	1250	1340	1340	1750
	Water heater dimensions diameter	D, ø mm	520	520	520	580	580	580
	Cold water inlet	J	R ½"	R ½"	R ½"	R ¾"	R ¾"	R ¾"
	Hot water outlet	K	R ½"	R ½"	R ½"	R ¾"	R ¾"	R ¾"
	Heat carrier inlet of mantle	M	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Heat carrier outlet of mantle	N	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Air vent sleeve	O	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Expansion vessel	Q	R ½" , 2L	R ½" , 2Liter	R ½" , 2Liter	R ½" , 2Liter	R ½" , 2Liter	R ½" , 2 Liter
	Anode protectors	P_1/P_2	✓/✓	✓/✓	✓/✓	✓/ -	✓/ -	✓/ -
	Recirculation	R				R ½"	R ½"	R ½"
	Electric heater	U, kW/V	2/~220	2/~220	2/~220	3/~220	3/~220	3/~220
	Stainless corrugated pipe diameter/ insulation	V, ø/mm	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13
	Decorative corrugated pipe holder	W, mm	2080	2080	2080	2080	2080	2080
	Safety valve	Z_1/Z_2	½" / ½"	½" / ½"	½" / ½"	½" / ¾"	½" / ¾"	½" / ¾"
	Roof-top support system TSS, inclined roof mounting	X	✓	✓	✓	✓	✓	✓
	Roof-top support system TSS, flat roof mounting	Y	✓	✓	✓	✓	✓	✓



Flat plate collector SUNSYSTEM PK -TO

- Absorber: choice of two levels of efficiency – Standard and Select.
- Heat tempered solar glass Durasolar® P+ with prismatic surface pattern and low ferrous content (FeO ≤ 0.02 %) protects the absorber from the outer environment while letting the solar energy in.
- All connections are placed between the collector and tank and do not protrude outside the boundaries of the unit.

Thermosyphon water heater SUNSYSTEM TSBM

Like every SUNSYSTEM water heater, the TSBM conforms to the strictest quality norms, its water tank is protected from corrosion by means of state of-the-art titanium enamel. Another protective device ensuring corrosion free exploitation of the tank is the built-in magnesium anode protector. The domestic hot water in the TSBM keeps warm thanks to the rigid PU insulation of 50 mm thickness. Optional energy backup available – an electric heating element with thermostatic control acting as reserve heat source on occasions of cloudy weather or increased night water consumption. All connections are placed between the tank and collector and do not protrude outside the boundaries of the unit.

Solar support system of hot galvanized steel

Solar support system of hot galvanized steel in modifications for flat an inclined roof. Designed to withstand the severe whims of weather. Simple and lightweight, a single mounting construction bears the entire thermosyphon system.

Entire out-of-the-building mounting concept

The whole system is installed outside the useful area of the building – on its roof. Compact design with no protruding piping from the sides of the system saves space at the mounting place.

SUNSYSTEM®

Thermosyphon systems TSSM

A thermosyphon system is a cost-effective way to heat water with solar energy. It makes use of the natural thermal convection of liquids to transfer the heat from the solar collectors to the water tank. The system is comprised of flat plate collector connected to a water tank with a cylinder-type heat exchanger. The circulation of the heat carrier liquid is driven by natural thermal convection. The heat carrier inside the absorber of the collector heats up by the solar energy and moves up along the piping to reach the water tank, positioned above the collector. There it passes through the heat exchanger and gives away its heat to the water inside the tank. As it cools down, the heat carrier then is returned to the collector to repeat the process. Thanks to optimized placing of the connections - in the space between the water tank and the collector - TSSM boasts a smaller footprint at the mounting site.

TSSM

thermosyphon systems

Product features:

- Energy-autonomous system free from CO emissions. The circulation of the heat-carrier is driven by natural thermal convection and needs no power supply.
- Since no circulation equipment is needed, the TSSM is a highly cost-effective and energy-efficient solution.
- All connections are placed between the tank and collector and do not protrude outside the boundaries of the unit.
- The set includes Propylene Glycol, heat carrier. It is used in water dilution of 1:1.
- Certificate EN 12976:2006-04; CEN - Solar Keymark, (only models with flat-plate collector PK SL)

Available in modifications:

TSSM 120	TSBM 120	1xPK ST 2,15TO		
		1xPK SL 2,15TO		
TSSM 150	TSBM 150	1xPK ST 2,15TO	1xPK ST 2,7TO	
		1xPK SL 2,15TO	1xPK SL 2,7TO	
TSSM 200	TSBM 200	1xPK ST 2,15TO	1xPK ST 2,7TO	
		1xPK SL 2,15TO	1xPK SL 2,7TO	
TSSM 300	TSBM 300	2xPK ST 2,15TO		
		2xPK SL2,15TO		

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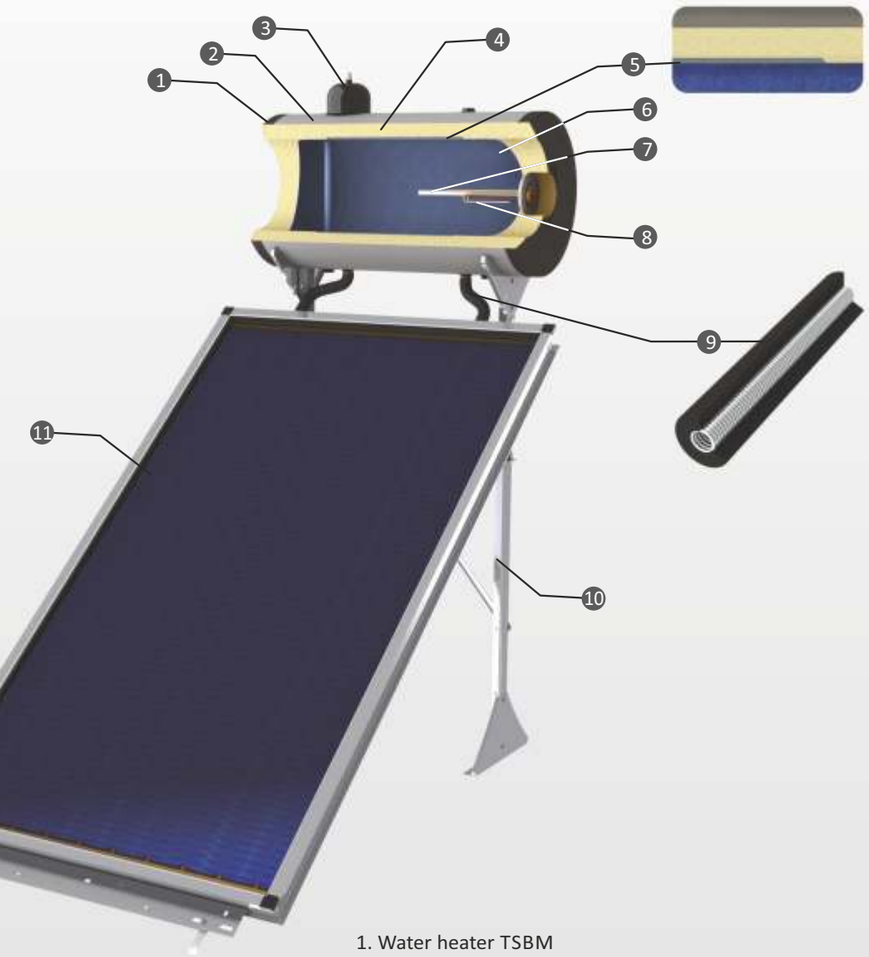


1. Water heater TSBM
2. Aesthetic casing
3. High efficiency insulation
4. Expansion vessel
5. Mantle
6. Water tank made of low-carbon steel coated with titanium enamel (DIN 4753-3)
7. Anode protector (DIN 4753-6)
8. Electric heating element
9. Corrugated stainless steel pipe
10. Roof-top support system TSSM, flat roof mounting
11. Flat-plate solar collector PK Select
12. Heat carrier fluid
13. Safety valve, 1,5 bar

TSSM

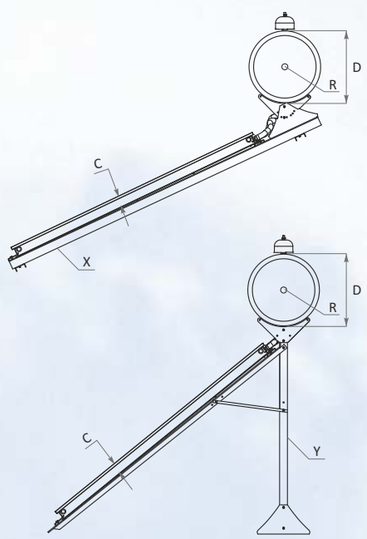
technical specifications

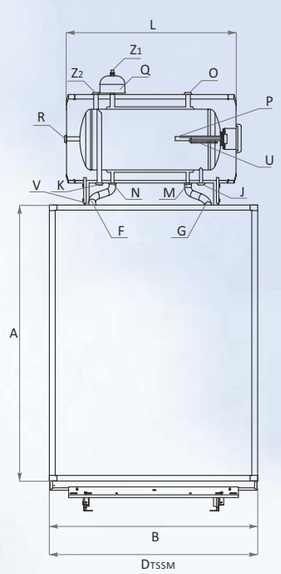
SUNSYSTEM®

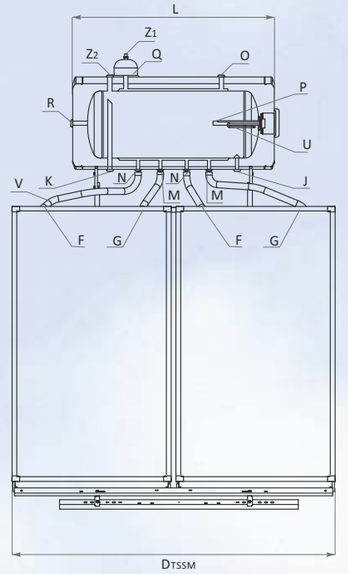
			TSSM 120 1xPK 2,15 TO	TSSM 150 1xPK 2,15 TO	TSSM 150 1xPK 2,7 TO	TSSM 200 1xPK 2,15 TO	TSSM 200 1xPK 2,7 TO	TSSM 300 2xPK 2,15 TO
	Overall dimensions: inclined roof mounting- height H /width D /length L flat roof mounting- height H /width D /length L	 mm mm	 900/1020/2920 2310/1020/2080	 900/1250/2920 2310/1250/2080	 900/1250/2920 2310/1250/2080	 950/1350/2920 2360/1350/2080	 950/1350/2920 2360/1350/2080	 950/1750/2920 2360/1750/2080
Flat-plate solar collector	Flat-plate solar collector	type	PK Standard TO or PK Select TO	PK Standard TO or PK Select TO		PK Standard TO or PK Select TO		PK Standard TO or PK Select TO
	Number of collectors	pcs./size	1 x PK 2,15 TO	1 x PK 2,15 TO	1 x PK 2,7 TO	1 x PK 2,15 TO	1 x PK 2,7 TO	2 x PK 2,15 TO
	Overall surface	m^2	2,14	2,14	2,61	2,14	2,61	4,28
	Absorber / Aperture surface	m^2	1,865/1,897	1,865/1,897	2,23/2,34	1,865/1,897	2,23/2,34	1,865/1,897
	Flow rate of heat carrier	l/m^2h	50	50	50	50	50	50
	Collector case		Aluminum (RAL 9006)	Aluminum (RAL 9006)		Aluminum (RAL 9006)		Aluminum (RAL 9006)
	Stagnation temperature	°C	200	200	200	200	200	200
	Test pressure / Operating pressure of collector	bar	25/6	25/6	25/6	25/6	25/6	25/6
Water heater TSBM	Capacity of tank	Liter	120	150	150	200	200	150
	Tank material	type	Low-carbon steel coated with titanium enamel	Low-carbon steel coated with titanium enamel		Low-carbon steel coated with titanium enamel		Low-carbon steel coated with titanium enamel
	Casing material	type	Stainless steel or Galvanized steel with polymer coating	Stainless steel or Galvanized steel with polymer coating		Stainless steel or Galvanized steel with polymer coating		Stainless steel or Galvanized steel with polymer coating
	Insulation	type	50 mm rigid PU	50 mm rigid PU		50 mm rigid PU		50 mm rigid PU
	Operating pressure/ Max. temperature of tank	bar/°C	8/95	8/95	8/95	8/95	8/95	8/95
	Test pressure of tank	bar	13	13	13	13	13	13
	Mantle capacity	Liter	4,5	6,1	6,1	7	7	12,5
	Operating pressure/ Max. temperature of mantle	bar/°C	1,5/95	1,5/95	1,5/95	1,5/95	1,5/95	1,5/95
	Test pressure of mantle	bar	3	3	3	3	3	3
	Heat carrier capacity	Liter	17	17	17	30	25	30
	Heat carrier		PG 50% (freezing point -34°C)	PG 50% (freezing point -34°C)		PG 50% (freezing point -34°C)		PG 50% (freezing point -34°C)
	Roof-top support system TSSM		Galvanized steel	Galvanized steel		Galvanized steel		Galvanized steel
	Overall weight excl. water load, inclined/flat roof mounting	kg	140/135	155/145	160/150	165/160	170/165	255/250

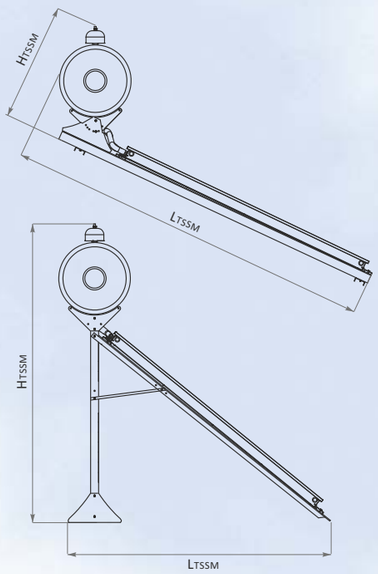
TSSM

technical specifications









			TSSM 120	TSSM 150		TSSM 200		TSSM 300
			1xPK 2,15 TO	1xPK 2,15 TO	1xPK 2,7 TO	1xPK 2,15 TO	1xPK 2,7 TO	2xPK 2,15 TO
Flat-plate collector	Collector case dimensions	A, mm B, mm C, mm	2125 1020 90	2125 1020 90	2125 1248 90	2125 1020 90	2125 1248 90	2125 1020 90
	Heat carrier inlet of collector	F	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Heat carrier outlet of collector	G	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
Water heater TSBM	Water heater dimensions length diameter	L, mm D, ø mm	1000 520	1250 520	1250 520	1340 580	1340 580	1750 580
	Cold water inlet	J	R ½"	R ½"	R ½"	R ¾"	R ¾"	R ¾"
	Hot water outlet	K	R ½"	R ½"	R ½"	R ¾"	R ¾"	R ¾"
	Heat carrier inlet of mantle	M	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Heat carrier outlet of mantle	N	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Air vent sleeve	O	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Expansion vessel	Q	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Anode protectors	P	✓	✓	✓	✓	✓	✓
	Recirculation	R	R ½"	R ½"	R ½"	R ½"	R ½"	R ½"
	Electric heater	U, kW/V	2/~220	2/~220	2/~220	3/~220	3/~220	3/~220
Stainless corrugated pipe	diameter/ insulation	V, ø /mm	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13	DN 12 /13
Safety valve		Z_1	½"	½"	½"	½"	½"	½"
Sleeve for temperature and pressure relief valve, 8 bar *		Z_2	¾"	¾"	¾"	¾"	¾"	¾"
Roof-top support system TSSM, inclined roof mounting		X	✓	✓	✓	✓	✓	✓
Roof-top support system TSSM, flat roof mounting		Y	✓	✓	✓	✓	✓	✓

*It is highly recommendable to have a temperature and pressure relief valve, 8 bar installed at the designated position.

The appropriate support systems for each SUNSYSTEM product

Support systems specially designed for the SUNSYSTEM range of solar appliances.

Robust and safe

We selected the right materials to design lightweight, still robust structures to resist the meteorological conditions throughout the whole useful life of the appliance.

Even weight distribution

The mounting construction serves not only to bear the appliance. The special design of SUNSYSTEM mounting constructions ensures that they also distribute the weight evenly to the roof underneath so as to protect it from damage even in the case of unfavorable meteorological conditions.

Diversity of supports

Each SUNSYSTEM solar appliance may be alternatively mounted on flat or inclined roof, and in the case of evacuated tube collectors - even on vertical walls.

SUNSYSTEM®

Solar support systems SUNSYSTEM

A cost-effective solution for any roof type and facade.
Specially designed support systems for:
- Flat-plate solar collectors SUNSYSTEM PK
- Evacuated tube collectors SUNSYSTEM VTC
- Hybrid collectors SUNSYSTEM PVT
- Thermosyphon systems SUNSYSTEM TSS
- Thermosyphon systems SUNSYSTEM TSSM

Solar support systems

for flat-plate solar collectors SUNSYSTEM PK

Product features:

- Strain-resistant construction.
- Made of Aluminum for ultimate corrosion resistance.
- Designed to resist severe meteorological conditions:
  - wind speed up to 150 km/h
  - snow load up to 1,25 kN/m^2 according to ENV 1991-1-3 1991-1-4
- Easy to insatall
- Versions for flat roof and inclined roof
- Capability for fine-tuning the inclination angle (for the model for flat roof mounting)
- Adjustable mounting plate (for the model for inclined roof mounting)

Available in modifications:

flat roof mounting	1 x PK 2,0 PK 2,15	2 x PK 2,0 PK 2,15	3 x PK 2,0 PK 2,15	4 x PK 2,0 PK 2,15	5 x PK 2,0 PK 2,15	6 x PK 2,0 PK 2,15	7 x PK 2,0 PK 2,15	8 x PK 2,0 PK 2,15	9 x PK 2,0 PK 2,15	10 x PK 2,0 PK 2,15
	1 x PK 2,5 PK 2,7	2 x PK 2,5 PK 2,7	3 x PK 2,5 PK 2,7	4 x PK 2,5 PK 2,7	5 x PK 2,5 PK 2,7	6 x PK 2,5 PK 2,7	7 x PK 2,5 PK 2,7	8 x PK 2,5 PK 2,7		
inclined roof mounting	1 x PK 2,0 PK 2,15	2 x PK 2,0 PK 2,15	3 x PK 2,0 PK 2,15	4 x PK 2,0 PK 2,15	5 x PK 2,0 PK 2,15	6 x PK 2,0 PK 2,15	7 x PK 2,0 PK 2,15	8 x PK 2,0 PK 2,15	9 x PK 2,0 PK 2,15	10 x PK 2,0 PK 2,15
	1 x PK 2,5 PK 2,7	2 x PK 2,5 PK 2,7	3 x PK 2,5 PK 2,7	4 x PK 2,5 PK 2,7	5 x PK 2,5 PK 2,7	6 x PK 2,5 PK 2,7	7 x PK 2,5 PK 2,7	8 x PK 2,5 PK 2,7		

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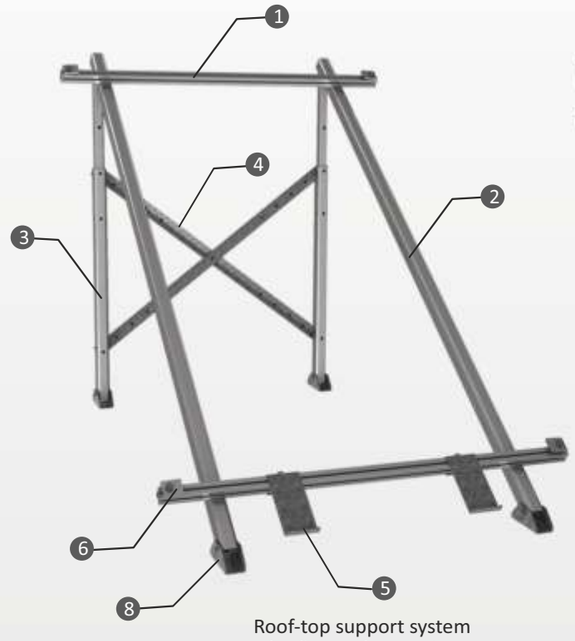
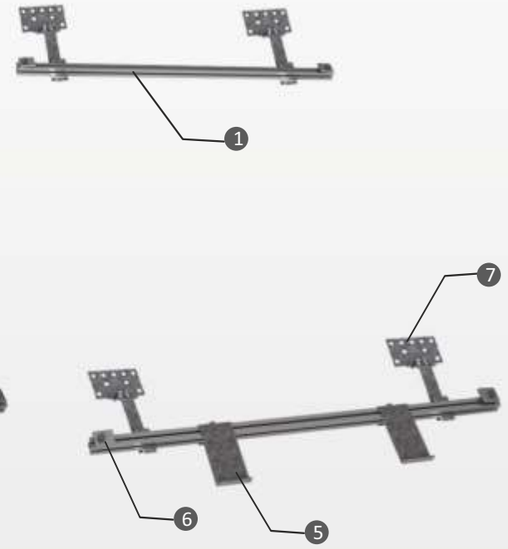
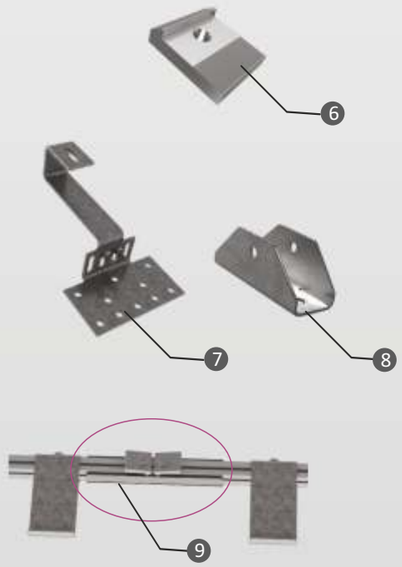


Roof-top support system for flat roof mounting



Roof-top support system for inclined roof mounting

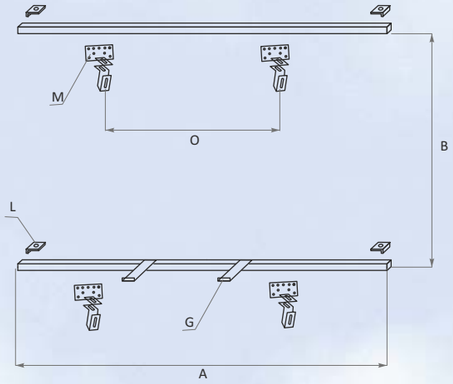


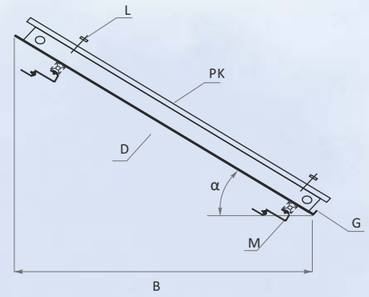
1. Tie-beam
2. Mainbeam
3. Telescopic leg
4. Crossbar
5. Collector holder
6. Retaining plate
7. Adjustable mounting plate
8. Foot
9. Extension rail

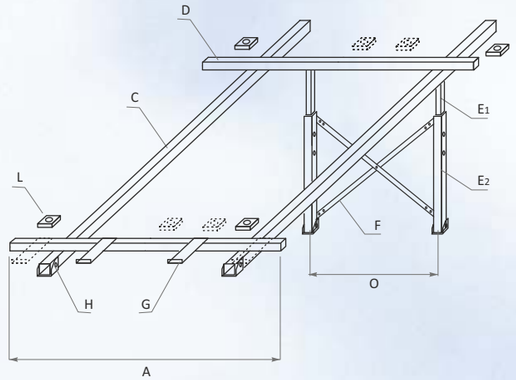
Solar support systems for flat-plate collectors

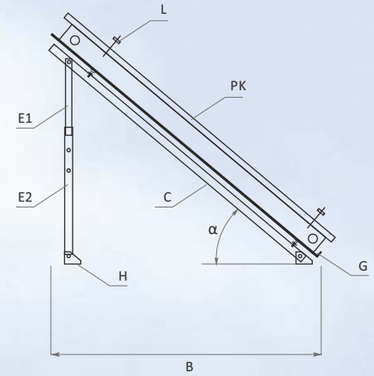
technical specifications

SUNSYSTEM®







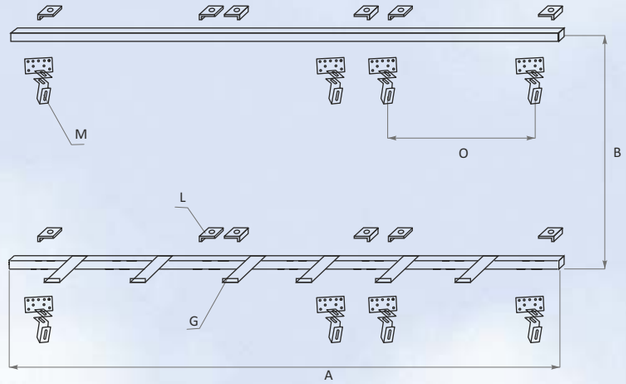


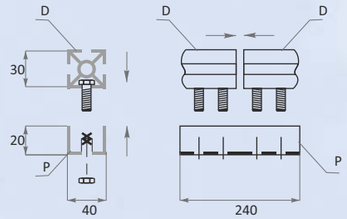
			Support system for flat-plate collector SUNSYSTEM PK 2,0/2,15		Support system for flat-plate collector SUNSYSTEM PK 2,5/2,7	
	Mounting type		inclined roof mounting	flat roof mounting	inclined roof mounting	flat roof mounting
	Number of collectors, mounted on the support	pcs.	1÷10	1÷10	1÷8	1÷8
	Collector positioning angle on the support	∺α °	30°÷45°	30°÷45°	30°÷45°	30°÷45°
	Support system material		Aluminum	Aluminum	Aluminum	Aluminum
Support system for 1x PK	Mounting dimensions of single collector support system	A, mm B, mm	1065 2200	1065 1630	1295 2200	1295 1630
	Mainbeam, 40x40x4	C, mm		2x1900		2x1900
	Tie-beam, 40x40x4	D, mm	2x1065	2x1065	2x1295	2x1295
	Telescopic leg Element 1, 40x40x4 Element 2, 30x30x3	E1, mm E2, mm		2x690 2x780		2x690 2x780
	Crossbar	F, mm		2x1020		2x1020
	Collector holder	G, pcs.	2	2	2	2
	Foot	H, pcs.		4		4
	Retaining plate	L, pcs.	4	4	4	4
	Adjustable mounting plate	M, pcs.	4		4	
	Distance between carrying elements	O, mm	710	680	863	842
	Weight	kg	4,1	14,6	4,5	15,0

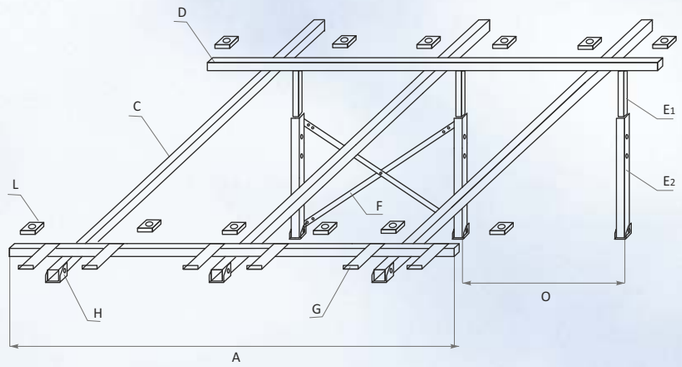
Solar support systems for flat-plate collectors

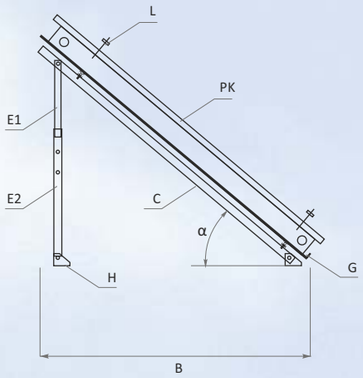
technical specifications

SUNSYSTEM®









			Support system for flat-plate collector SUNSYSTEM PK 2,0/2,15		Support system for flat-plate collector SUNSYSTEM PK 2,5/2,7	
	Mounting type		inclined roof mounting	flat roof mounting	inclined roof mounting	flat roof mounting
	Number of collectors, mounted on the support	pcs.	1÷10	1÷10	1÷8	1÷8
	Collector positioning angle on the support	∢α °	30°÷45°	30°÷45°	30°÷45°	30°÷45°
	Support system material		Aluminum	Aluminum	Aluminum	Aluminum
Support sys. for 2/3/4/5/6/7/8/9/10 x PK	Mainbeam, 40x40x4	C, mm		2/3/4/5/6/8/9/10x1900		2/3/4/5/6/8x1900
	Tie-beam, 40x40x4	D, mm	2/2/4/4/6/6/8/8/10/x2130	2/2/4/4/6/6/8/8/10/x2130	2/2/4/4/6/6/8x2590	2/2/4/4/6/6/8x2590
	Telescopic leg Element 1, 40x40x4	E1, mm		2/3/4/5/6/7/8/9/10x690		2/3/4/5/6/7/8x690
	Telescopic leg Element 2, 30x30x3	E2, mm		2/3/4/5/6/7/8/9/10x780		2/3/4/5/6/7/8x780
	Crossbar	F, mm		2/2/4/4/6/6/8/8/10x1220		2/2/4/4/6/6/8x1550
	Collector holder	G, pcs.	2/3/4/5/6/7/8/9/10x2	2/3/4/5/6/7/8/9/10x2	2/3/4/5/6/7/8x2	2/3/4/5/6/7/8x2
	Foot	H, pcs.		2/3/4/5/6/7/8/9/10x4		2/3/4/5/6/7/8x4
	Retaining plate	L, pcs.	2/3/4/5/6/7/8/9/10x4	2/3/4/5/6/7/8/9/10x4	2/3/4/5/6/7/8x4	2/3/4/5/6/7/8x4
	Adjustable mounting plate	M, pcs.	2/3/4/5/6/7/8/9/10x4		2/3/4/5/6/7/8x4	
	Extension rail	P, pcs.	-/2/2/4/4/6/6/8/8	-/2/2/4/4/6/6/8/8	-/2/2/4/4/6/6/8/8	-/2/2/4/4/6/6/8/8
	Distance between carrying elements	O, mm	1065	1070	1295	1284

Solar support systems

for evacuated tube collectors SUNSYSTEM VTC



Product features:

- Strain-resistant construction.
- Made of hot-galvanized steel.
- Designed to resist severe meteorological conditions:
  - wind speed up to 150 km/h
  - snow load up to 1,25 kN/m^2 according to ENV 1991-1-3 1991-1-4
- Easy to install
- Versions for flat roof mounting, inclined roof mounting and façade mounting
- Capability for fine-tuning the inclination angle (for the model for flat roof mounting)

Available in modifications:

flat roof mounting	Sunsystem VTC 15 x1	Sunsystem VTC 20 x1	Sunsystem VTC 30 x1
inclined roof mounting	Sunsystem VTC 15 x1	Sunsystem VTC 20 x1	Sunsystem VTC 30 x1
façade mounting	Sunsystem VTC 15 x1	Sunsystem VTC 20 x1	Sunsystem VTC 30 x1

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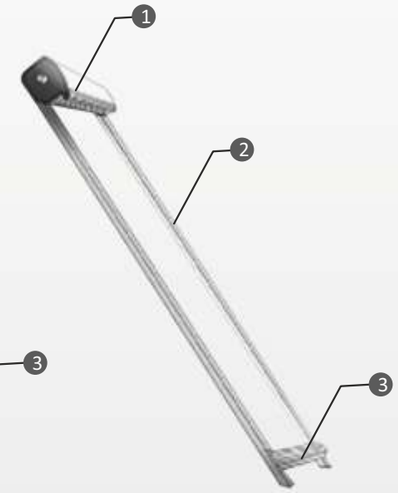
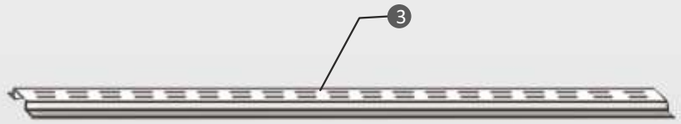
Roof-top support system for flat roof mounting



Roof-top support system for inclined roof mounting



1. Manifold unit of VTC collector
2. Mainbeam
3. Tie-beam with openings for VTC plastic tube holders
4. Leg
5. Crossbar
6. Retaining plate
7. Silicon pad
8. Mounting plate

Solar support systems

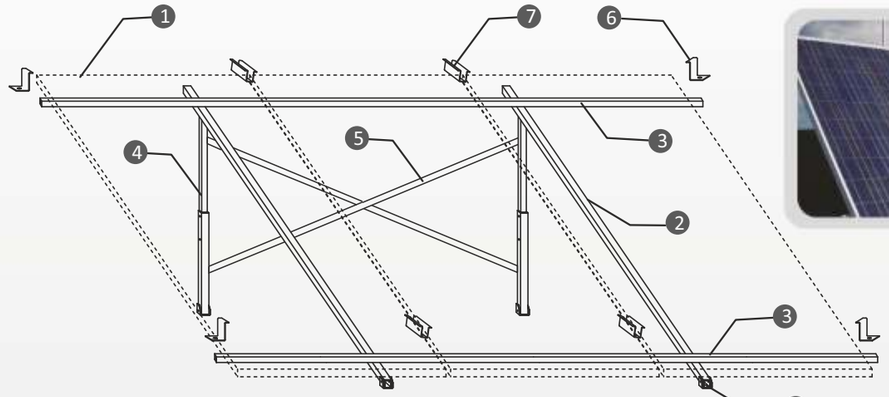
for
hybrid collectors
SUNSYSTEM PVT

Product features:

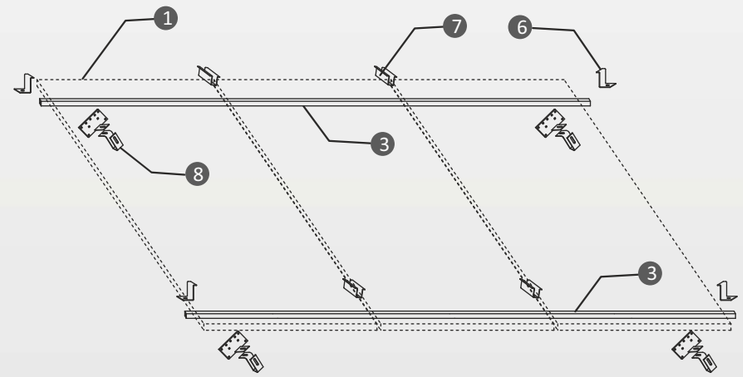
- Strain-resistant construction.
- Made of aluminum for ultimate corrosion resistance.
- Designed to resist severe meteorological conditions:
  - wind speed up to 150 km/h
  - snow load up to 1,25 kN/m^2 according to ENV 1991-1-3 1991-1-4
- Easy to install
- Versions for flat roof mounting and inclined roof mounting
- Capability for fine-tuning the inclination angle (for the model for flat roof mounting)
- Adjustable mounting plate (for the model for inclined roof mounting)

flat roof mounting	1 x PVT 240	2 x PVT 240	3 x PVT 240	4 x PVT 240	5 x PVT 240	6 x PVT 240	7 x PVT 240	8 x PVT 240	9 x PVT 240	10 x PVT 240	12 x PVT 240
inclined roof mounting	1 x PVT 240	2 x PVT 240	3 x PVT 240	4 x PVT 240	5 x PVT 240	6 x PVT 240	7 x PVT 240	8 x PVT 240	9 x PVT 240	10 x PVT 240	12 x PVT 240

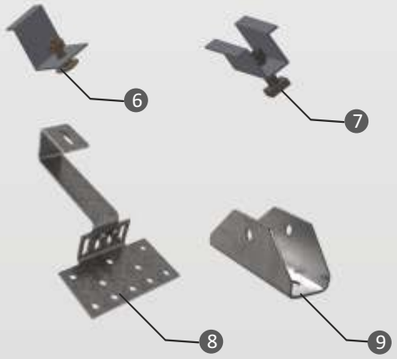
SUNSYSTEM®

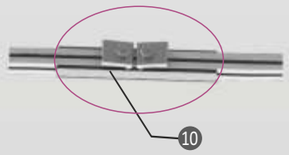


Roof-top support system for flat roof mounting



Roof-top support system for inclined roof mounting

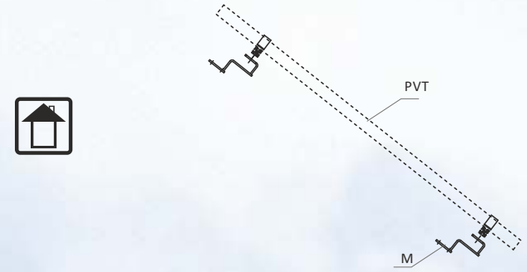


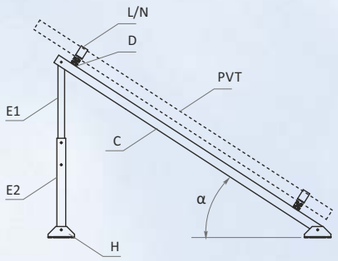


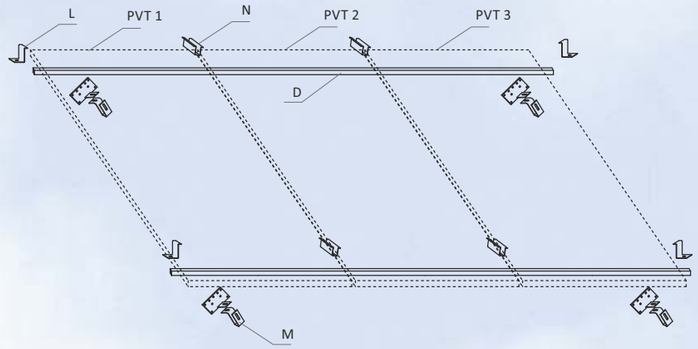
1. Position of PVT hybrid collector
2. Mainbeam
3. Tie-beam
4. Telescopic leg
5. Crossbar
6. End-retaining plate
7. MIddle-retaining plate
8. Adjustable mounting plate
9. Foot
10. Extension rail

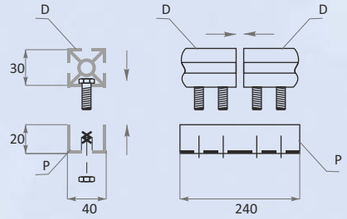
Solar support systems for hybrid collectors PVT 240

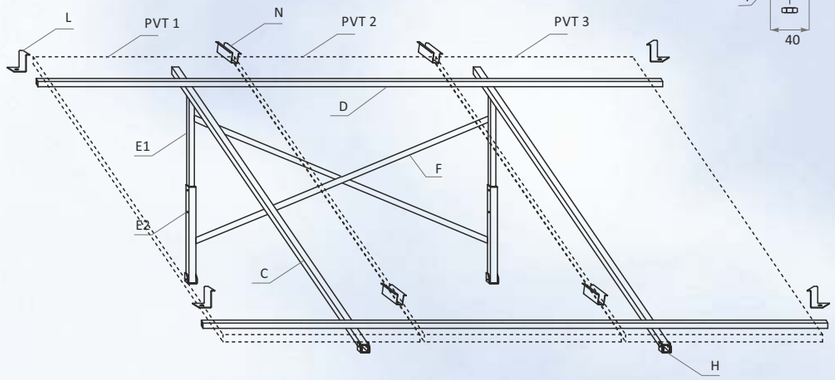
technical specifications







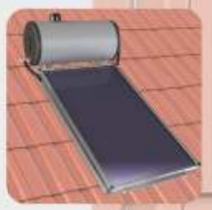




			Support system for hybrid collectors SUNSYSTEM PVT 240	
	Mounting type		**inclined roof mounting**	**flat roof mounting**
	Number of collectors, mounted on the support	pcs	2/3/4/5/6/7/8/9/10/12	2/3/4/5/6/7/8/9/10/12
	Overall dimensions for 1 x PVT 240	mm	1650 x 990 x 40	1650 x 990 x 40
	Collector positioning angle on the support	∢α °	30°÷45°	30°÷45°
Support system for 2/3/4/5/6/7/8/9/10/12 x PVT 240	Support system material		Aluminum	Aluminum
	Mainbeam, 40x40x4	C, mm		2/2/3/5/5/5/7/7/8/10 x 1500
	Tie-beam, 40x40x4	D, pcs	2	2
	Telescopic leg Element 1, 40x40x4 Element 2, 30x30x3	E1, mm E2, mm		2/2/3/5/5/5/7/7/8/10 x690 2/2/3/5/5/5/7/7/8/10 x780
	Galvanized steel crossbar	F, mm		1/1/1/2/2/3/3/4/4/5 x 1550
	Foot	H, pcs		2/2/3/5/5/5/7/7/8/10 x2
	End-retaining plate	L, pcs	4	4
	Middle-retaining plate	N, pcs	2/4/6/8/10/12/14/16/18/22	2/4/6/8/10/12/14/16/18/22
	Adjustable mounting plate	M, pcs	4/6/6/8/8/10/10/12/12/16	
	Extension rail	P, pcs	-/-/2/2/4/6/6/8/8/10/	-/-/2/2/4/6/6/8/8/10/

Solar support systems

for thermosiphon system TSS and TSSM



Product features:

- A single strain-resistant construction bears the entire thermosyphon system.
- Made of hot-galvanized steel.
- Designed to resist severe meteorological conditions:
  - wind speed up to 150 km/h
  - snow load up to 1,25 kN/m^2 according to ENV 1991-1-3 1991-1-4
- Easy to install
- Versions for flat roof and inclined roof
- Capability for fine-tuning the inclination angle (for the model for flat roof mounting)
- Adjustable mounting plate (for the model for inclined roof mounting)
- Three positions adjustable arc base (for the model for inclined roof mounting)

Available in modifications:

flat roof mounting	TSS 100 1xPK 2.15	TSS 150 1xPK 2.15	TSS 150 1xPK 2.7		TSS 200 1xPK 2.7	TSS 200 2xPK 2.15	TSS 300 2xPK 2.15
	TSSM 120 1xPK 2.15TO	TSSM 150 1xPK 2.15TO	TSSM 150 1xPK 2.7TO	TSSM 200 1xPK 2.15 TO	TSSM 200 1xPK 2.7TO		TSSM 300 2xPK2.15 TO
inclined roof mounting	TSS 100 1xPK 2.15	TSS 150 1xPK 2.15	TSS 150 1xPK 2.7		TSS 200 1xPK 2.7	TSS 200 2xPK 2.15	TSS 300 2xPK 2.15
	TSSM 120 1xPK 2.15TO	TSSM 150 1xPK 2.15TO	TSSM 150 1xPK 2.7TO	TSSM 200 1xPK 2.15 TO	TSSM 200 1xPK 2.7TO		TSSM 300 2xPK2.15 TO

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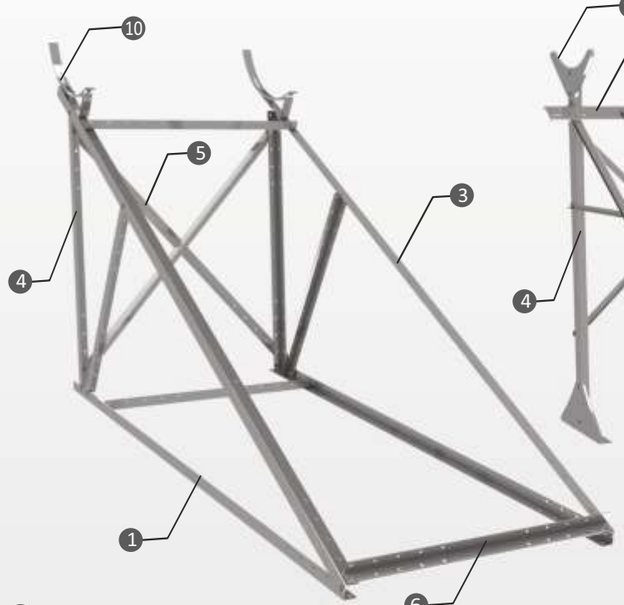
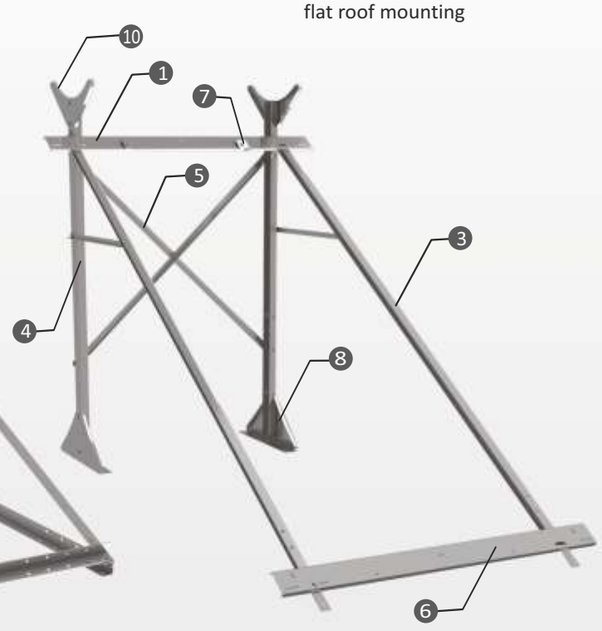
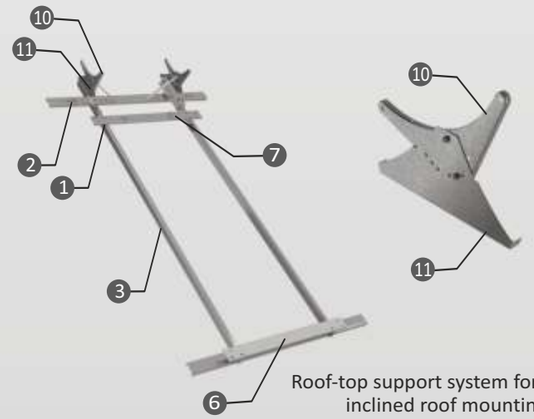
Roof-top support system for TSS, flat roof mounting



Roof-top support system for TSSM, flat roof mounting



Roof-top support system for TSS, inclined roof mounting



Roof-top support system for TSSM, inclined roof mounting

1. Tie-beam
2. Base-beam
3. Mainbeam
4. Leg
5. Crossbar
6. Retaining rail
7. Retaining plate
8. Foot
9. Adjustable mounting plate
10. Supporting arc
11. Adjustable arc base

Solar support systems for thermosiphon system TSS

technical specifications

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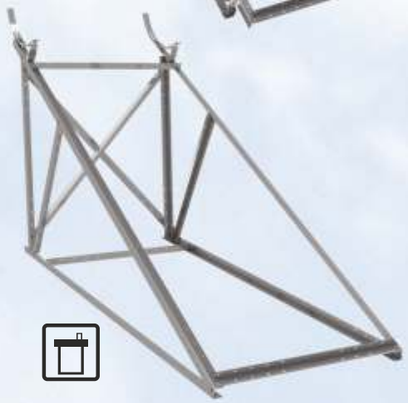
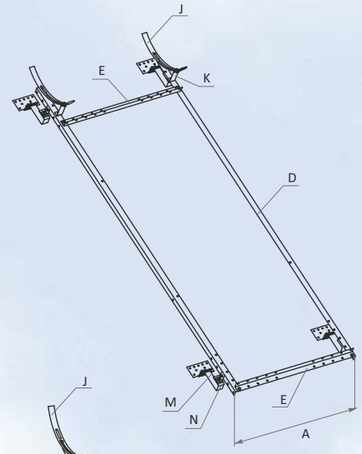
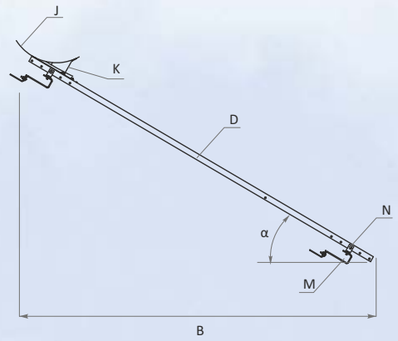
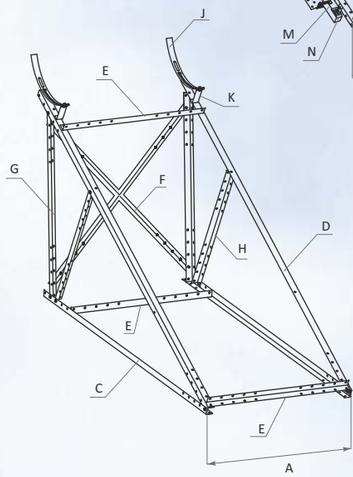
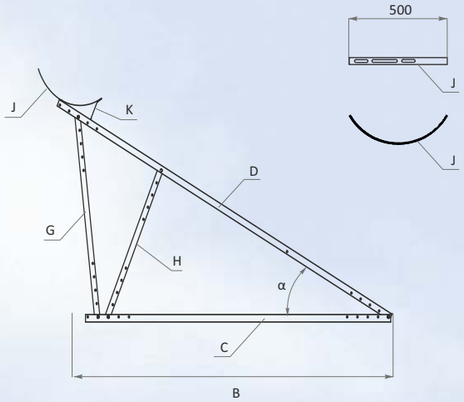






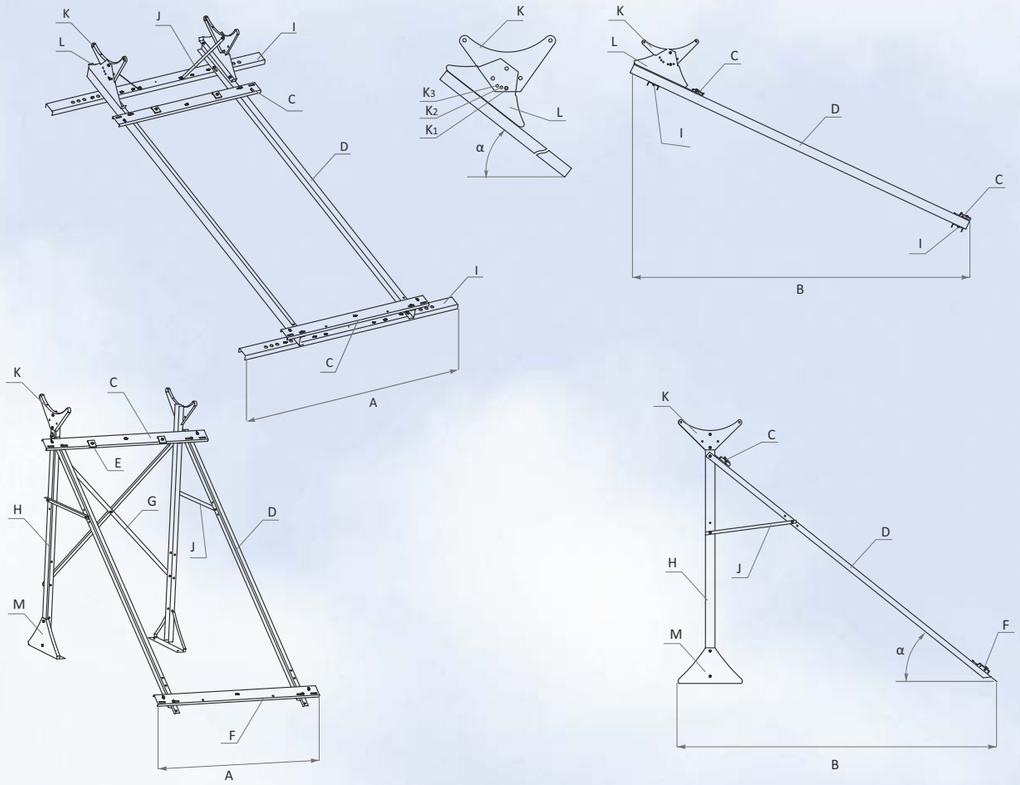




		Support system for TSS 100 (1xPK 2,15) TSS 150 (1xPK 2,15) TSS 150 (1xPK 2,7) TSS 200 (1xPK 2,7)		Support system for TSS 200 (2xPK 2,15)		Support system for TSS 300 (2xPK 2,15)	
Mounting type		flat roof mounting	inclined roof mounting	flat roof mounting	inclined roof mounting	flat roof mounting	inclined roof mounting
Number of collectors, mounted on the support	pcs.	1	1	2	2	2	2
Collector positioning angle on the support	∢α °	30°	30°	30°	30°	30°	30°
Support system material		Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel
Mounting dimensions of support system	A, mm B, mm	1550 2740	1550 2300	2330 2740	2330 2300	2060 2740	2060 2300
Tie-beam, 35x35	C, mm	2x2000		2x2000		2x1680	
Mainbeam, 35x35	D, mm	2x2430	2x2430	2x2430	2x2430	2x2430	2x2430
Retaining rail, 35x35	E, mm	3x830	2x830	3x1040	2x1040	3x1040	2x1040
Crossbar	F, mm	2x1220		2x1370		2x1370	
Leg, 35x35	G, mm	2x1040		2x1040		2x1040	
Side crossbar	H, mm	2x840		2x840		2x840	
TSB supporting arc Connecting arc plate	J, mm K, pcs.	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2
Adjustable mounting plate Connecting plate	M, pcs. N, pcs.		4 4		4 4		4 4
Weight	kg	32	20	32	20	32	20

Solar support systems for thermosiphon system TSSM

technical specifications



		Support system for TSSM 120 (1xPK 2,15TO) TSSM 150 (1xPK 2,15TO) TSSM 150 (1xPK 2,7TO) TSSM 200 (1xPK 2,15TO) TSSM 200 (1xPK 2,7TO)		Support system for TSSM 200 (2xPK 2,15TO)		Support system for TSSM 300 (2xPK 2,15TO)	
Mounting type		flat roof mounting	inclined roof mounting	flat roof mounting	inclined roof mounting	flat roof mounting	inclined roof mounting
Number of collectors, mounted on the support	pcs	1	1	2	2	2	2
Collector positioning angle on the support	∢α °	38°	11°; 25°; 38°	38°	11°; 25°; 38°	38°	11°; 25°; 38°
Support system material		Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel	Galvanized steel
Mounting dimensions of single support system	A, mm B, mm	1350 2080	1350 2920	1750 2080	1750 2920	1750 2080	1750 2920
Tie-beam	C, mm	1x1000	2x1000	1x2000	2x2000	1x2000	2x2000
Mainbeam	D, mm	2x2400	2x2710	2x2400	2x2710	2x2400	2x2710
Retaining plate	E, pcs	2		2			2
Retaining rail	F, mm	1x1000		1x2000		1x2000	
Crossbar	G, mm	2x1253		2x1670		2x1670	
Leg	H, mm	2x1620		2x1040		2x1040	
Side crossbar	J, mm	2x590	2x590	2x590	2x590	2x590	2x590
Base-beam	I, mm		2x1500		2x1500		2x1500
TSBM supporting arc Three positions adjustable arc base	K, pcs L, pcs	2	2 2	2	2 2	2	2 2
Foot	M, pcs	2		2		2	
Weight	kg	39	52	39	52	39	52

Flat solar collector SUNSYSTEM Select

- Thanks to their highly selective absorber they are efficient throughout all seasons
- Rock wool insulation brings about reduced heat loss back to the atmospher.
- Harp absorber construction ensuring low flow resistance and economic energy consumption
- Durasolar® P+ glass used on the front for optimum absorbtion of solar radiation and endurance.
- UV resistant materials guarantee long lifespan
- Certified by DIN CERTCO for compliance with DIN EN 12975:2006-06 and Solar Keymark
- The models are available in sizes of 2.0, 2.15, 2.5 and 2.7 m^2.

SUNSYSTEM family of solar water heaters

- Floor standing solar water heaters
- Water tank of low-carbon steel, coated with titanium enamel for a long service life.
- Rigid PU insulation for efficient heat conservation.
- High efficiency heat exchanger coils.
- Volumes ranging from 150 up to 500 liters

Solar support system SUNSYSTEM

- Two versions available: for inclined and for flat roof.
- Durable lightweight construction of Aluminum withstanding severe climate conditions.
- Robust - The supports withstand average wind speed up to 150 km/h and snow load up to 1,25 kN/m^2 according to ENV 1991-1-3 1991-1-4
- Possibility to mount up to 10 collectors in a connected structure

Accessories set. The necessary fittings, expansion vessel, and heat carrier.

- **Solar station** ensures forced circulation of the heat carrier fluid, performs basic system measurements, safety and maintenance functions. Employs energy efficient solar grade Wilo pump, designed to withstand the demanding conditions of a solar system. Smart insulating case of durable elastic EPP ensures thermal insulation of all elements and neat appearance.
- **Solar controller** with pump speed control, drainback option, and 4 temperature sensors monitors the operation of the entire system and controls the function of the solar station for maximum yield.
- **Cross fitting 2 in 1** with sensor housing and manual air vent.
- **Propylene glycol** - is used to ensure flawless heat carrier even at negative ambient temperatures.
- **Expansion vessel** Fixed bladder expansion vessels are designed to absorb the volume increase when temperature rises. Working temperature tolerance -10°C +110°C. The products comply with European Directive 97/23/CE.

SUNSYSTEM®

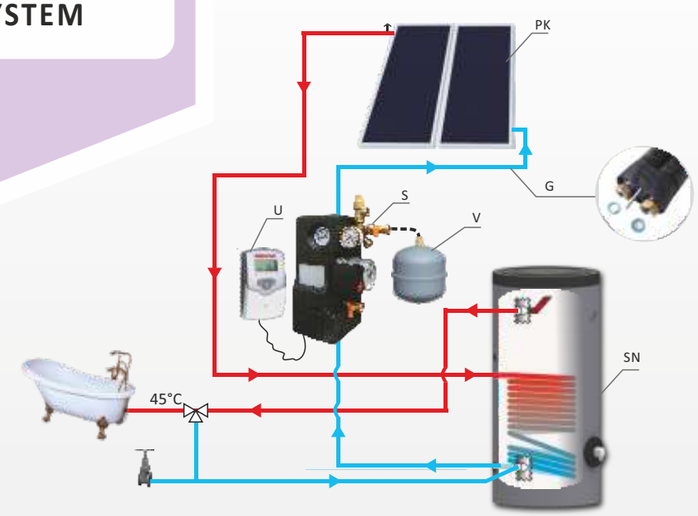
Year-round solar kits SUNSYSTEM

The SUNSYSTEM solar kits for hot water are ideally conceived for quick and hassle-free installation.

Features:
- Ideally selected components for optimum performance
- Energy efficiency
- All-in set. Just unpack and install
- Inclined or flat roof instalation possibilities
- Reliable design
- High-grade materials employed
- Solar Keymark certified

Go for
RENEWABLE ENERGY!

Year-round solar kits SUNSYSTEM



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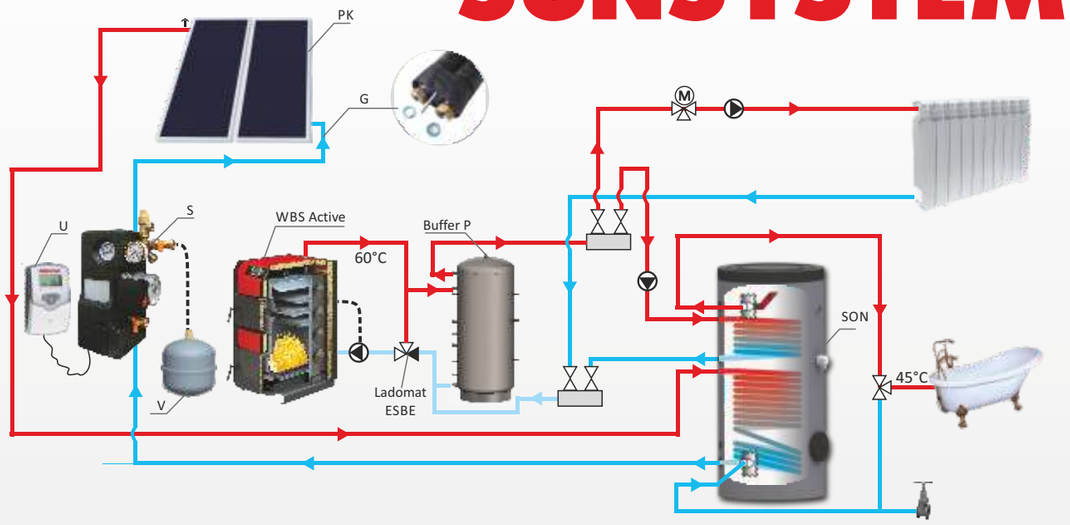

			Solar kit 150 L	Solar kit 200 L	Solar kit 300 L	Solar kit 400 L	Solar kit 500 L
	Household size	pcs	2 persons	3 persons	3-4 persons	5-6 persons	7-8 persons
Solar flat-plate collector	Flat-plate collector		1 x PK SL 2,7	2 x PK SL 2,15	3 x PK SL 2,15	4 x PK SL 2,15	5 x PK SL 2,15
	Absorber coating		Select	Select	Select	Select	Select
	Inlet/outlet sleeves		R ½"	R ½"	CL R ½"	R ½"	R ½"
	Overall dimensions of 1xPK	mm	2125/1248/90	2125/1000/90	2125/1000/90	2125/1000/90	2125/1000/90
	Collector roof-top support system		flat/inclined roof mounting	flat/inclined roof mounting	flat/inclined roof mounting	flat/inclined roof mounting	flat/inclined roof mounting
Solar water heater S series	Solar water heater S series		SN SON	SN SON	SN SON	SN SON	SN SON
	Water heater capacity	Liter	150 150	200 200	300 300	400 400	500 500
	Water heater operating pressure/Max. temperature	bar/°C	10/95 10/95	10/95 10/95	10/95 10/95	10/95 10/95	10/95 10/95
	Overall dimensions of water heater	mm	1070/ø560 1070/ø560	1340/ø560 1340/ø560	1420/ø660 1420/ø660	1470/ø750 1470/ø750	1720/ø750 1720/ø750
	Lower/Upper coil capacity	Liter	4.56/- 4.56/2.47	5.55/- 5.55/3.70	7.40/- 7.40/5.55	9.25/6.17 9.25/6.17	11.10/7.40 11.10/7.40
	Coil operating pressure/Max. temperature	bar/°C	16/110 16/110	16/110 16/110	16/110 16/110	16/110 16/110	16/110 16/110
	Electric heating element (optional)	kW	3÷7,5 3÷7,5	3÷7,5 3÷7,5	3÷7,5 3÷7,5	3÷7,5 3÷7,5	3÷7,5 3÷7,5
	Solar station	S	single/twin line	single/twin line	single/twin line	single/twin line	single/twin line
	Electronic control unit with 4 temperature sensors	U	Delta Sol BS 4	Delta Sol BS 4	Delta Sol BS 4	Delta Sol BS 4	Delta Sol BS 4
Accessories	Solar check valve		1"	1"	1"	1"	1"
	Solar filter		1"	1"	1"	1"	1"
	Cross fitting 2 in 1		ø 22	ø 22	ø 22	ø 22	ø 22
	Transition fitting		22x ½"	22x ½"	22x ½"	22x ½"	22x ½"
	Hollaender fitting		-	2x½"	4x½"	6x½"	8x½"
	Solar expansion vessel	V, Liter	12	18	24	35	50
	Heat carrier fluid, PG 100%	Liter	10	10	10	20	20
	Double corrugated pipe Number of pipes/size connections material components insulation	G	2xDN16 / 2x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2xDN16 / 2x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2xDN16 / 2x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2xDN16 / 2x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2xDN16 / 2x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation
Installation options for back up heat supply	Wood-fired boiler WBS		✓	✓	✓	✓	✓
	Wood-fired boiler WBS Active		✓	✓	✓	✓	✓
	Wood-gasifying boiler PyroBURN		✓	✓	✓	✓	✓
	Pellet burning boiler PelleBURN		✓	✓	✓	✓	✓
	Buffer thank P series		✓	✓	✓	✓	✓

* Larger kits are also available upon request to cover the needs of up to 20 persons.
The recommendable number and type of solar collectors varies from climate to climate.