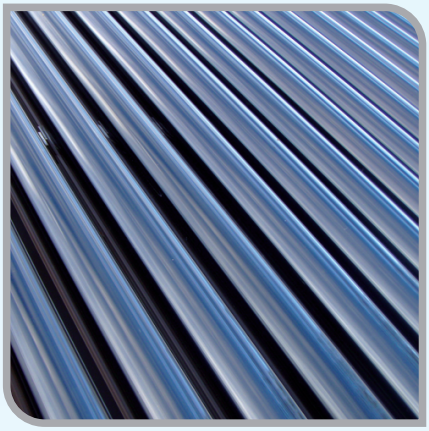
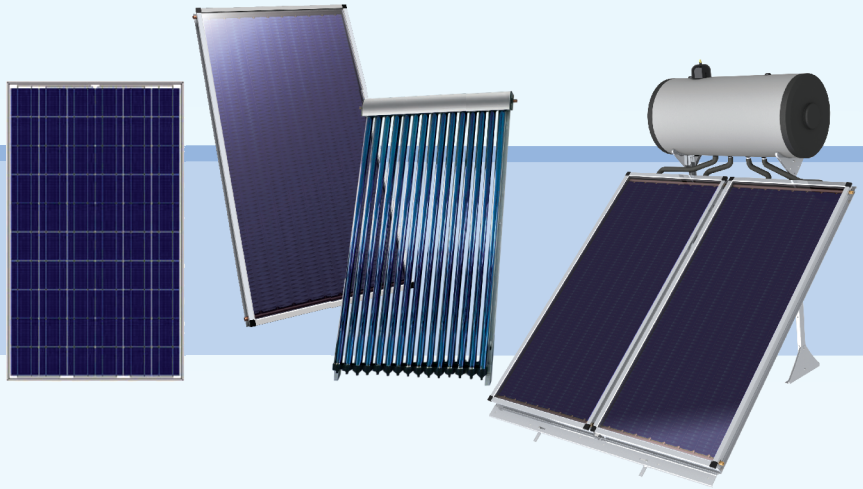
SUNSYSTEM

SOLAR THERMAL SYSTEMS

- FLAT-PLATE SOLAR COLLECTOR
- EVACUATED TUBE SOLAR COLLECTOR
- HYBRID SOLAR COLLECTOR
- THERMOSYPHON SOLAR SYSTEMS
- SOLAR KITS





2018
CATALOGUE

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Our markets

Contacts

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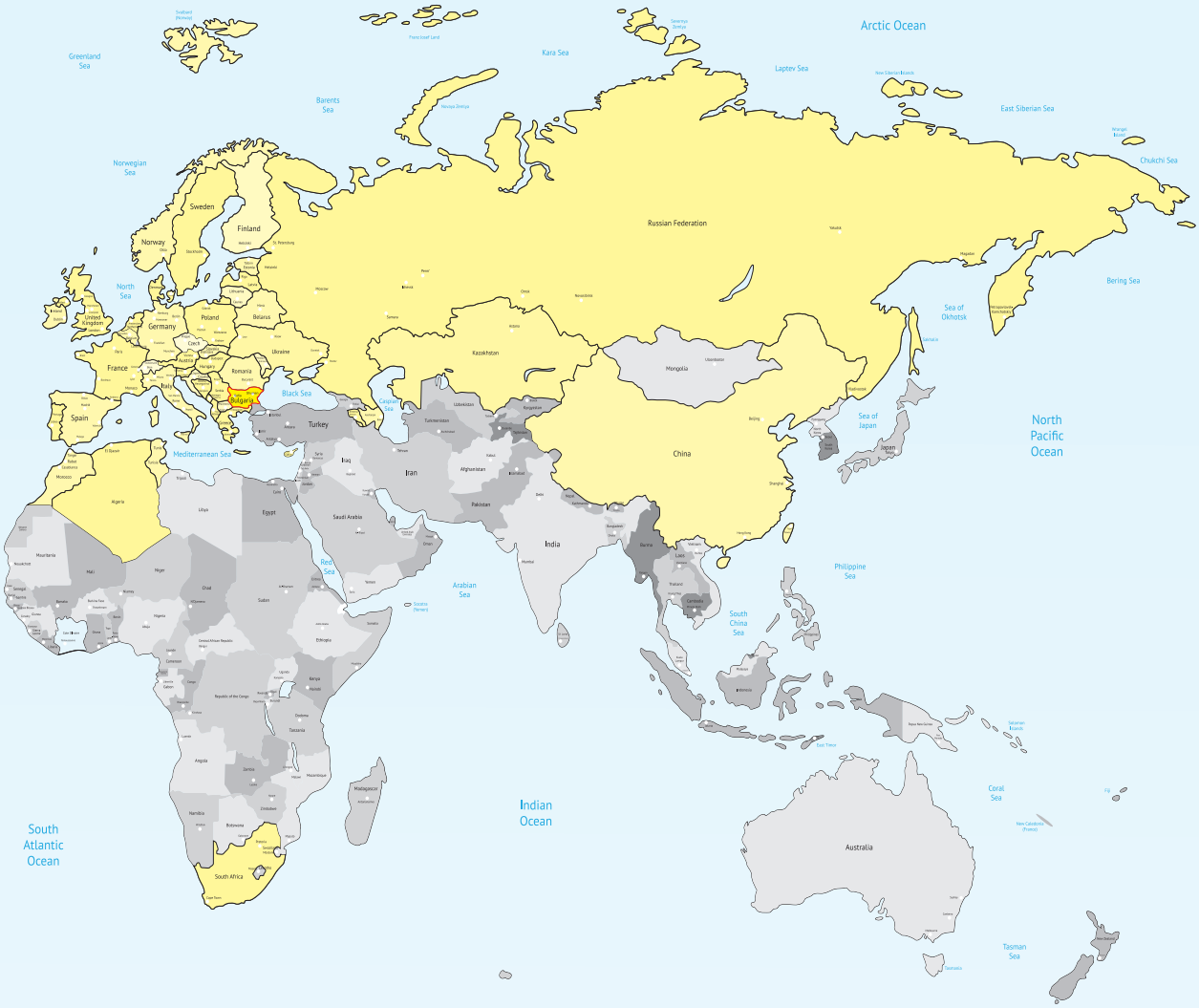

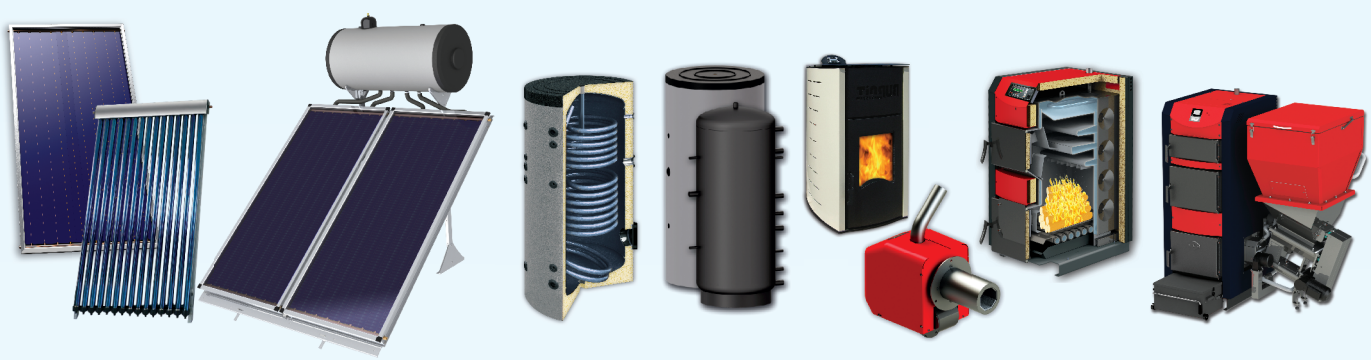

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NES Ltd., Town of Shumen, Bulgaria

NES Ltd.

The Company

NES Ltd. is a manufacturer of appliances utilizing alternative energy sources.

The company was established in 2002 in town of Shumen, Bulgaria.

The company has its own manufacturing, warehousing and administrative facilities with an area of 30 000 sq. meters.

The staff amounts to 360 highly qualified specialists.

NES Ltd., Town of Sofia, Bulgaria

All company activities are governed by QMS ISO 9001:2008.

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

Most products of NES Ltd. 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.

Our trademarks ®

SUNSYSTEM
BURNiT
by SUNSYSTEM

- **SOLAR THERMAL**
  Solar collectors
  Domestic/ Storage / Combi tanks
  Buffer tanks
  Heat pump heaters / Heat pumps
  Non-standart storage tanks

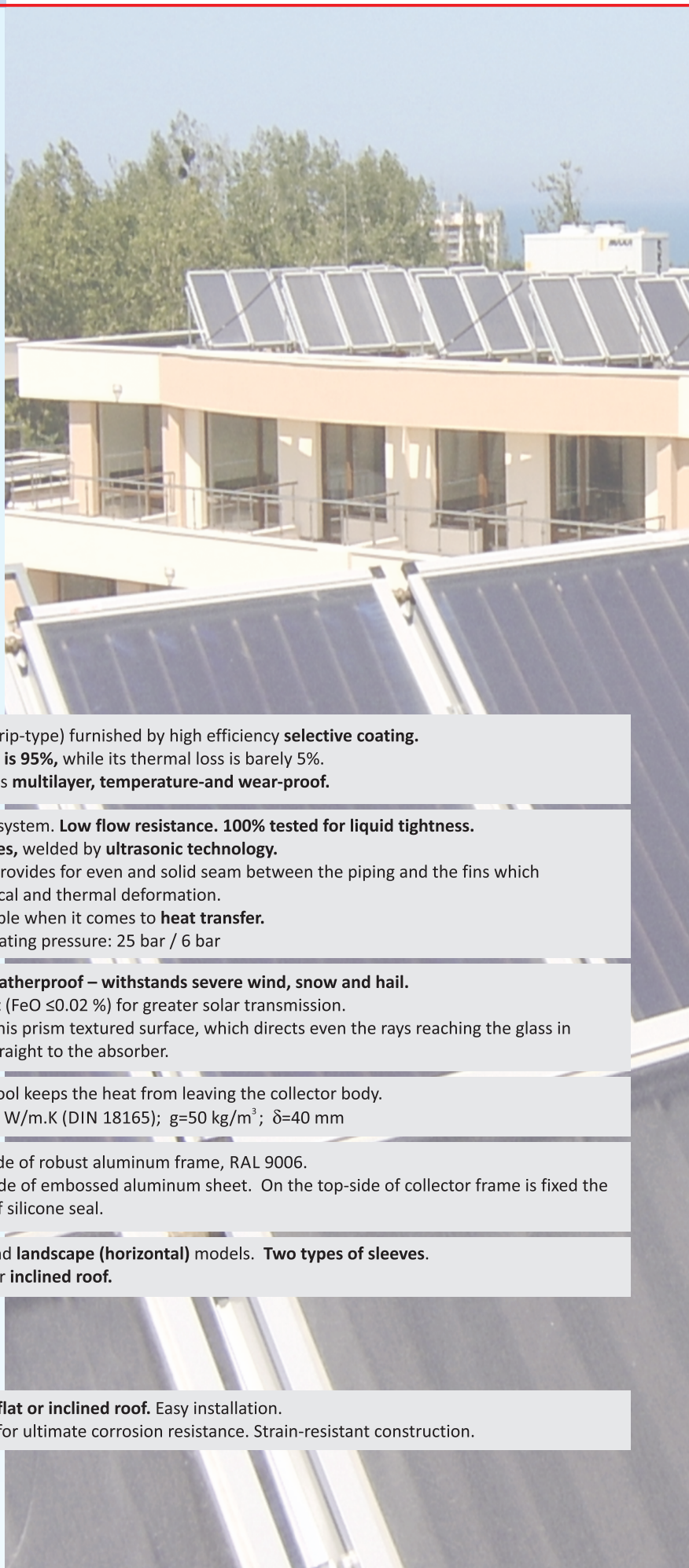
- **PHOTOVOLTAIC**
  Photovoltaic modules, accessories
  Engineering, Procurement and Construction of photovoltaic plants

- **BIOMASS HEATING**
  Automated boilers
  Pellet stoves
  Pellet burners
  Solid Fuel Boilers
  Fuel Hoppers

- **BIOMASS HEATING INDUSTRIAL EQUIPMENT**
  Solid fuel boilers
  Combined boilers
  Pellet burners
  Set Pellet boilers

Contents

High performance flat-plate solar collectors with selective coating of the absorber.
Ecological and low-cost way for domestic hot water supply and central heating support throughout the year.
Thermal collector absorbs a solar heat and emits it to the heat carrier fluid, circulating into collector pipe system.

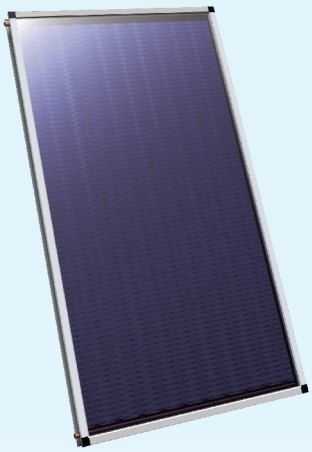


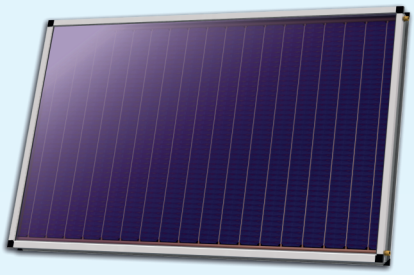
Certificate
EN 12975:2006-06
CEN - Keymark 011 -7S381 F.

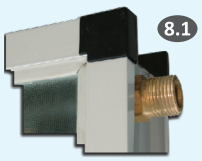
Collector type	m^2
PK SL CL	2.15 / 2.7
PK SL CL NL	2.15 / 2.7

Absorber.	**Copper absorber** (strip-type) furnished by high efficiency **selective coating.** **Its absorptance rate is 95%,** while its thermal loss is barely 5%. This special coating is **multilayer, temperature-and wear-proof.**
Pipe system.	**Harp** absorber pipe system. **Low flow resistance. 100% tested for liquid tightness.** Made of **copper pipes,** welded by **ultrasonic technology.** Ultrasonic welding provides for even and solid seam between the piping and the fins which withstands mechanical and thermal deformation. Copper is irreplaceable when it comes to **heat transfer.** Test pressure / Operating pressure: 25 bar / 6 bar
Protective solar glass.	**Heat-tempered. Weatherproof – withstands severe wind, snow and hail.** **Low ferrous content** (FeO ≤0.02 %) for greater solar transmission. **Prismatic surface.** This prism textured surface, which directs even the rays reaching the glass in unfavorable angle straight to the absorber.
Insulation.	Insulation of rock wool keeps the heat from leaving the collector body. Rock wool: λ=0,035 W/m.K (DIN 18165); g=50 kg/m^3; δ=40 mm
Collector case.	Collector case is made of robust aluminum frame, RAL 9006. Collector back is made of embossed aluminum sheet. On the top-side of collector frame is fixed the solar glass. UV-proof silicone seal.
Mounting options.	**Portrait (vertical)** and **landscape (horizontal)** models. **Two types of sleeves**. Installation on **flat** or **inclined roof.**

Optional equipment.	**Support system for flat or inclined roof.** Easy installation. Made of Aluminum for ultimate corrosion resistance. Strain-resistant construction.





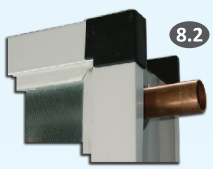


PK SL CL
Portrait (vertical) models.

	Model		Code
2.15	PK SL CL 2.15	R½"	00100336006002
2.7	PK SL CL 2.7	R½"	00100336006004

PK/H SL CL
Landscape (horizontal) models.

	Model		Code
2.15	PK/H SL CL 2.15	R½"	00105336006002
2.7	PK/H SL CL 2.7	R½"	00105336006004

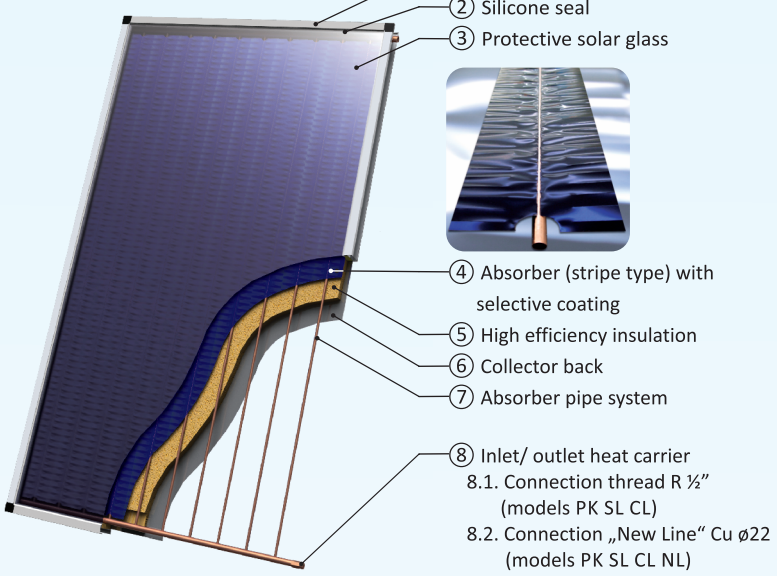


PK SL CL NL
Portrait (vertical) models.

	Model		Code
2.15	PK SL CL NL 2.15	ø22	00100335006002
2.7	PK SL CL NL 2.7	ø22	00100335006004

PK/H SL CL NL
Landscape (horizontal) models.

	Model		Code
2.15	PK/H SL CL NL 2.15	ø22	00105335006002
2.7	PK/H SL CL NL 2.7	ø22	00105335006004



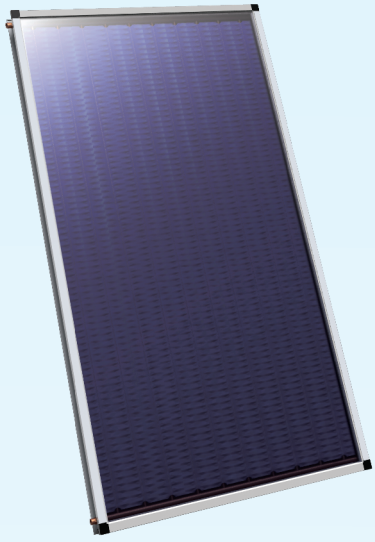
Recommended heat carrier fluid

Propylene glycol.
Used for freeze protection of the solar collector (in closed loop systems).

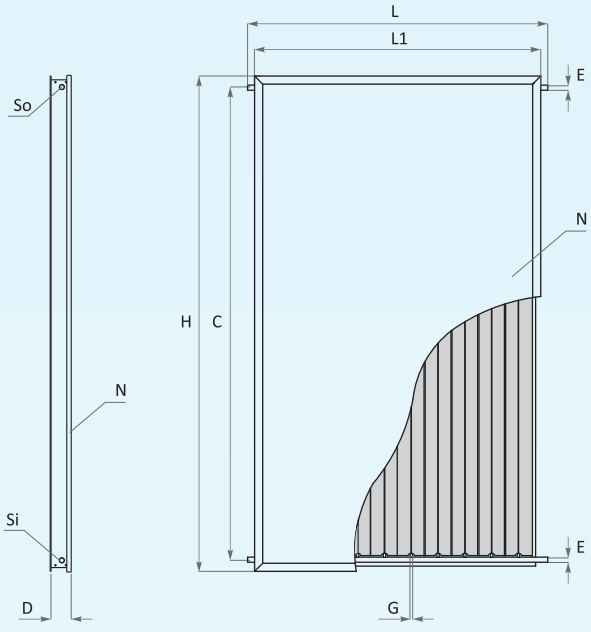
Mixing ratio
Propylene glycol (PG) : Water (H_2O)

50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

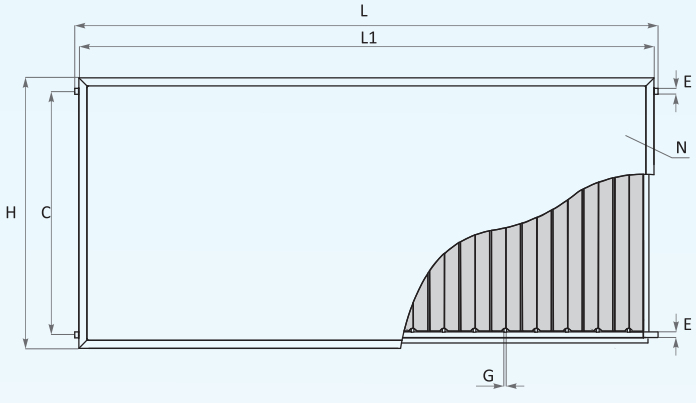
Technical characteristics.



PK SL CL 2.15 - 2.7
PK SL CL NL 2.15 - 2.7



PK/H SL CL 2.15 - 2.7
PK/H SL CL NL 2.15 - 2.7



PK SL CL, portrait (vertical) models.
PK/H SL CL, landscape (horizontal) models.

General parameters

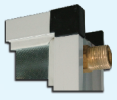
	A m²	A1 m²	A2 m²	K1 W/m²K	K2 W/m²K²	η_o %	F, L	F1, L/m²h	To C°
2.15	2.141	1.94	1.897	3.83	0.0080	76.4	1.6	50	200
2.7	2.619	2.41	2.39	4.23	0.0035	77	2.1	50	200

General parameters

A, m² Overall surface
A1, m² Absorber surface
A2, m² Aperture surface
K1, W/m²K Thermal loss coefficient- k1
K2, W/m²K² Thermal loss coefficient- k2

η_o Efficiency in relation to aperture
F, L Volume of heat carrier fluid
F1, L/m²h Flow rate of heat carrier fluid
T_o, C° Stagnation temperature

PK SL CL NL, portrait (vertical) models.
PK/H SL CL NL, landscape (horizontal) models.



PK SL CL, portrait (vertical) models.

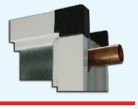
Dimensions. Inlets / Outlets

	H mm	L mm	L1 mm	D mm	kg	Si/So	C mm	E mm/pcs.	G mm/pcs.	N mm	PK x (20 m²)
2.15	2125	1030	1000	90	38	R½"/ R½"	2025	ø22/2	ø10/8	4.2	10
2.7	2125	1258	1228	90	47	R½" / R½"	2025	ø22/2	ø10/10	4.2	8

PK/H SL CL, landscape (horizontal) models.

Dimensions. Inlets / Outlets

	H mm	L mm	L1 mm	D mm	kg	Si/So	C mm	E mm/pcs.	G mm/pcs.	N mm	PK x (20 m²)
2.15	1000	2155	2125	90	37	R½"/ R½"	900	ø22/2	ø10/18	4.2	10
2.7	1228	2155	2125	90	45.5	R½"/ R½"	1128	ø22/2	ø10/18	4.2	8



PK SL CL NL, portrait (vertical) models.

Dimensions. Inlets / Outlets

	H mm	L mm	L1 mm	D mm	kg	Si/So	C mm	E mm/pcs.	G mm/pcs.	N mm	PK x (20 m²)
2.15	2125	1060	1000	90	38	ø22/ ø22	2025	ø22/2	ø10/8	4.2	10
2.7	2125	1288	1228	90	47	ø22/ ø22	2025	ø22/2	ø10/10	4.2	8

PK/H SL CL NL, landscape (horizontal) models.

Dimensions. Inlets / Outlets

	H mm	L mm	L1 mm	D mm	kg	Si/So	C mm	E mm/pcs.	G mm/pcs.	N mm	PK x (20 m²)
2.15	1000	2185	2125	90	37	ø22/ ø22	900	ø22/2	ø10/18	4.2	10
2.7	1228	2185	2125	90	45.5	ø22/ ø22	1128	ø22/2	ø10/18	4.2	8

Dimensions. Inlets / Outlets

H, mm Height
L, mm Width with inlets/outlets
L1, mm Width of collector case
D, mm Thickness
kg Weight

Si/So Inlet/outlet of Heat carrier
C, mm Distance between collecting pipes
E, mm / pieces Collecting pipes
G, mm / pieces Absorber pipes
N, mm Thickness of solar glass
PK x (20 m²) Maximum number of collectors in one array (20 m² absorber surface)

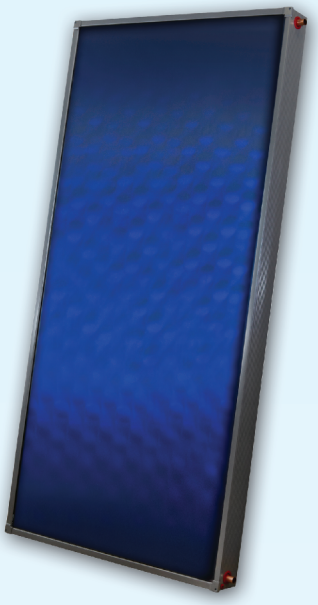
High performance flat-plate solar collectors.
Full plate absorber with selective coating.
Ecological and low-cost way for domestic hot water supply and central heating support throughout the year.
Thermal collector absorbs a solar heat and emits it to the heat carrier fluid, circulating into collector pipe system.

Certificate
EN 12975:2006-06
CEN - Keymark
OEM 9949/2/2
DQS HELLAS

Collector type	m^2
PK SL FP	2.0/ 2.4

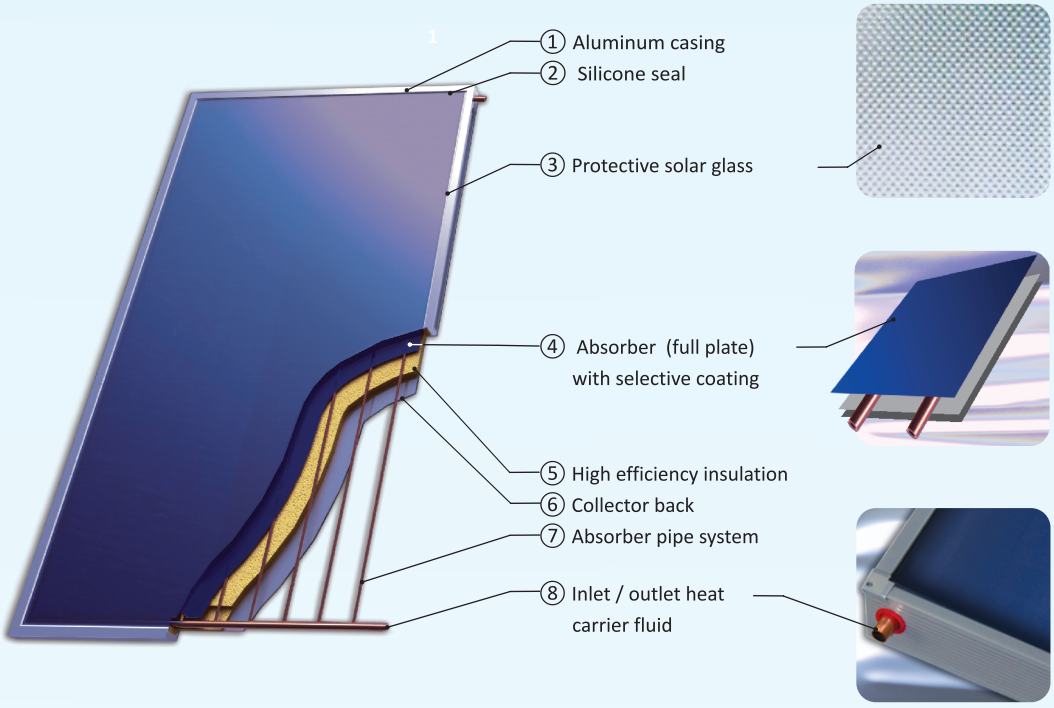
Absorber.	**Full plate absorber** furnished by high efficiency **selective coating.** **Its absorptance rate is 95%,** while its thermal loss is barely 5%. This special coating is **multilayer, temperature-and wear-proof.**
Pipe system.	**Harp** absorber pipe system. **Low flow resistance. 100% tested for liquid tightness.** Made of **copper pipes,** welded by **ultrasonic technology.** Ultrasonic welding provides for even and solid seam between the piping and the fins which withstands mechanical and thermal deformation. Copper is irreplaceable when it comes to **heat transfer.** Test pressure / Operating pressure: 15 bar / 10 bar
Protective solar glass.	**Heat-tempered. Weatherproof – withstands severe wind, snow and hail.** **Low ferrous content** (FeO ≤0.02 %) for greater solar transmission. **Prismatic surface.** This prism textured surface, which directs even the rays reaching the glass in unfavorable angle straight to the absorber.
Insulation.	Insulation of rock wool keeps the heat from leaving the collector body. Rock wool: (DIN 18165); g=50 kg/m^3; δ=30 mm
Collector case.	Collector case is made of robust aluminum frame, gray metallic color. Collector back is made of embossed aluminum sheet. On the top-side of collector frame is fixed the solar glass. UV-proof silicone seal.
Mounting options.	**Portrait (vertical)** models. **Sleeves (cooper pipe) without any threading or union nuts.** Installation on **flat** or **inclined roof.**

Optional equipment.	**Support system for flat or inclined roof.** Easy installation. Made of hot-galvanized steel for ultimate corrosion resistance. Strain-resistant construction.



PK SL FP
Portrait (vertical) models.

	Models		Code
2.0	PK SL FP 2.0	ø 22	21100335006101
2.4	PK SL FP 2.4	ø 22	21100335006102



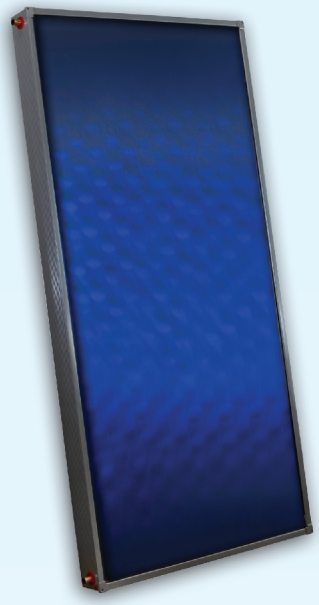
Recommended heat carrier fluid

Propylene glycol.
Used for freeze protection of the solar collector (in closed loop systems).

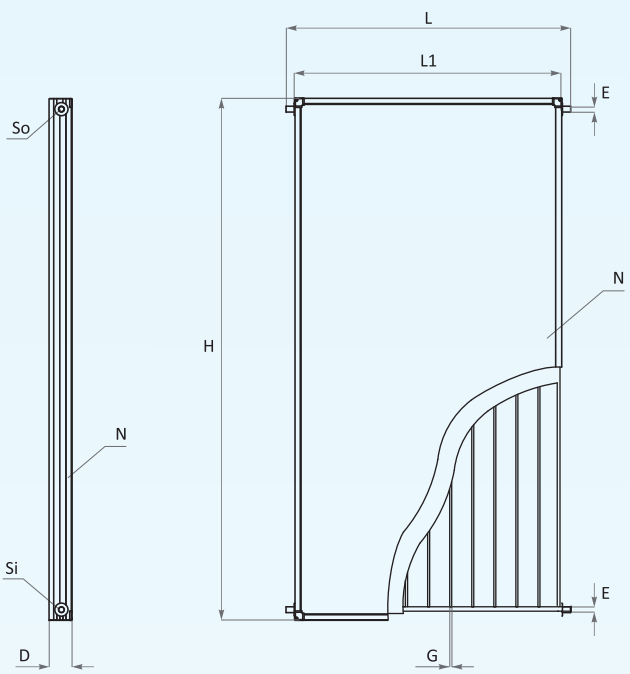
Mixing ratio
Propylene glycol (PG) : Water (H_2O)

50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

Technical characteristics.



PK SL FT 2.0 - 2.4



PK SL FP, portrait (vertical) models.

General parameters

	A m²	A1 m²	A2 m²	K1 W/m²K	K2 W/m²K²	η_o %	F, L	F1, L/m²h	To C°
2.0	2.0	1.86	1.86	5.14	0.017	78.8	1.4	50	152
2.4	2.37	2.23	2.23	5.14	0.017	78.8	1.7	50	152

General parameters

A, m² Overall surface
A1, m² Absorber surface
A2, m² Aperture surface
K1, W/m²K Thermal loss coefficient- k1
K2, W/m²K² Thermal loss coefficient- k2

η_o Efficiency in relation to aperture
F, L Volume of heat carrier fluid
F1, L/m²h Flow rate of heat carrier fluid
T_o, C° Stagnation temperature

PK SL FP, portrait (vertical) models.

Dimensions. Inlets / Outlets

	H mm	L mm	L1 mm	D mm	kg	Si/So	C mm	E mm/pcs.	G mm/pcs.	N mm	PK x (20 m²)
2.0	1980	1050	1010	86	35	ø22 / ø22	1900	ø22/2	ø10/9	4.2	10
2.4	1930	1270	1230	86	43	ø22 / ø22	1850	ø22/2	ø10/11	4.2	8

Dimensions. Inlets / Outlets

H, mm Height
L, mm Width with inlets/outlets
L1, mm Width of collector case
D, mm Thickness
kg Weight

Si/So Inlet/outlet of Heat carrier
C, mm Distance between collecting pipes
E, mm / pieces Collecting pipes
G, mm / pieces Absorber pipes
N, mm Thickness of solar glass
PK x (20 m²) Maximum number of collectors in one array (20 m² absorber surface)

Collector design, professional finishing, top quality and high energy yield, as well as its excellent price and performance ratio make it stand out.
Designed for domestic water heating and support of space heating. 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 make evacuated tube collectors cost-effective solution for any solar installation.

Certificate
EN 12975:2006-06
CEN - Keymark 011-7S2236 R.

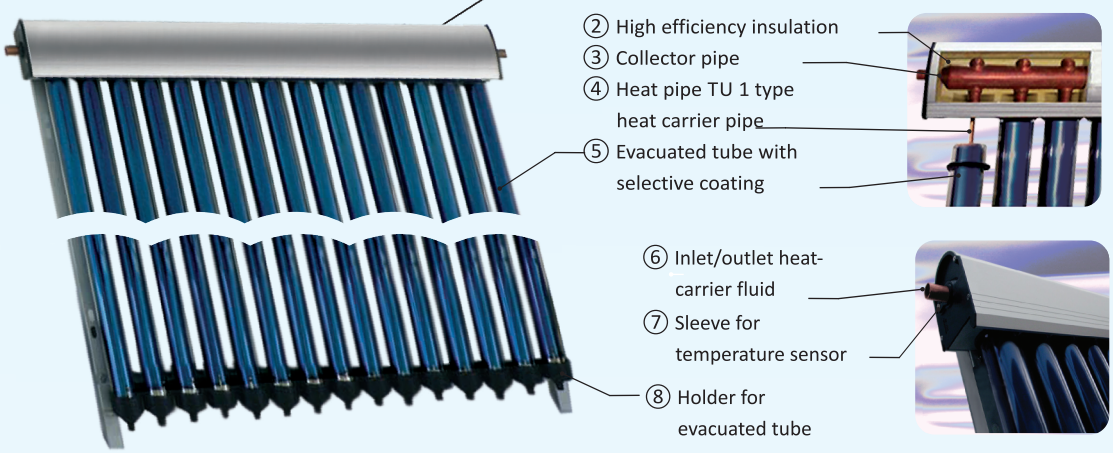
Collector type	Number of tubes
VTC	15 / 20 / 30

Evacuated tubes. Absorber coating.	Evacuated tubes two concentrically positioned glass are 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 evacuated tubes was confirmed by positive test results in the impact-from-hail test according to DIN EN 12975-2 and thermal shock test. Resistance to wind, hail, snow and dust.
Pipe system.	**Copper heat-carrier tubes type Heat Pipe Tu1**. Pipe system is manufactured with a minimum number of welds for perfect air-tightness and reduced deposits accumulation possibility. Copper is irreplaceable when it comes to **heat transfer.** Test pressure / Operating pressure**:** 25 bar / 12 bar
Manifold unit. Case. Insulation.	Manifold case is made of anodized aluminum. High-efficiency insulation of manifold unit: rigid PU, thickness 30 mm.
Mounting options.	Optional location of Inlet and Outlet connection at both sides of manifold unit. **Support system for inclined roof (façade).** Installation on **flat** or **inclined roof (façade).**

Optional equipment.	**Support system for flat roof.** Easy installation. Made of hot-galvanized steel for ultimate corrosion resistance. Strain-resistant construction.

VTC

	Model		Code
15	VTC 15	ø 22	00100000007102
20	VTC 20	ø 22	00100000007103
30	VTC 30	ø 22	00100000007104



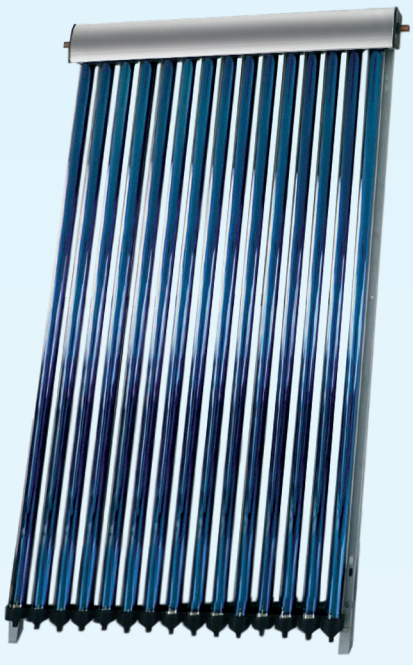
Recommended heat carrier fluid

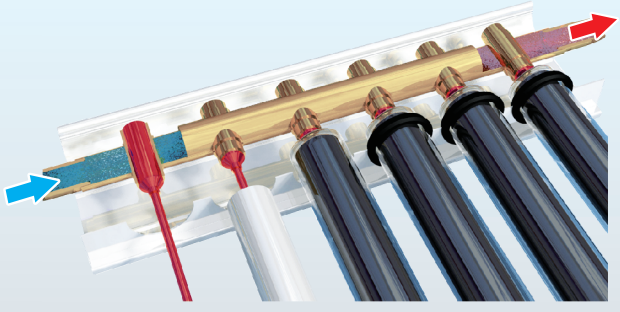
Propylene glycol.
Used for freeze protection of the solar collector (in closed loop systems).

Mixing ratio
Propylene glycol (PG) : Water (H_2O)

50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

Technical characteristics.

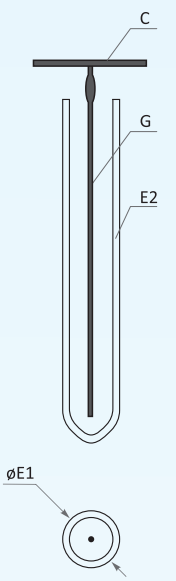


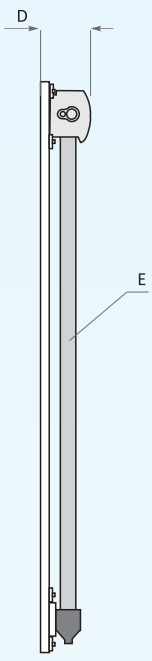


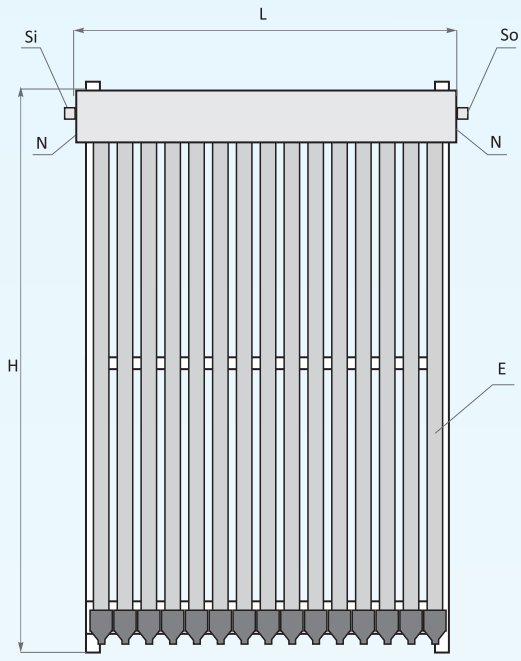
Heat Pipe technology

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.

VTC 15 / 20 /30







VTC
General parameters

	A m²	A1 m²	A2 m²	K1 W/m²K	K2 W/m²K²	η_o %	F, L	F1, L/m²h	Tmax / To C°
15	2.36	1.412	1.215	1.5	0.02	66	0.94	60-80	180/221
20	3.41	1.882	1.62	1.5	0.02	66	1.24	60-80	180/221
30	4.55	2.824	2.429	1.5	0.02	66	1.82	60-80	180/221

General parameters

A, m² Overall surface
A1, m² Absorber surface
A2, m² Aperture surface
K1, W/m²K Thermal loss coefficient- k1
K2, W/m²K² Thermal loss coefficient- k2

η_o Efficiency in relation to aperture
F, L Volume of heat carrier fluid
F1, L/m²h Flow rate of heat carrier fluid
T max / T_o, C° Maximum operating temperature/ Stagnation temperature

VTC
Dimensions. Inlets / Outlets

	H mm	L mm	D mm	kg	Si/So	C mm	E pcs.	E1 / E2 mm	G mm/pcs.	N mm	VTC x (Xm²)
15	1980	1190	125	43	ø22 / ø22	ø22	15	ø58/1800	ø14/15	ø8	8 x (20.14)
20	1980	1570	125	57	ø22 / ø22	ø22	20	ø58/1800	ø14/20	ø8	7 x (22.85)
30	1980	2300	125	86	ø22 / ø22	ø22	30	ø58/1800	ø14/30	ø8	6 x (28.20)

Dimensions. Inlets / Outlets

H, mm Height
L, mm Width
D, mm Thickness
kg Weight

Si/So Inlet/outlet of Heat carrier
C Diameter of collecting pipe
E, pieces Number of evacuated tubes
E1/ E2, mm Evacuated tubes, Diameter / Length
G, mm / pieces Heat carrier pipes, Diameter/ pieces
N, mm Sleeve for temperature sensor, Diameter
VTC x (Xm²) Maximum number of collectors in one array (X m² absorber surface)

SUNSYSTEM

Hybrid solar collector

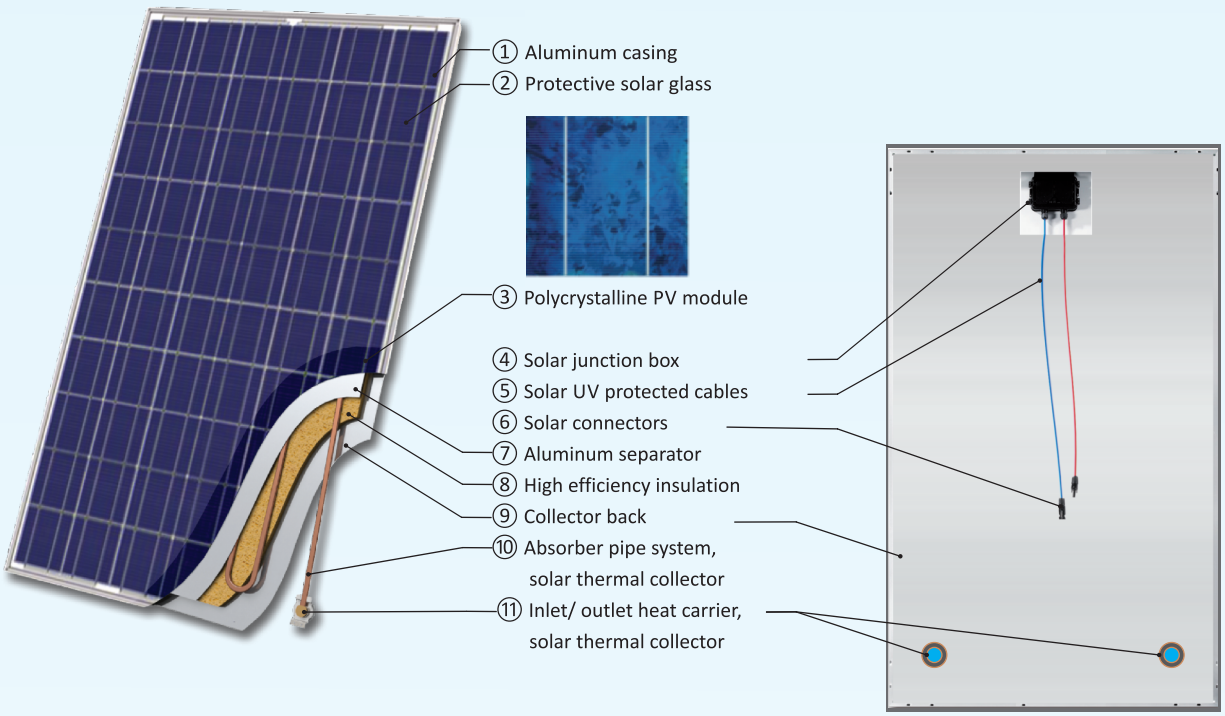
The hybrid solar collector SUNSYSTEM PVT is a combination of a photovoltaic module and a solar thermal collector.
This compact device converts solar radiation to electricity and heat simultaneously.
High energy yield, small footprint and reduced installation costs are just some of the benefits.

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 regular PV modules heats up in result of being exposed to direct sunlight. Only 15-20% of radiation that falls upon the surface of module is utilized to produce electricity, and the remaining energy is wasted as emitted heat. **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.** **Protective solar glass:** Low ferrous content (FeO ≤0.02 %). Heat-tempered. Weatherproof – withstands severe wind, snow and hail. **UV-proof silicone seal.**
PV module. 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 multicrystalline) 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.
Solar thermal collector.	**Powers a hot water system.** **Copper pipe system.** Low flow resistance. 100% tested for liquid tightness. Insulation of **rigid PU with thickness of 20 mm.**
Mounting options.	**Portrait (vertical)** models. Installation on **flat** or **inclined roof.**

Optional equipment.	**Support system for flat or inclined roof.** Easy installation. Made of Aluminum for ultimate corrosion resistance. Strain-resistant construction.

PVT

	Model			Code
240 Pmax, Wp 1.62 m²	HYBRID COLLECTOR 240 POLY	MC 4	Rp ½"	00100050012001



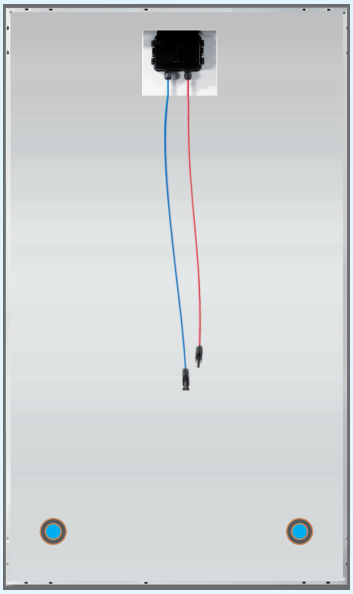
Recommended heat carrier fluid

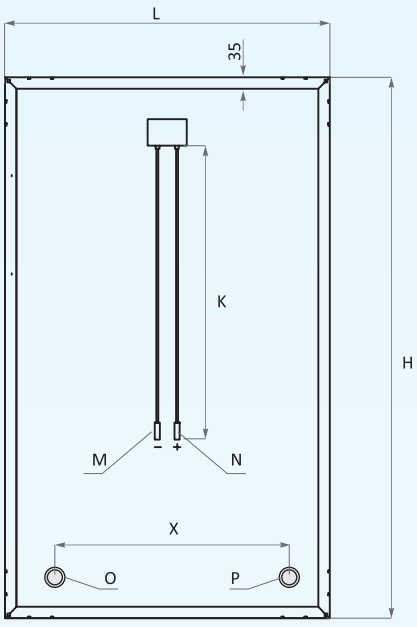
Propylene glycol.
Used for freeze protection of the solar collector (in closed loop systems).

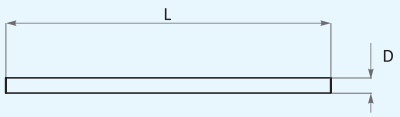
Mixing ratio
Propylene glycol (PG) : Water (H_2O)

50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

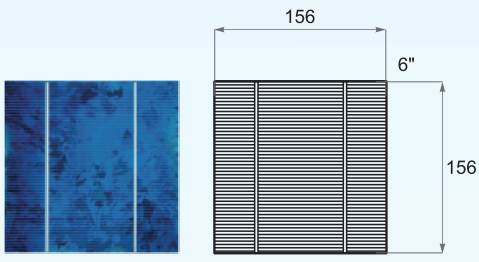
Technical characteristics







PVT 240



polycrystalline cell (PV module)

PVT
Hybrid solar collector. Dimensions

	H mm	L mm	D mm	kg
240 Pmax, Wp 1.62 m²	1650	990	40	28

Hybrid solar collector. Dimensions.
H, mm Height
L, mm Width
D, mm Thickness
kg Weight

PVT
PV module. Parameters.

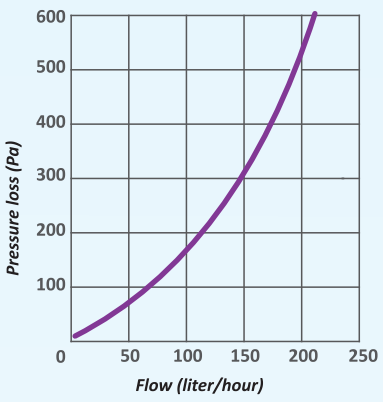
Number of cells for 1 PV module	pcs.	60 (6x10)
Cell size	mm	156x156
Maximum power Pmax	Wp	240
Cable length	K, mm	900
Type of connector	M, N	MC 4
Electricity yield tolerance	%	+ 3 - 0
Voltage at max power Vmp	V	30.6
Current at max power Imp	A	7.84
Open circuit voltage Voc	V	37.2
Short circuit current 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
Maximum system voltage	V DC	1000
Temperature range	˚C	-40 ÷ +85
Maximum 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

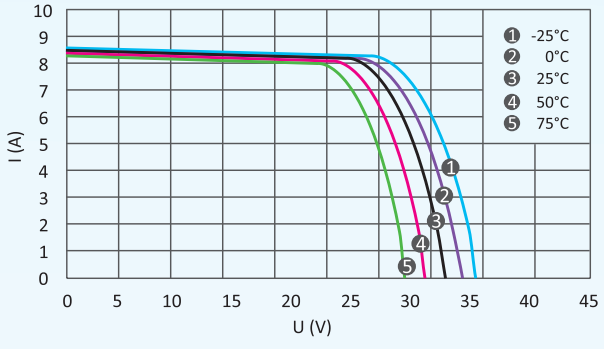
PVT
Solar thermal collector. Parameters.

Overall surface	m²	1,62
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/m²K	9,13
Thermal loss coefficient K_2	W/m²K²	0,00
Heat carrier inlet/outlet	O, P	2 x Rp ½"
Distance between heat carrier inlet/outlet	X, mm	840

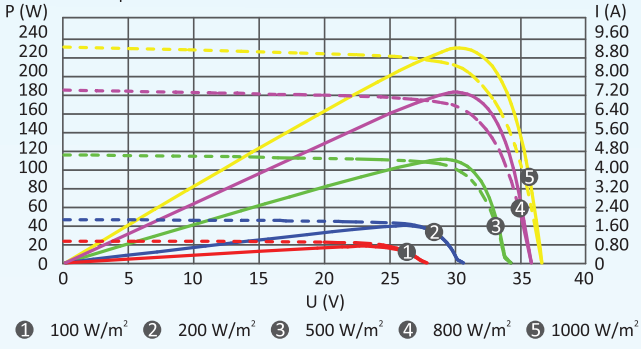
Diagram
Pressure drop in
PVT hybrid collector



I-V characteristic of
module temperature dependence



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

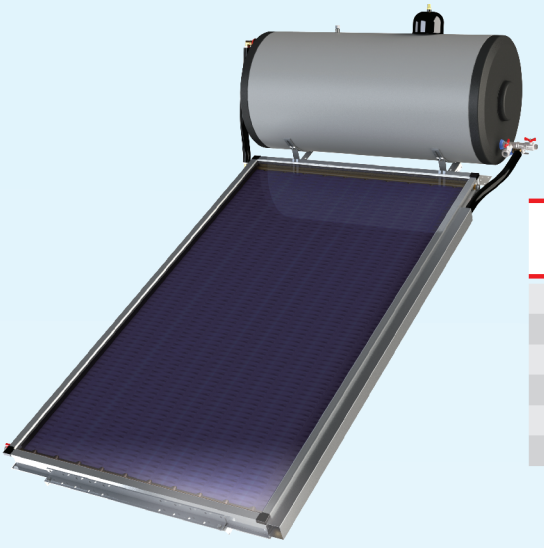


Thermosyphon system is a cost-effective way to heat water with solar energy. It makes use of the natural thermal convection of liquids to transfer the heat from solar collectors to water tank.

The thermosyphon system is comprised of flat plate solar collector (one or two pieces), connected to a solar water tank with a cylinder-type heat exchanger.

The circulation of heat carrier liquid is driven by natural thermal convection. The heat carrier fluid into collector absorber 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 water tank. As it cools down, the heat carrier then is returned to the collector to repeat the process.

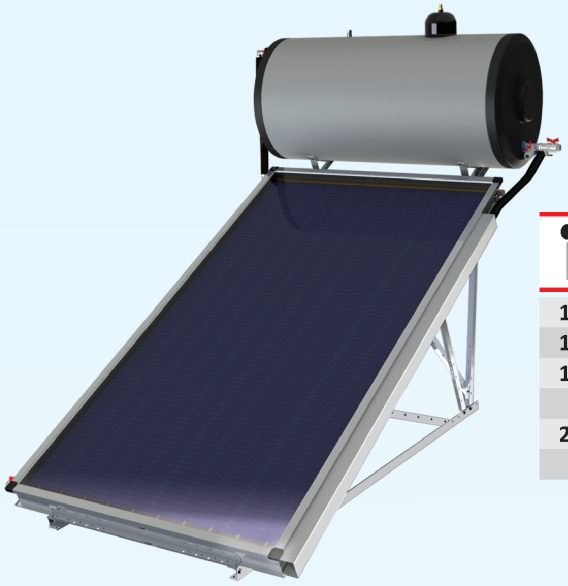
Flat-plate solar collector PK SL CL	**Absorber** high efficiency **selective coating.** Harp absorber pipe system. **Low flow resistance. 100% tested for liquid tightness.** Made of **copper** pipes. Test pressure / Operating pressure: 25 bar / 6 bar. **Protective solar glass.** Heat-tempered. Weatherproof – withstands severe wind, snow and hail. Low ferrous content (FeO ≤0.02 %). Prismatic surface.
Thermosyphon water tank TSB	Corrosion-free exploitation of water tank is ensured by **titanium enamel** and built-in **magnesium anode.** Test pressure / Operating pressure: 13 bar/ 8 bar Maximum temperature: 95°C **Mantle (cylinder-type) heat exchanger.** Test pressure / Operating pressure: 3 bar/ 1.5 bar Maximum temperature: 95°C **Insulation of rigid PU with thickness of 50 mm** keeps warm the potable water into thermosyphon water tank. Optional equipment of TSB water tank: electric heater as a backup source of heat.
Support system for thermosyphon system	**A single s bears the entire thermosyphon train-resistant construction system.** Made of hot-galvanized steel for ultimate corrosion resistance. **Designed to resist severe meteorological conditions:** Wind speed up to 150 km/hour. Snow load up to 1.25 kN/m² according to ENV 1991-1: 3,4. **Versions for flat roof and inclined roof.**
Entire out-of-the-building mounting concept	Whole system is installed outside the useful building area - on the roof.



TSS
installation on inclined roof

Flat-plate solar collector PK SL CL. Thermosyphon water tank TSB.
Support system for inclined roof.

		PK m²	TSB L	Model	Code
100		2.15	100	TSS 100 PK SL CL 2.15 IR	04110303101033
150		2.15	150	TSS 150 PK SL CL 2.15 IR	04110303101035
150		2.7	150	TSS 150 PK SL CL 2.70 IR	04110303101037
	200	2.15	200	TSS 200 2PK SL CL 2.15 IR	04110303101043
200		2.7	200	TSS 200 PK SL CL 2.7 IR	04110303101041
	300	2.15	300	TSS 300 2PK SL CL 2.15 IR	04110303101045



TSS
installation on flat roof

Flat-plate solar collector PK SL CL. Thermosyphon water tank TSB.
Support system for flat roof.

		PK m²	TSB L	Model	Code
100		2.15	100	TSS 100 PK SL CL 2.15 FR	04110303101003
150		2.15	150	TSS 150 PK SL CL 2.15 FR	04110303101005
150		2.7	150	TSS 150 PK SL CL 2.70 FR	04110303101007
	200	2.15	200	TSS 200 2PK SL CL 2.15 FR	04110303101013
200		2.7	200	TSS 200 PK SL CL 2.7 FR	04110303101011
	300	2.15	300	TSS 300 2PK SL CL 2.15 FR	04110303101015

Recommended heat carrier fluid (Included in the kit)

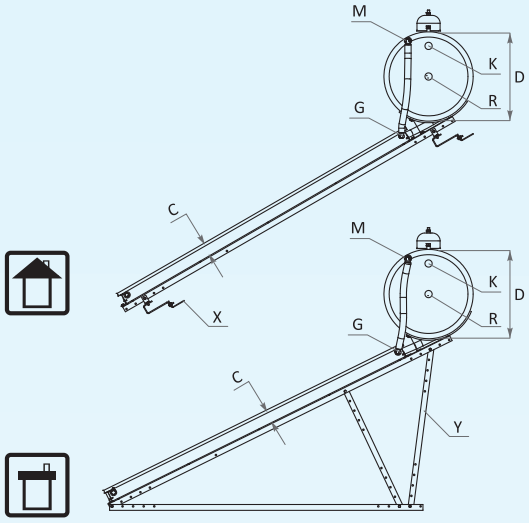
Propylene glycol.
Used for freeze protection of the collector (in closed loop systems).

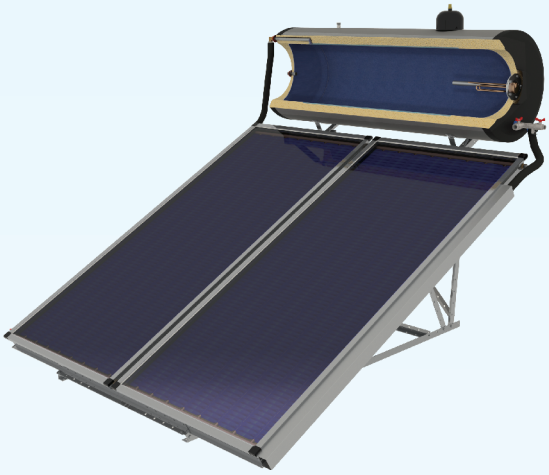
Item	Code
Propylene glycol, concentrate	31560000000020

Mixing ratio:
Propylene glycol (PG) : Water (H_2O)

50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

Technical characteristics.

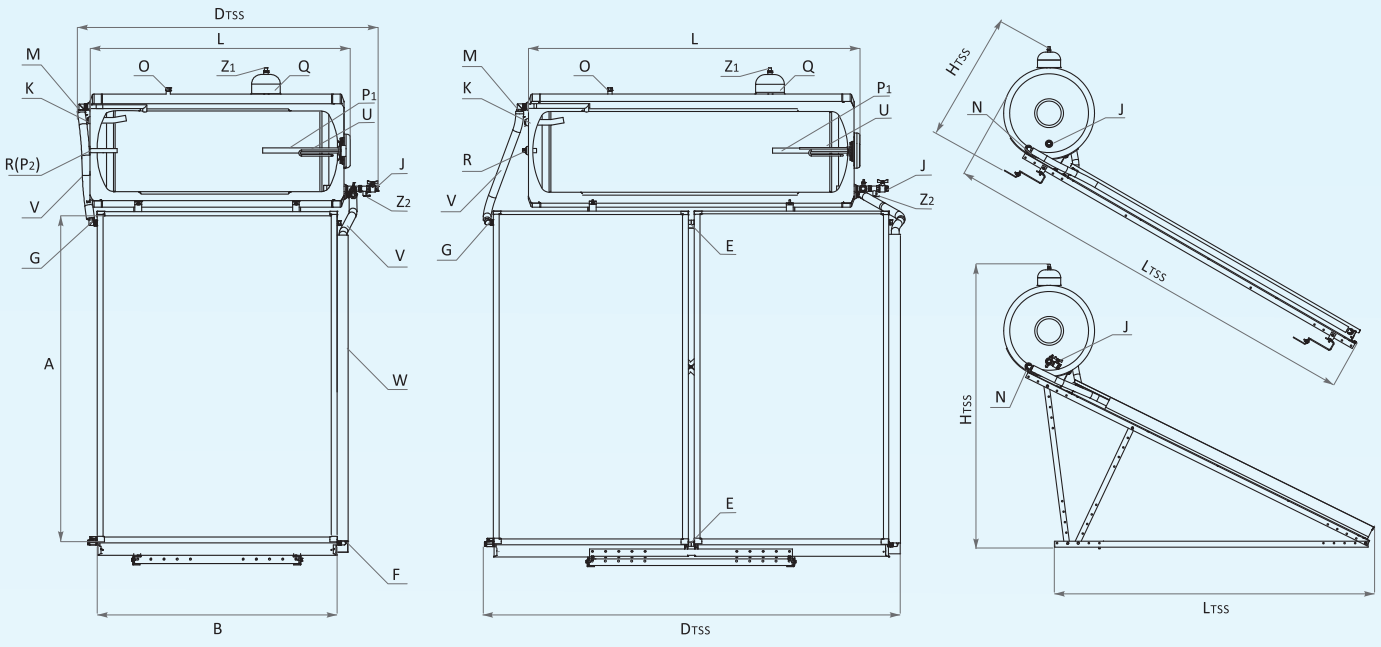




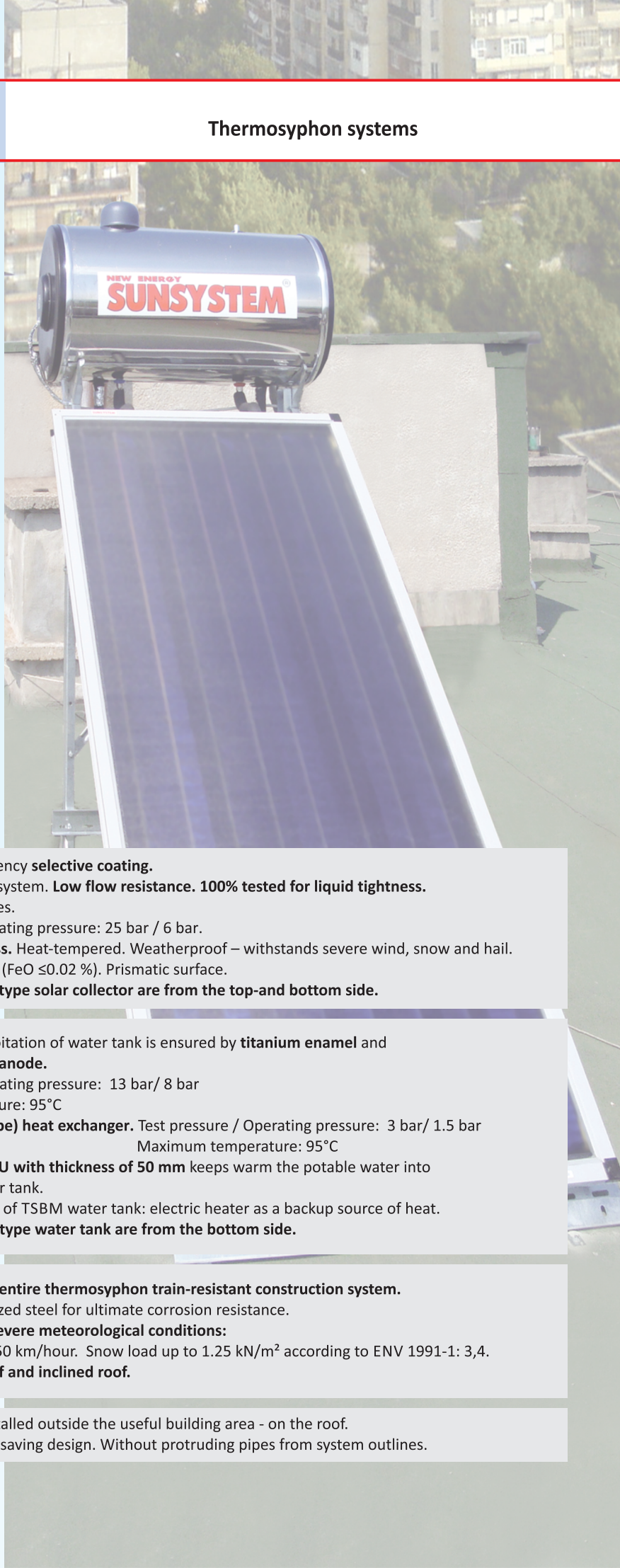
Dimensions for installation:	Inclined roof- Height H / Width D / Length L Flat roof- Height H / Width D / Length L	mm
	Volume of Heat carrier fluid	L
Overall weight of TSS excluding	water load. Installation: inclined roof/ flat roof	kg
	Stainless corrugated pipe: Diameter/ Insulation	V, ø/mm
	Decorative corrugated pipe holder	W, mm
	Safety valve	Z1/Z2
	Roof-top support system TSS for inclined roof	X
	Roof-top support system TSS for flat roof	Y

Dimensions of flat-plate collector case:	Height Width / Thickness	A, mm B / C, mm
	Type of collector connection	E
	Inlet/ outlet of collector heat carrier	F / G

Water tank TSB: Length / Diameter	L /D, ø mm
Cold water inlet / Hot water outlet	J/K
Inlet / outlet of Heat carrier (mantle)	M/N
Capacity of water tank	L
Capacity of mantle	L
Air vent	O
Expansion vessel: Connection / Capacity	Q
Anode	P1/P2
Recirculation	R
Electric heating element	U, kW/V



TSS 100	TSS 150		TSS 200		TSS 300
1x PK SL CL 2.15	1x PK SL CL 2.15	1x PK SL CL 2.7	2x PK SL CL 2.15	1x PK SL CL 2.7	2x PK SL CL 2.15
870/1300/2740 1900/1300/2300	1870/1550/2740 900/1550/2300	870/1550/2740 1900/1550/2300	920/2330/2740 1950/2330/2300	920/1630/2740 1950/1630/2300	920/2060/2740 1950/2060/2300
17	17	17	30	25	30
115/125	125/140	130/145	175/190	145/155	220/235
DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13
2080	2080	2080	2080	2080	2080
1/2" / 1/2"	1/2" / 1/2"	1/2" / 1/2"	1/2 / 3/4"	1/2" / 3/4"	1/2" / 3/4"
✓		✓	✓	✓	✓
✓		✓	✓	✓	✓
2125 1020 / 90	2125 1020 / 90	2125 1248 / 90	2125 1020 / 90	2125 1248 / 90	2125 1020 / 90
hollaender fitting 1/2"	hollaender fitting 1/2"		hollaender fitting 1/2"		hollaender fitting 1/2"
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"
1000 / ø520	1250 / ø520	1250 / ø520	1340 / ø580	1340 / ø580	1750 / ø580
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ¾"/R ¾"	R ¾"/R ¾"	R ¾"/R ¾"
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"
100	150	150	200	200	300
5.1	6.9	6.9	8.1	8.1	11.2
R ½"	R ½"	R ½"			
R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L
✓ / ✓	✓ / ✓	✓ / ✓	✓ / -	✓ / -	✓ / -
			R ½"	R ½"	R ½"
2/~220	2/~220	2/~220	3/~220	3/~220	3/~220



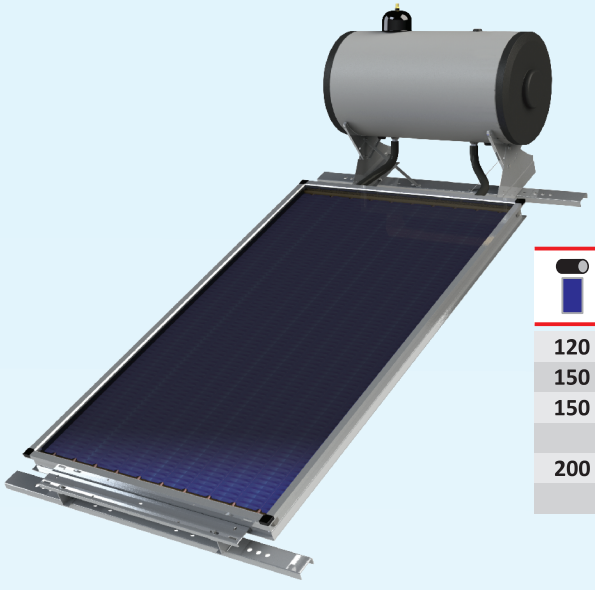
Thermosyphon system is a cost-effective way to heat water with solar energy. It makes use of the natural thermal convection of liquids to transfer the heat from solar collectors to water tank.

The thermosyphon system is comprised of flat plate solar collector (one or two pieces), connected to a solar water tank with a cylinder-type heat exchanger.

The circulation of heat carrier liquid is driven by natural thermal convection. The heat carrier fluid into collector absorber 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 water tank. As it cools down, the heat carrier then is returned to the collector to repeat the process.

All connections are placed between solar collector and thermosyphon water tank and do not protrude outside the boundaries of the unit.

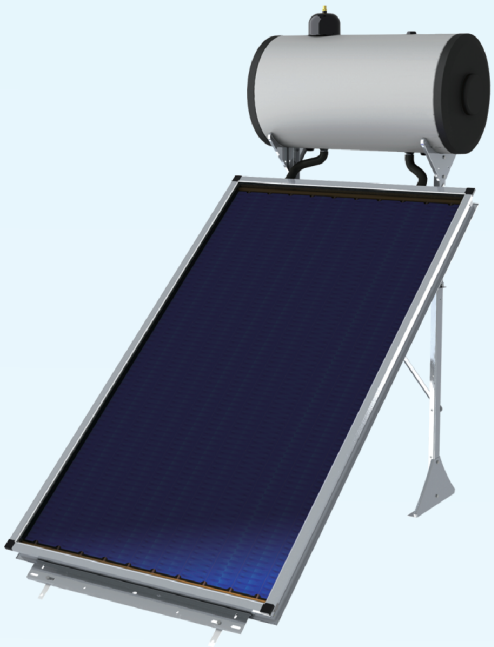
Flat-plate solar collector PK SL CL-TO	**Absorber** high efficiency **selective coating.** Harp absorber pipe system. **Low flow resistance. 100% tested for liquid tightness.** Made of **copper** pipes. Test pressure / Operating pressure: 25 bar / 6 bar. **Protective solar glass.** Heat-tempered. Weatherproof – withstands severe wind, snow and hail. Low ferrous content (FeO ≤0.02 %). Prismatic surface. **Connections of this type solar collector are from the top-and bottom side.**
Thermosyphon water tank TSBM	Corrosion-free exploitation of water tank is ensured by **titanium enamel** and built-in **magnesium anode.** Test pressure / Operating pressure: 13 bar/ 8 bar Maximum temperature: 95°C **Mantle (cylinder-type) heat exchanger.** Test pressure / Operating pressure: 3 bar/ 1.5 bar Maximum temperature: 95°C **Insulation of rigid PU with thickness of 50 mm** keeps warm the potable water into thermosyphon water tank. Optional equipment of TSBM water tank: electric heater as a backup source of heat. **Connections of this type water tank are from the bottom side.**
Support system for thermosyphon system	**A single s bears the entire thermosyphon train-resistant construction system.** Made of hot-galvanized steel for ultimate corrosion resistance. **Designed to resist severe meteorological conditions:** Wind speed up to 150 km/hour. Snow load up to 1.25 kN/m² according to ENV 1991-1: 3,4. **Versions for flat roof and inclined roof.**
Entire out-of-the-building mounting concept	Whole system is installed outside the useful building area - on the roof. Compact and space-saving design. Without protruding pipes from system outlines.



TSSM
installation on inclined roof

Flat-plate solar collector PK SL CL-TO.
Thermosyphon water tank TSBM.
Support system for inclined roof.

		PK m²	TSBM L	Model	Code
120		2.15	100	TSSM 120 PK SL CL 2.15 IR	04110304101033
150		2.15	150	TSSM 150 PK SL CL 2.15 IR	04110304101035
150		2.7	150	TSSM 150 PK SL CL 2.70 IR	04110304101036
	200	2.15	200	TSSM 200 2PK SL CL 2.15 IR	04110304101038
200		2.7	200	TSSM 200 PK SL CL 2.7 IR	04110304101039
	300	2.15	300	TSSM 300 2PK SL CL 2.15 IR	04110304101041



TSSM
installation on flat roof

Flat-plate solar collector PK SL CL-TO.
Thermosyphon water tank TSBM.
Support system for flat roof.

		PK m²	TSBM L	Model	Code
120		2.15	100	TSSM 100 PK SL CL 2.15 FR	04110304101003
150		2.15	150	TSSM 150 PK SL CL 2.15 FR	04110304101005
150		2.7	150	TSSM 150 PK SL CL 2.70 FR	04110304101006
	200	2.15	200	TSSM 200 2PK SL CL 2.15 FR	04110304101008
200		2.7	200	TSSM 200 PK SL CL 2.7 FR	04110304101009
	300	2.15	300	TSSM 300 2PK SL CL 2.15 FR	04110304101011

Recommended heat carrier fluid (Included in the kit)

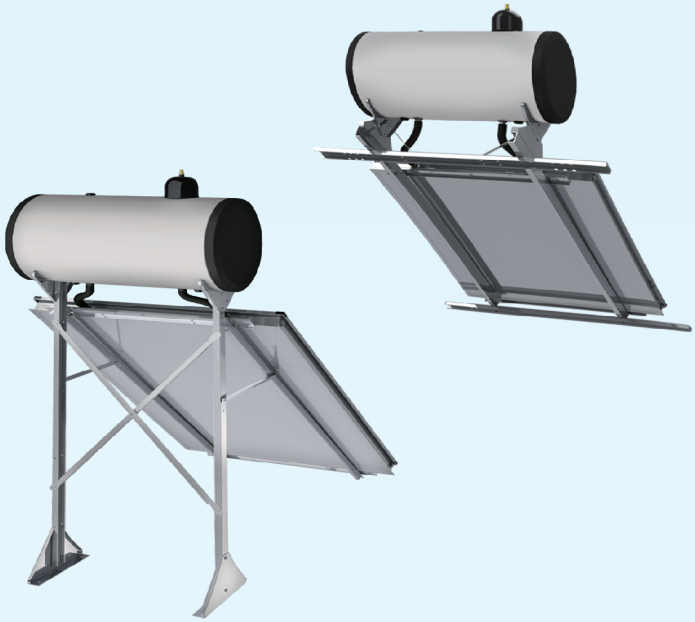
Propylene glycol.
Used for freeze protection of the collector (in closed loop systems).

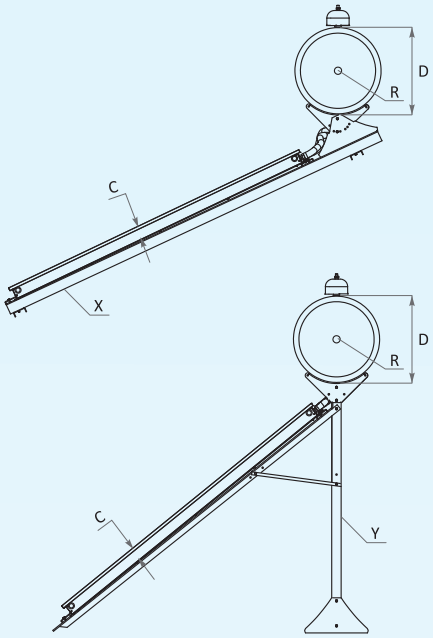
Item	Code
Propylene glycol, concentrate	31560000000020

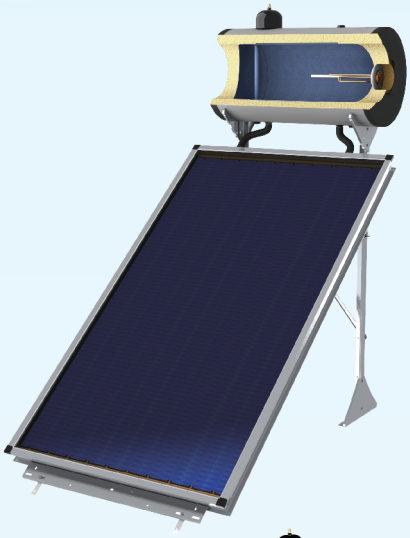
Mixing ratio:
Propylene glycol (PG) : Water (H_2O)

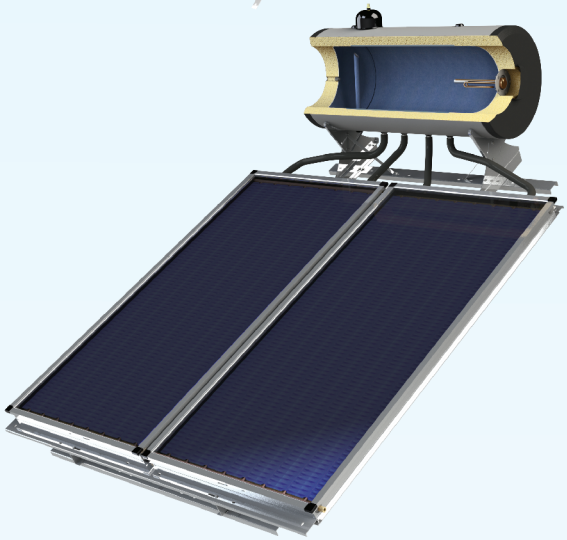
50% : 50% (Freezing point: minus 34°C)
40% : 60% (Freezing point: minus 23°C)
30% : 70% (Freezing point: minus 13°C)

Technical characteristics.







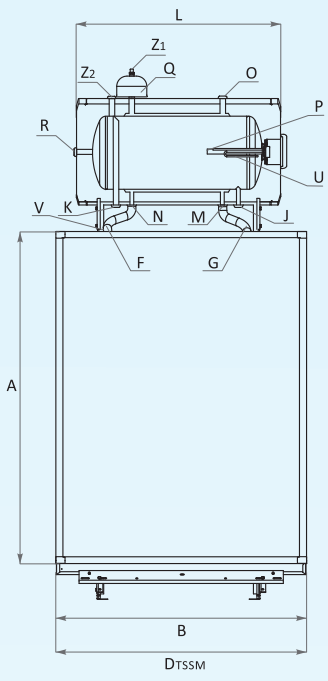


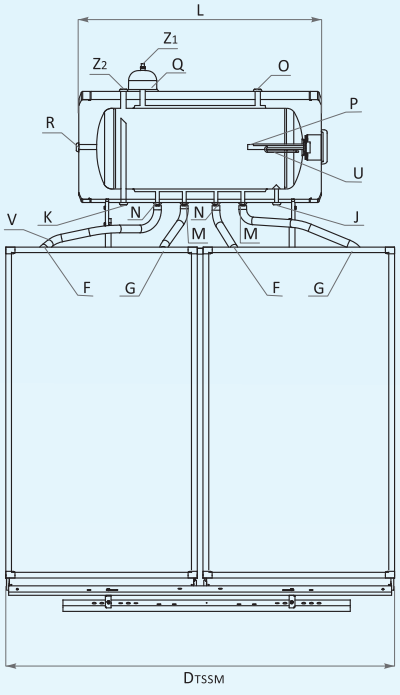
Dimensions for installation:	Inclined roof- Height H / Width D / Length L Flat roof- Height H / Width D / Length L	mm
	Volume of Heat carrier fluid	L
Overall weight of TSSM excluding water load. Installation: inclined roof/ flat roof		kg
	Stainless corrugated pipe: Diameter/ Insulation	V, ø/mm
	Safety valve	Z1
	Sleeve for temperature and pressure relief valve, 8 bar*	Z2
	Roof-top support system TSSM for inclined roof	X
	Roof-top support system TSSM for flat roof	Y

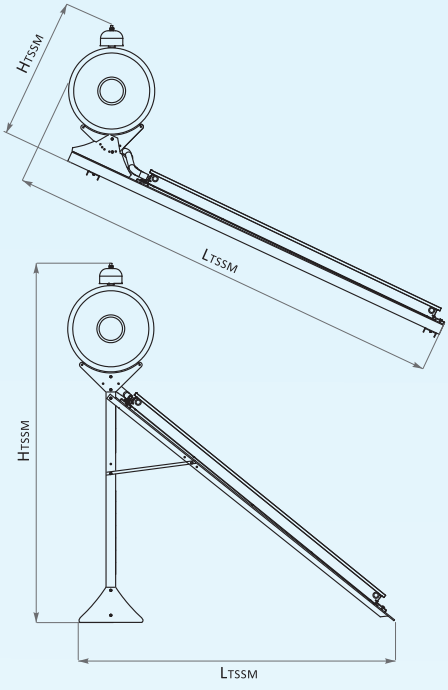
Dimensions of flat-plate collector case:	Height Width / Thickness	A, mm B / C, mm
	Inlet/ outlet of collector heat carrier	F / G

Water tank TSBM: Length / Diameter	L /D, ø mm
Cold water inlet / Hot water outlet	J/K
Inlet / outlet of Heat carrier (mantle)	M/N
Capacity of water tank	L
Capacity of mantle	L
Air vent	O
Expansion vessel: Connection / Capacity	Q
Anode	P1/P2
Recirculation	R
Electric heating element	U, kW/V

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







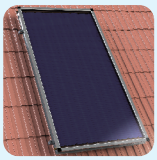
TSSM 150 1x PK SL CL 2.15 TO	TSSM 150 1x PK SL CL 2.15 TO	 1x PK SL CL 2.7 TO	TSSM 200 2x PK SL CL 2.15 TO	 1x PK SL CL 2.7 TO	TSSM 300 2x PK SL CL 2.15 TO
900/1020/2920 2310/1020/2080	900/1250/2920 2310/1250/2080	900/1250/2920 2310/1250/2080	950/1350/2920 2360/1350/2080	950/1350/2920 2360/1350/2080	950/1750/2920 2360/1750/2080
17	17	17	30	25	30
140/135	155/145	160/150	165/160	170/165	255/250
DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13	DN ø12 /13
½"	½"	½"	½"	½"	½"
¾"	¾"	¾"	¾"	¾"	¾"
✓		✓	✓	✓	✓
✓		✓	✓	✓	✓
2125 1020 / 90	2125 1020 / 90	2125 1248 / 90	2125 1020 / 90	2125 1248 / 90	2125 1020 / 90
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"
1000 / ø520	1250 / ø520	1250 / ø520	1340 / ø580	1340 / ø580	1750 / ø580
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ¾"/R ¾"	R ¾"/R ¾"	R ¾"/R ¾"
R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"	R ½"/R ½"
120	150	150	200	200	300
4.5	6.1	6.1	7	7	12.5
R ½"	R ½"	R ½"			
R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L	R ½" / 2L
✓ / ✓	✓ / ✓	✓ / ✓	✓ / -	✓ / -	✓ / -
			R ½"	R ½"	R ½"
2/~220	2/~220	2/~220	3/~220	3/~220	3/~220

Specially designed support systems for SUNSYSTEM solar appliances as solar collector, hybrid collector and thermosyphon system.

The support system serves not only to bear the appliance. Its special design ensures the weight is evenly distributed to the roof underneath so as to protect it from damage even in case of unfavorable meteorological conditions.

A cost-effective solution for any roof type and facade.
Designed to resist severe meteorological conditions:
Wind speed up to 150 km/hour.
Snow load up to 1.25 kN/m^2 acc. to ENV 1991-1: 3,4.

Support system for flat-plate solar collector PK SL CL	Strain-resistant construction. Made of **Aluminum** for ultimate corrosion resistance. Easy installation. Versions for flat roof and inclined roof. **Fine-tuning of inclination angle** (all models for flat roof installation). **Adjustable mounting plate** (all models for inclined roof installation).
Support system for flat-plate solar collector PK SL FP	Strain-resistant construction. Made of **hot-galvanized steel** for ultimate corrosion resistance. Easy installation. Versions for flat roof and inclined roof. **Fine-tuning of inclination angle** (all models for flat roof installation). **Adjustable mounting plate** (all models for inclined roof installation).
Support system for evacuated tube solar collector VTC	Strain-resistant construction. Made of **hot-galvanized steel** for ultimate corrosion resistance. Easy installation. Versions for flat roof, inclined roof and façade. **Fine-tuning of inclination angle** (all models for flat roof installation). **Adjustable mounting plate** (all models for inclined roof installation).
Support system for hybrid solar collector PVT	Strain-resistant construction. Made of **Aluminum** for ultimate corrosion resistance. Easy installation. Versions for flat roof and inclined roof. **Fine-tuning of inclination angle** (all models for flat roof installation). **Adjustable mounting plate** (all models for inclined roof installation).
Support system for thermosyphon system TSS / TSSM	A single s bears the entire thermosyphon train-resistant construction system. Made of **hot-galvanized steel** for ultimate corrosion resistance. Easy installation. Versions for flat roof and inclined roof. **Fine-tuning of inclination angle** (all models for flat roof installation). **Adjustable mounting plate** (all models for inclined roof installation). **Three positions adjustable arc base** (all models for inclined roof installation).



**Support system
for PK SL CL
inclined roof installation**

	Model	Code
2.15	ASIR 1 PK - 2.15	00151041006002
2.15	ASIR 2 PK - 2.15	00151041006005
2.7	ASIR 1 PK - 2.70	00151041006003
2.7	ASIR 2 PK - 2.70	00151041006006

**Support system
for PK SL CL
flat roof installation**

	Model	Code
2.15	ASFR 1 PK - 2.15	00151040006002
2.15	ASFR 2 PK - 2.15	00151040006005
2.7	ASFR 1 PK - 2.70	00151040006003
2.7	ASFR 2 PK - 2.70	00151040006006

**Support system
for PK SL FP
inclined roof installation**

	Model	Code
2.0 / 2.4	ASIR 1 PK SL FP	21151141000011
2.0 / 2.4	ASIR 2 PK SL FP	21151141000012

**Support system
for PK SL FP
flat roof installation**

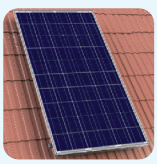
	Model	Code
2.0 / 2.4	ASFR 1 PK SL FP	21151140000001
2.0 / 2.4	ASFR 2 PK SL FP	21151140000002

**Support system
for VTC
inclined roof installation**

Included in VTC kit.

**Support system
for VTC
flat roof installation**

	Model	Code
15	SFR 1 VTC 15	21151100000001
20	SFR 1 VTC 20	21151100000002
30	SFR 1 VTC 30	21151100000003

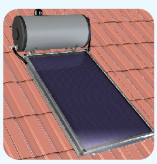


**Support system
for PVT
inclined roof installation**

Specific design.

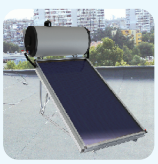
**Support system
for PVT
flat roof installation**

Specific design.



**Support system
for TSS/TSSM
inclined roof installation**

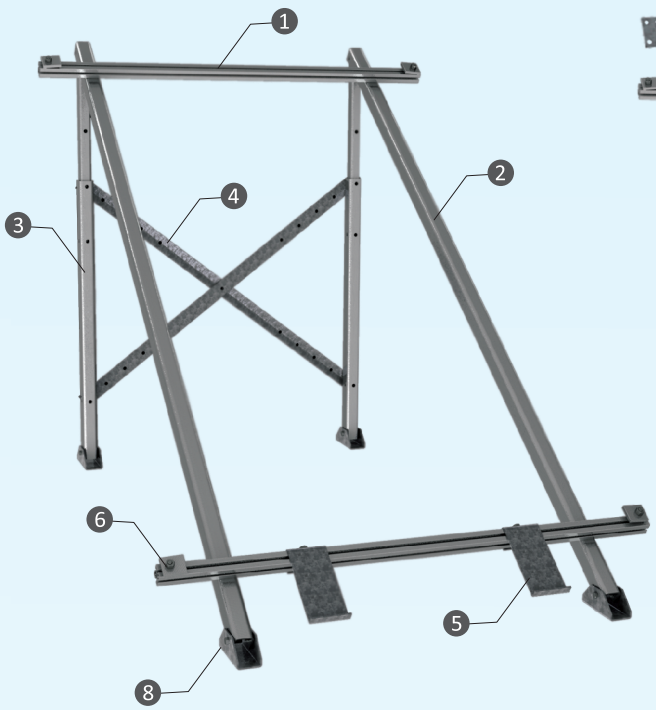
Included in TSS/TSSM kit.



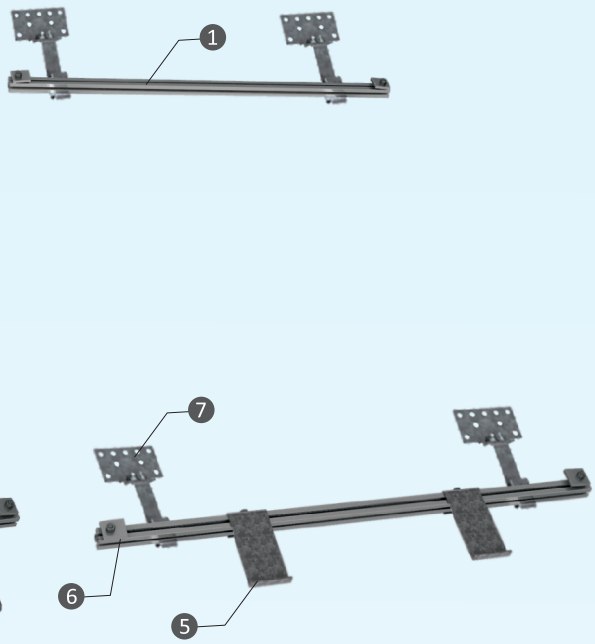
**Support system
for TSS/TSSM
flat roof installation**

Included in TSS/TSSM kit.

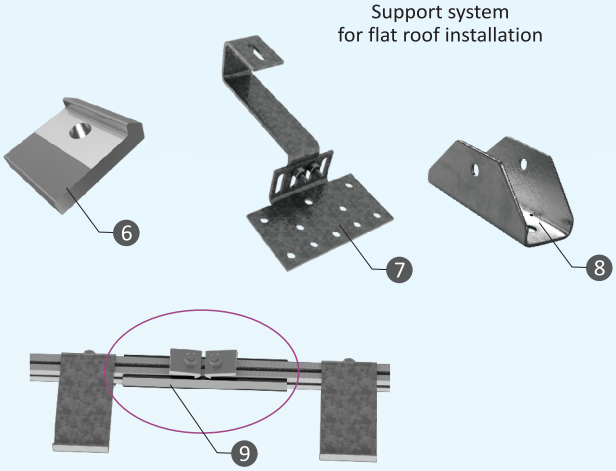
Technical characteristics.



Support system
for flat roof installation



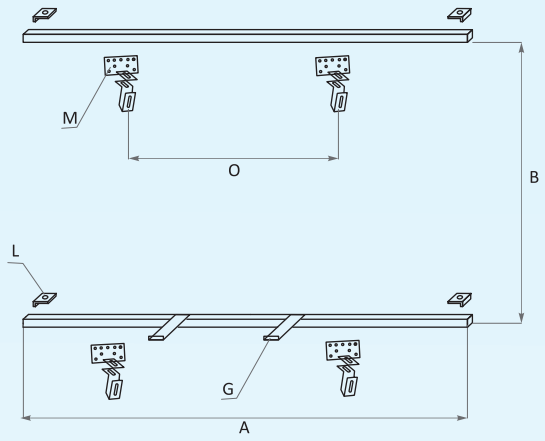
Support system
for inclined roof installation

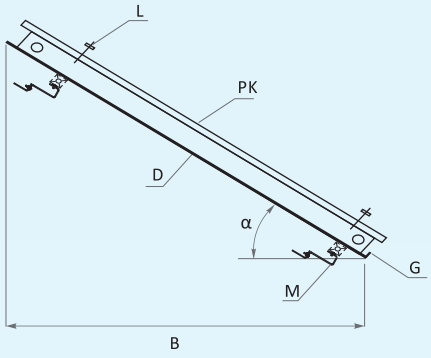


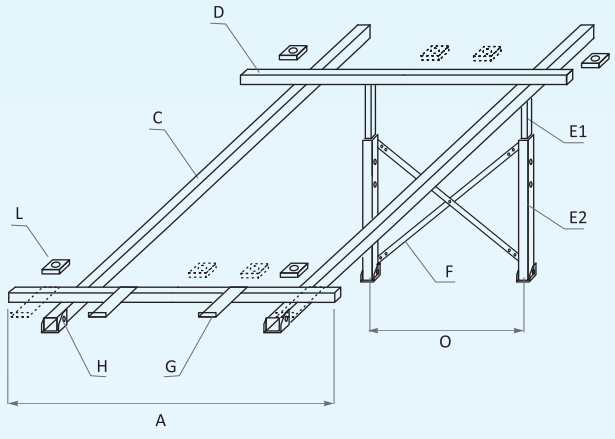
1. Tie-beam
2. Mainbeam
3. Telescopic leg
4. Crossbar
6. Retaining plate
7. Adjustable mounting plate
8. Foot
9. Extension rail

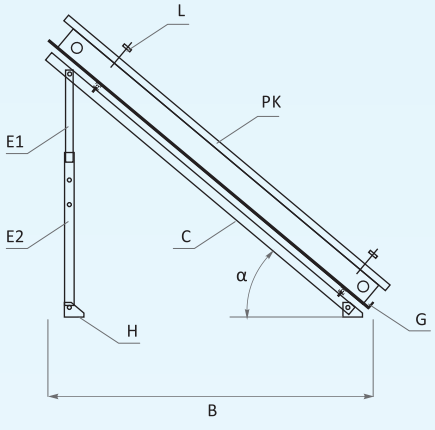
Available in modifications:

flat roof installation	1 x PK SL CL 2,15	2 x PK SL CL 2,15	3 x PK SL CL 2,15	4 x PK SL CL 2,15	5 x PK SL CL 2,15	6 x PK SL CL 2,15	7 x PK SL CL 2,15	8 x PK SL CL 2,15	9 x PK SL CL 2,15	10 x PK SL CL 2,15
	1 x PK SL CL 2,7	2 x PK SL CL 2,7	3 x PK SL CL 2,7	4 x PK SL CL 2,7	5 x PK SL CL 2,7	6 x PK SL CL 2,7	7 x PK SL CL 2,7	8 x PK SL CL 2,7		
inclined roof installation	1 x PK SL CL 2,15	2 x PK SL CL 2,15	3 x PK SL CL 2,15	4 x PK SL CL 2,15	5 x PK SL CL 2,15	6 x PK SL CL 2,15	7 x PK SL CL 2,15	8 x PK SL CL 2,15	9 x PK SL CL 2,15	10 x PK SL CL 2,15
	1 x PK SL CL 2,7	2 x PK SL CL 2,7	3 x PK SL CL 2,7	4 x PK SL CL 2,7	5 x PK SL CL 2,7	6 x PK SL CL 2,7	7 x PK SL CL 2,7	8 x PK SL CL 2,7		



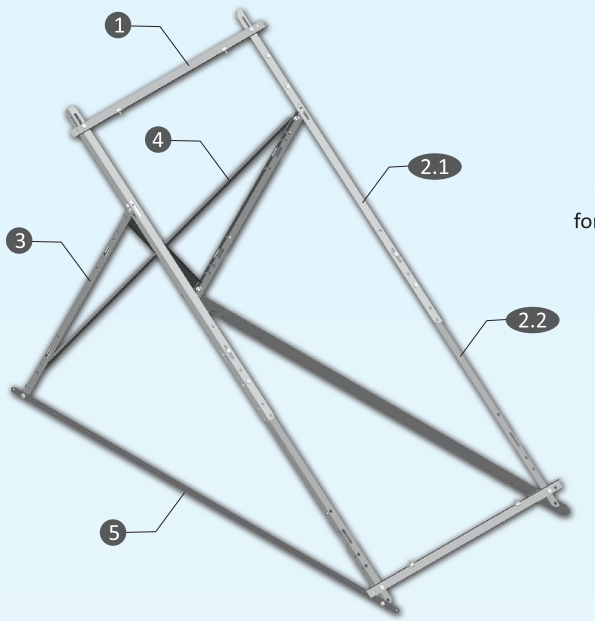




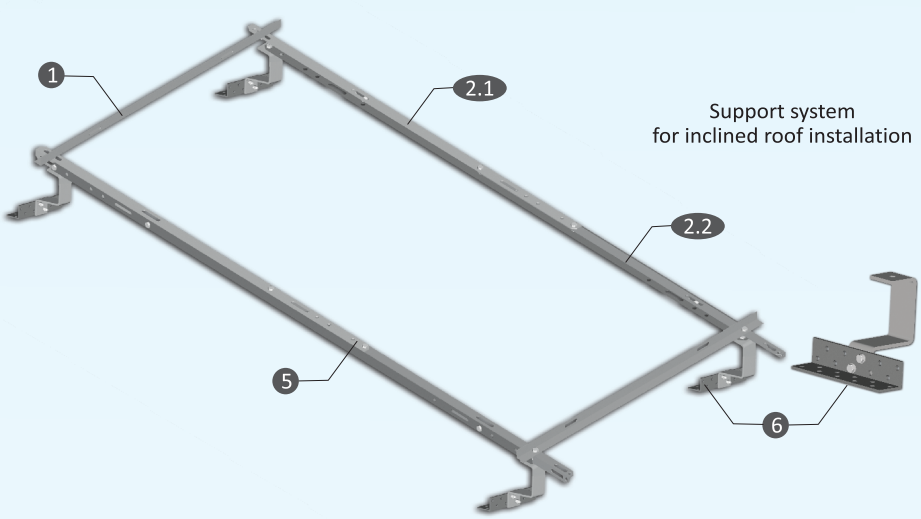


Support system for		1x PK SL CL 2.15		1x PK SL CL 2.7	
Number of collectors, mounted on the support system	pcs	1÷10	1÷10	1÷8	1÷8
Collector positioning angle	∢α °	30°÷45°	30°÷45°	30°÷45°	30°÷45°
Installation dimensions of support system for 1xPK	A, mm B, mm	1065 2200	1065 1630	1295 2200	1295 1630
Mainbeam, 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 load-bearing elements	O, mm	710	680	863	842
Weight	kg	4,1	14,6	4,5	15,0

Technical characteristics.



Support system
for flat roof installation

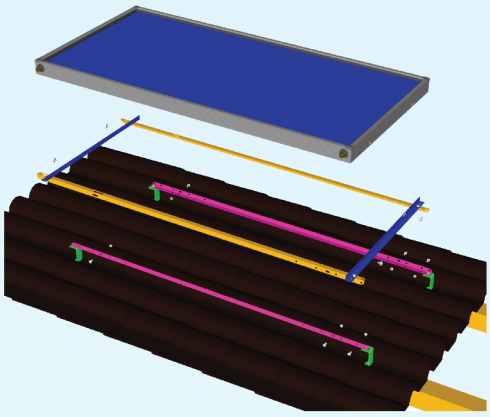


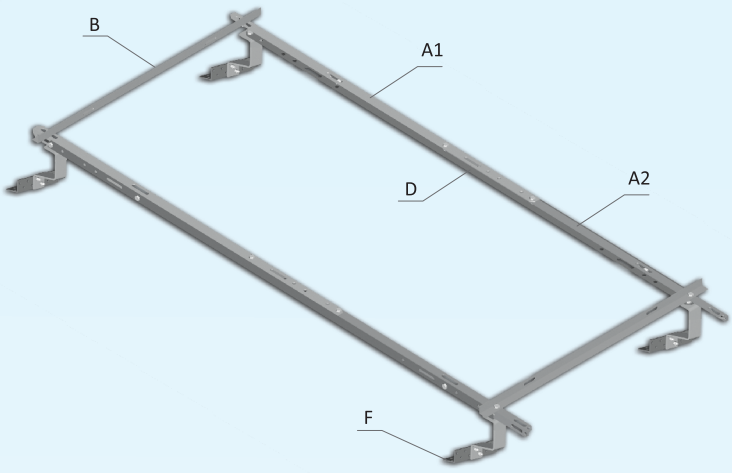
Support system
for inclined roof installation

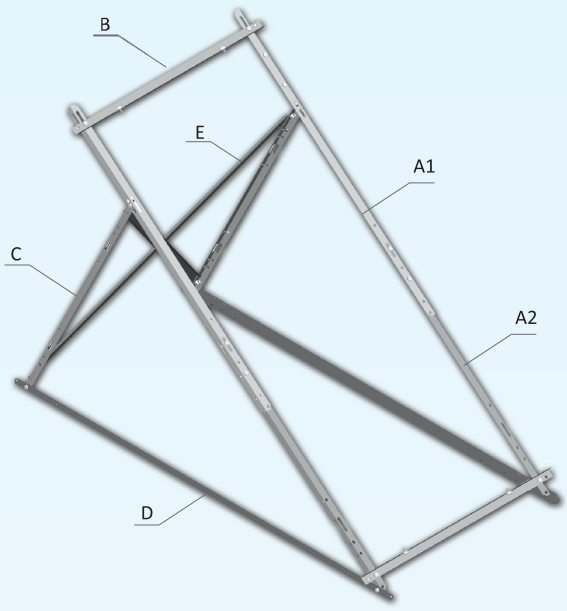
Available in modifications:

flat roof installation	1 x PK SL FP 2.0	2 x PK SL FP 2.0
	1 x PK SL FP 2.4	2 x PK SL FP 2.4
inclined roof installation	1 x PK SL FP 2.0	2 x PK SL FP 2.0
	1 x PK SL FP 2.4	2 x PK SL FP 2.4

1. Collector holder
2.1 Mainbeam, element 1
2.2 Mainbeam, element 2
3. Back beams
4. Crossbar
5. Ground base
6. Adjustable mounting plate

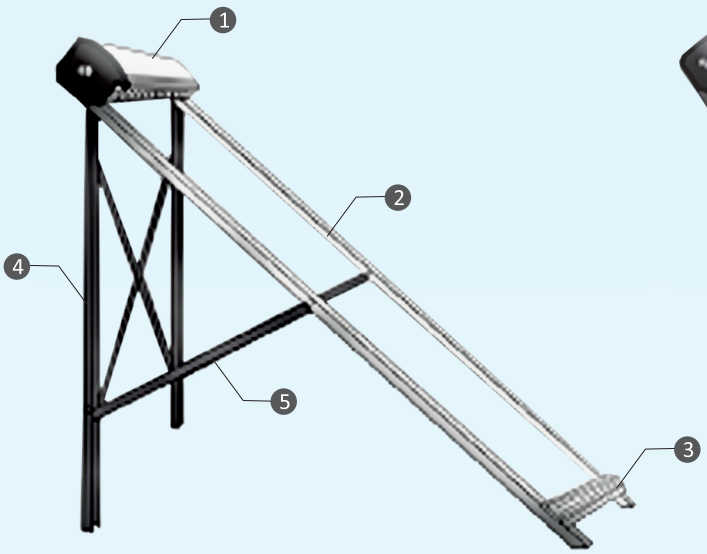




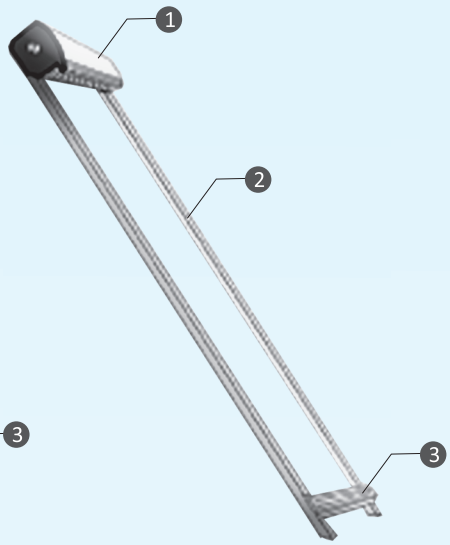


Support system for		1x PK SL FP 2.0 / 2.4	
Number of collectors, mounted on the support system	pcs.	1÷2	1÷2
Collector positioning angle on the support system	∢α °	30°÷45°	30°÷45°
Mainbeam Element 1, L-profile 33 x33	A1, mm	2x1370	2x1370
Element 2, L-profile 30x30	A2, mm	2x1270	2x1270
Collector holder, L-profile 30x30 for 1 collector	B, mm	2x1000	2x1000
for 2 collectors		2x2000	2x2000
Back beam, L-profile 30x30	C, mm	2	2
Ground base, L-profile 33x33	D, mm	2x 2000	2x 2000
Crossbar	E, pcs.	2	2
A djustable mounting plate	F, pcs.	4	
Weight - Support system for 1 collector / Support system for 2 collectors	kg	24/26	18/20

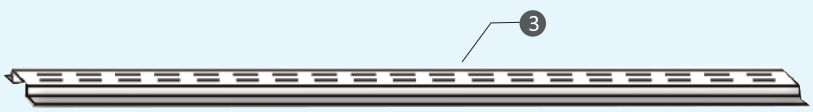
Technical characteristics.

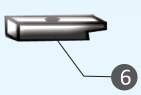


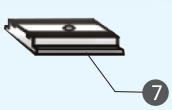
Support system
for flat roof installation



Support system
for inclined roof installation





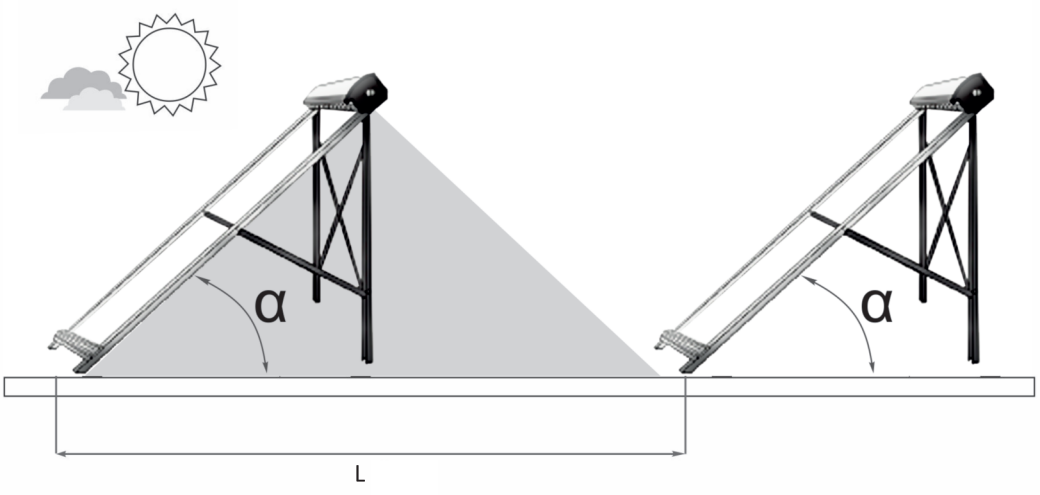


Available in modifications:

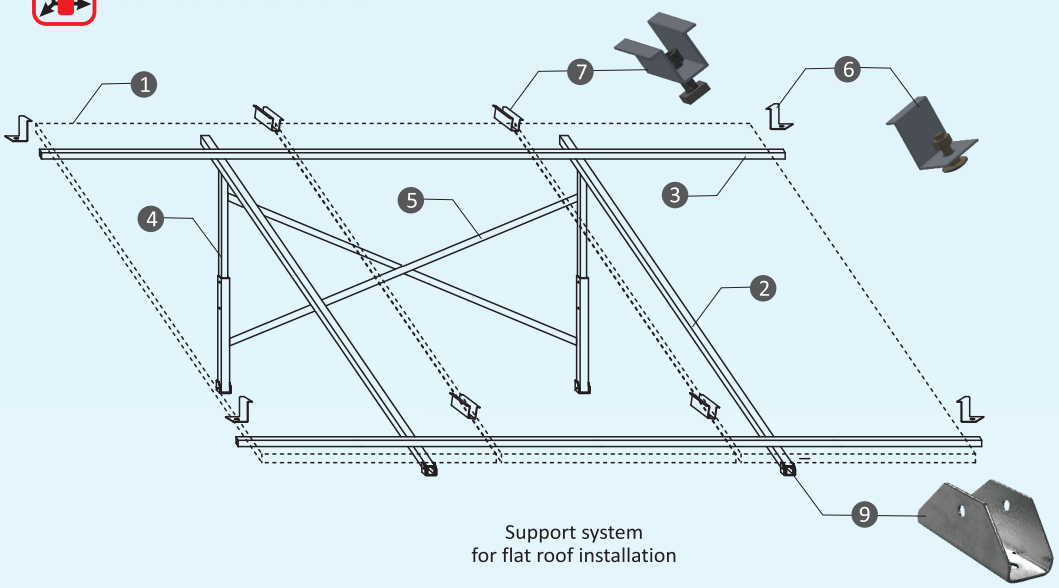
flat roof installation	1 x VTC 15	1 x VTC 20	1 x VTC 30
inclined roof installation	1 x VTC 15	1 x VTC 20	1 x VTC 30
façade installation	1 x VTC 15	1 x VTC 20	1 x VTC 30

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

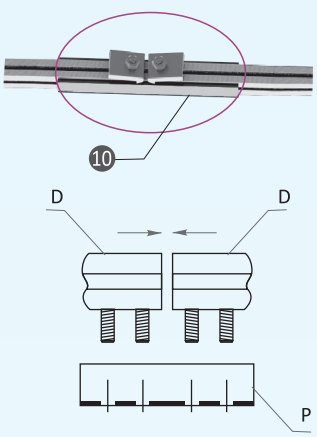
Collector positioning angle α	Distance L between rows, m
25°	4,74
30°	5,18
35°	5,58
40°	5,94
45°	6,26
50°	6,52
55°	6,74
60°	6,90



Technical characteristics.



Support system
for flat roof installation

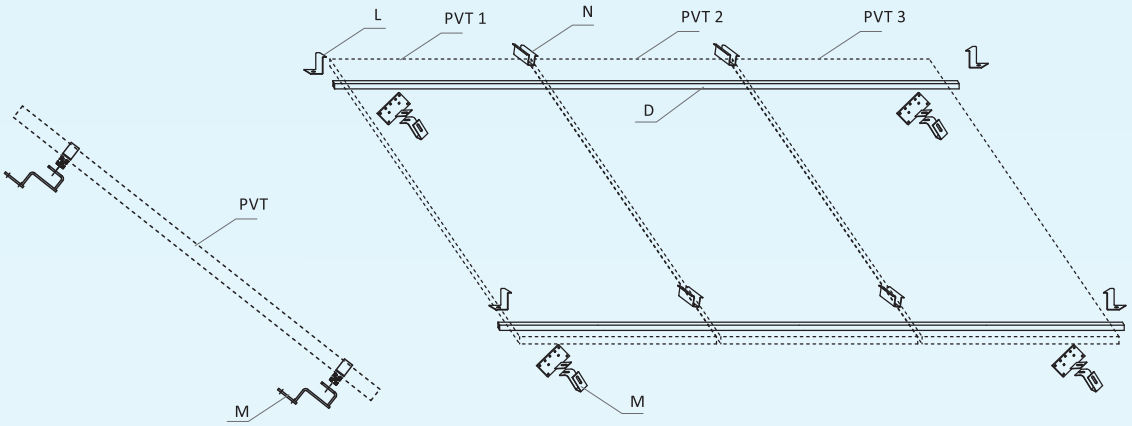


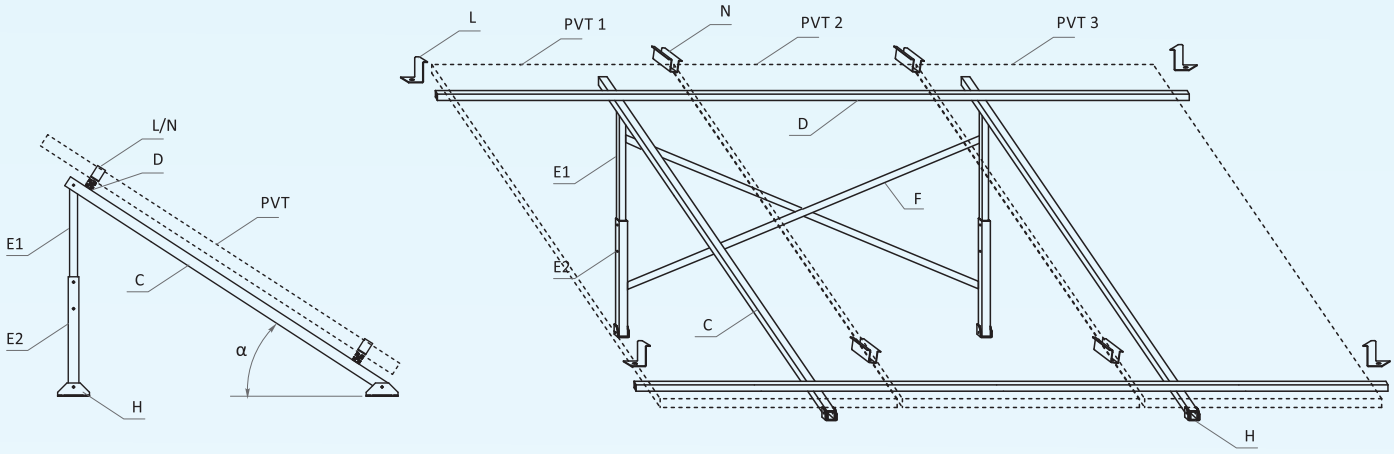
Support system
for inclined roof installation

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

Available in modifications:

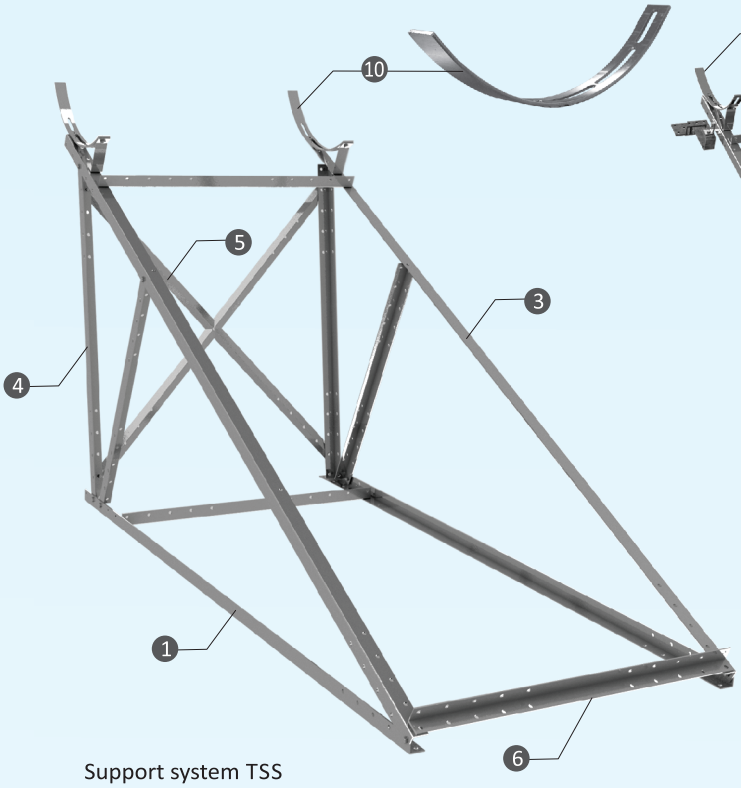
flat roof installation	1 x PVT 240	2 x PVT 240	3 x PVT 240	4 x PVT 240	5 x PVT 240	6 x PVT 240	7 x PVT 240	8 x PVT 240	9 x PVT 240	10 x PVT 240	11 x PVT 240	12 x PVT 240
inclined roof installation	1 x PVT 240	2 x PVT 240	3 x PVT 240	4 x PVT 240	5 x PVT 240	6 x PVT 240	7 x PVT 240	8 x PVT 240	9 x PVT 240	10 x PVT 240	11 x PVT 240	12 x PVT 240



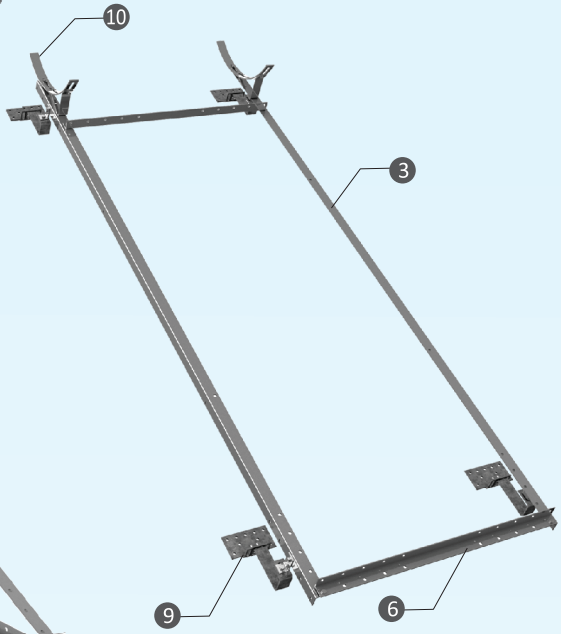


Support system for		1 x PVT 240 /2 x PVT 240/ 3 x PVT 240	
Installation dimensions of support system for 1 x PVT 240	mm	1650 x 990 x 40	1650 x 990 x 40
Collector positioning angle	∢α °	30°÷45°	30°÷45°
Mainbeam, 40x40x4	C, mm		2/2/3
Tie-beam, 40x40x4	D, pcs.	2	2
Telescopic leg Element 1, 40x40x4	E1, mm		2/2/3
Element 2, 30x30x3	E2, mm		2/2/3
Galvanized steel crossbar	F, mm		1/1/1
Foot	H, pcs.		2/2/3
End-retaining plate	L, pcs.	4	4
Middle-retaining plate	N, pcs.	2/4/6	2/4/6
Adjustable mounting plate	M, pcs.	4/6/6	
Extension rail	P, pcs.	-/-/2	-/-/2

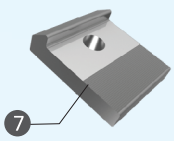
Technical characteristics.

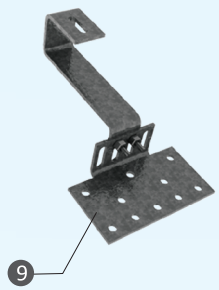


Support system TSS
for flat roof installation



Support system TSS
for inclined roof installation

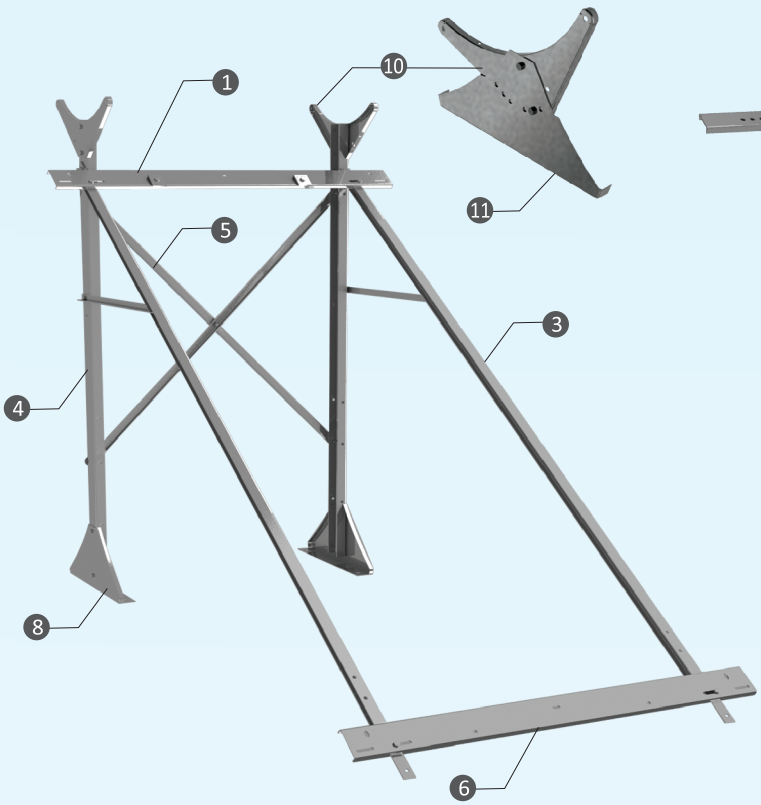




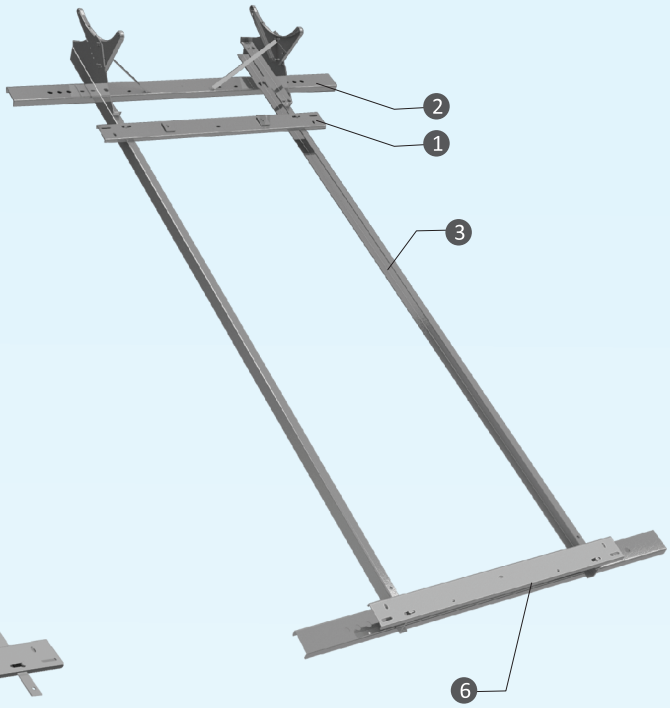
1. Tie-beam
2. Base-beam
3. Mainbeam
4. Leg
5. Crossbar

Available in modifications:

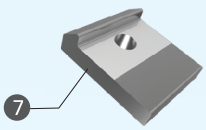
flat roof installation	TSS 100 1x PK SL CL 2.15	TSS 150 1x PK SL CL 2.15	TSS 150 1x PK SL CL 2.7	TSS 200 1x PK SL CL 2.7	TSS 200 2x PK SL CL 2.15	TSS 300 2x PK SL CL 2.15
inclined roof installation	TSS 100 1x PK SL CL 2.15	TSS 150 1x PK SL CL 2.15	TSS 150 1x PK SL CL 2.7	TSS 200 1x PK SL CL 2.7	TSS 200 2x PK SL CL 2.15	TSS 300 2x PK SL CL 2.15



Support system TSSM
for flat roof installation



Support system TSSM
for inclined roof installation



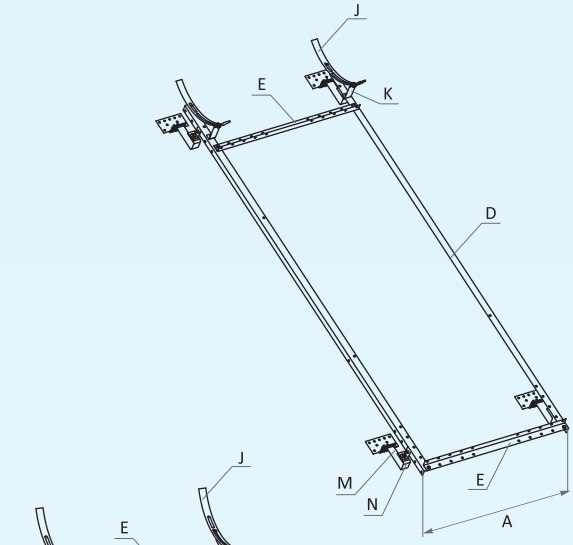
6. Retaining rail
7. Retaining plate
8. Foot
9. Adjustable mounting plate
10. Supporting arc
11. Adjustable arc base

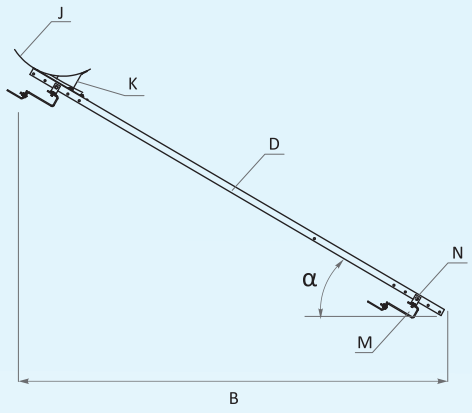
Available in modifications:

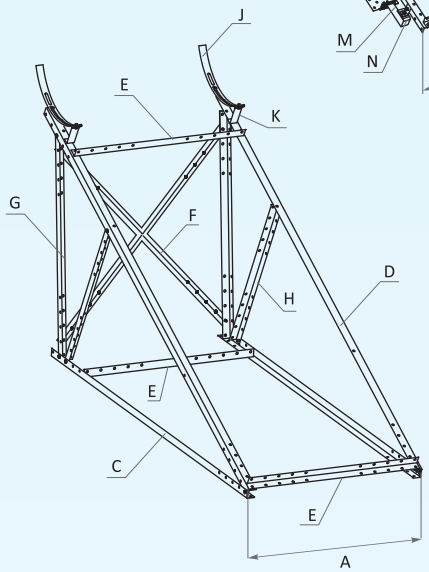
flat roof installation	TSSM 120 1x PK SL CL 2.15TO	TSSM 150 1x PK SL CL2.15TO	TSSM 150 1x PK SL CL 2.7TO	TSSM 200 1x PK SL CL 2.15TO	TSSM 200 1x PK SL CL 2.7TO	TSSM 300 2x PK SL CL 2.15TO
inclined roof installation	TSSM 120 1x PK SL CL 2.15TO	TSSM 150 1x PK SL CL2.15TO	TSSM 150 1x PK SL CL 2.7TO	TSSM 200 1x PK SL CL 2.15TO	TSSM 200 1x PK SL CL 2.7TO	TSSM 300 2x PK SL CL 2.15TO

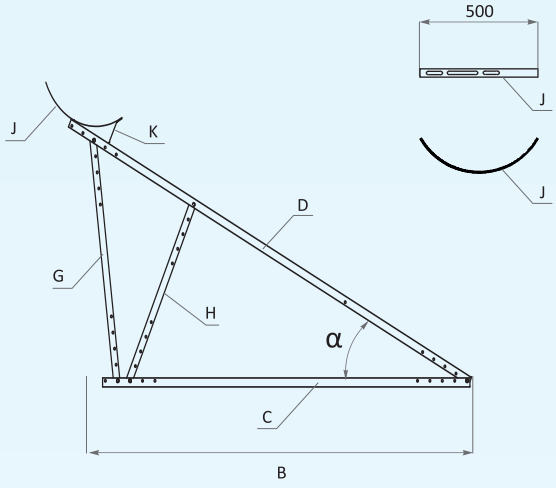
Technical characteristics.

Support system for	
Number of collectors, mounted on the support system	pcs.
Collector positioning angle	∢α °
Installation dimensions of support system	A, mm B, mm
Tie-beam, 35x35	C, mm
Mainbeam, 35x35	D, mm
Retaining rail, 35x35	E, mm
Crossbar	F, mm
Leg, 35x35	G, mm
Side crossbar	H, mm
TSB supporting arc Connecting arc plate	J, mm K, pcs.
Adjustable mounting plate Connecting plate	M, pcs. N, pcs.
Weight	kg







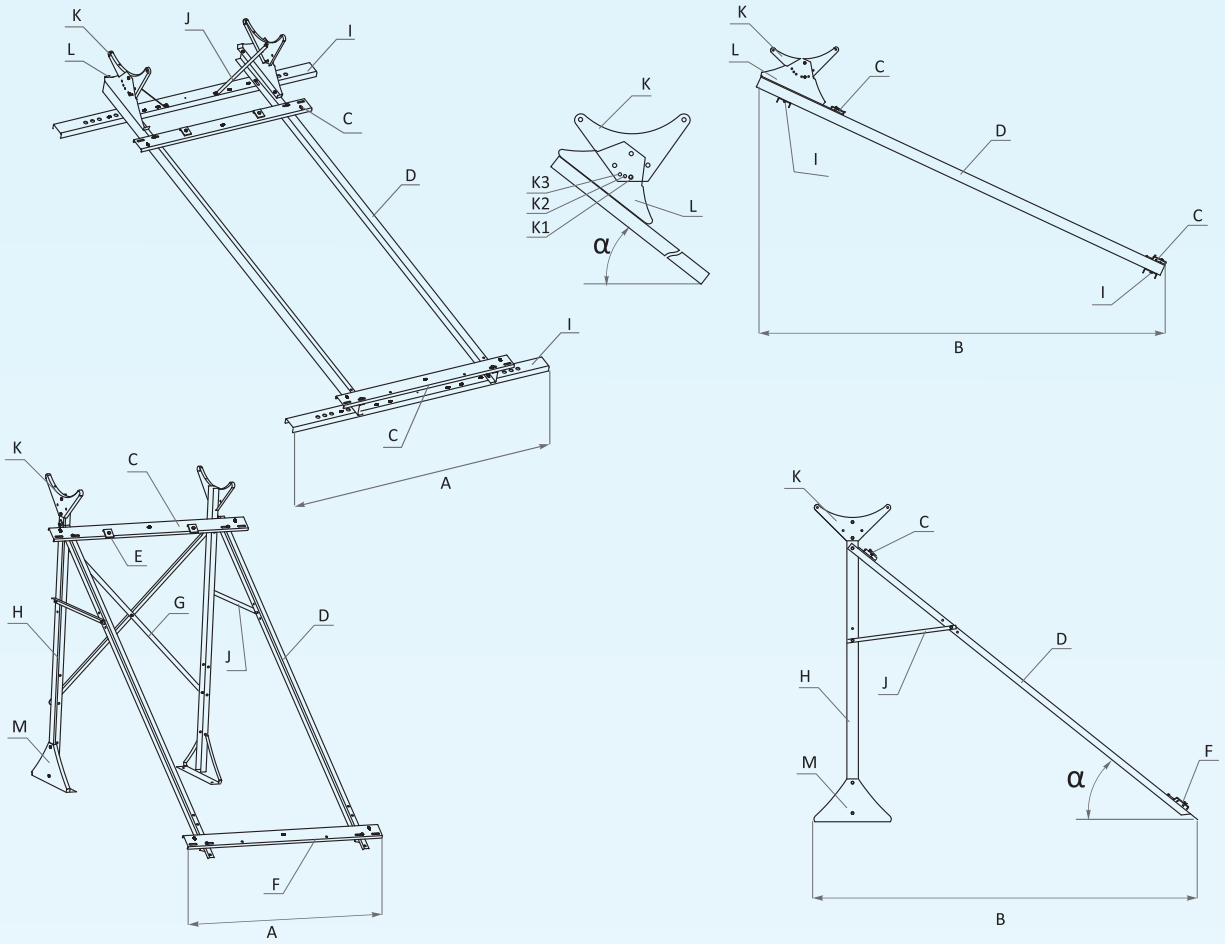


TSS 100 (1 x PK SL CL 2.15) **TSS 150** (1 x PK SL CL 2.15) **TSS 150** (1 x PK SL CL 2.7) **TSS 200** (1 x PK SL CL 2.7)		**TSS 200** (2 x PK SL CL 2.15)		**TSS 300** (2 x PK SL CL 2.15)	
1	1	2	2	2	2
30°	30°	30°	30°	30°	30°
1550 2740	1550 2300	2330 2740	2330 2300	2060 2740	2060 2300
2x2000		2x2000		2x1680	
2x2430	2x2430	2x2430	2x2430	2x2430	2x2430
3x830	2x830	3x1040	2x1040	3x1040	2x1040
2x1220		2x1370		2x1370	
2x1040		2x1040		2x1040	
2x840		2x840		2x840	
2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2	2x (500x40x5) 2
	4 4		4 4		4 4
32	20	32	20	32	20

Technical characteristics.

Support system for

Number of collectors, mounted on the support system	pcs.
Collector positioning angle	∢α °
Installation dimensions of support system	A, mm B, mm
Tie-beam	C, mm
Mainbeam	D, mm
Retaining plate	E, pcs.
Retaining rail	F, mm
Crossbar	G, mm
Leg	H, mm
Side crossbar	J, mm
Base-beam	I, mm
TSBM supporting arc Three positions adjustable arc base	K, pcs. L, pcs.
Foot	M, pcs.
Weight	kg

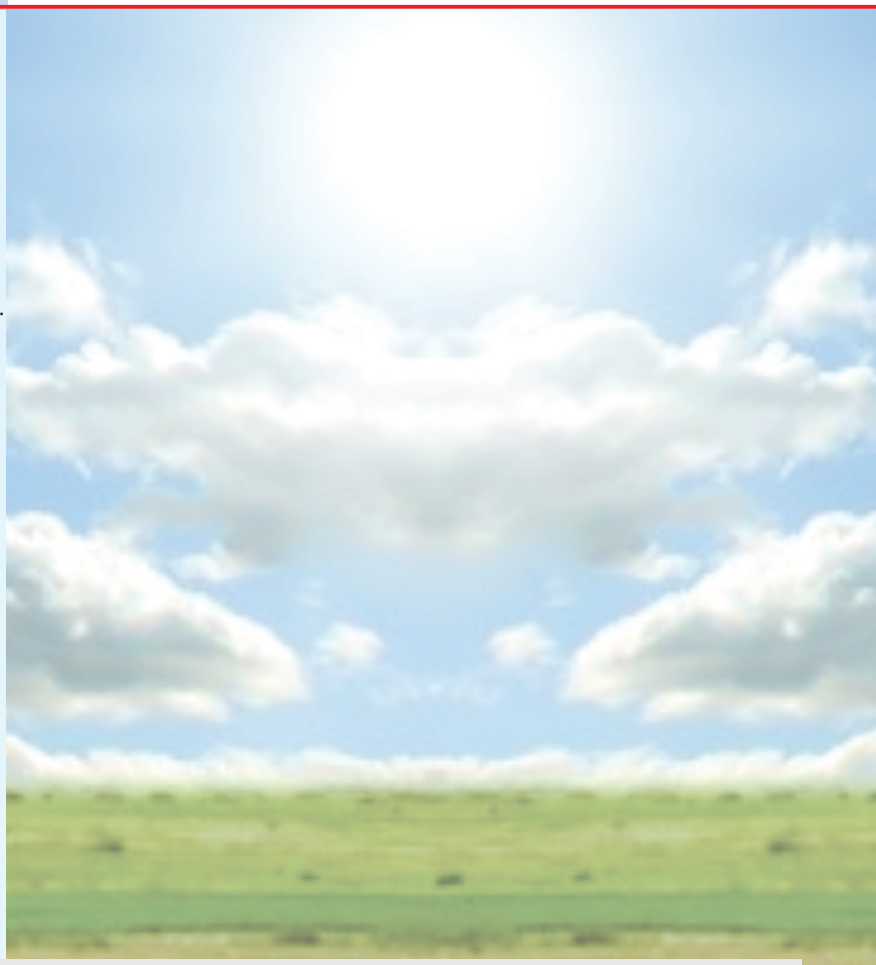


TSSM 120 (1 x PK SL CL 2.15TO) **TSSM 150** (1 x PK SL CL 2.15TO) **TSSM 150** (1 x PK SL CL 2.7TO) **TSSM 200** (1 x PK SL CL 2,15TO) **TSSM 200** (1 x PK SL CL 2.7TO)		**TSSM 200** (2 x PK SL CL 2.15TO)		**TSSM 300** (2 x PK SL CL 2,15TO)	
1	1	2	2	2	2
38°	11°; 25°; 38°	38°	11°; 25°; 38°	38°	11°; 25°; 38°
1350 2080	1350 2920	1750 2080	1750 2920	1750 2080	1750 2920
1x1000	2x1000	1x2000	2x2000	1x2000	2x2000
2x2400	2x2710	2x2400	2x2710	2x2400	2x2710
2		2			2
1x1000		1x2000		1x2000	
2x1253		2x1670		2x1670	
2x1620		2x1040		2x1040	
2x590	2x590	2x590	2x590	2x590	2x590
	2x1500		2x1500		2x1500
2 -	2 2	2 -	2 2	2 -	2 2
2		2		2	
39	52	39	52	39	52

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

Reliable design.
High-grade materials employed.
Specially selected components for optimum performance.
Energy efficiency.
All-in set. Just unpack and install.
Inclined or flat roof installation.

Certificate
EN 12975:2006-06
CEN - Keymark



Flat-plate solar collectors **PK SL CL** **PK SL FP**	Highly selective absorber for good performance in all seasons. Thermal insulation of rock wool to reduce heat loss of collectors. Absorber pipe system, made of copper. Low flow resistance. 100% tested for liquid tightness. Protective solar glass. Heat-tempered. Weatherproof. High solar radiation permeability. UV resistant materials guarantee long lifespan. Certificate Keymark. Models: **PK Select CL:** 2.15 / 2.7 m^2 **PK Select FP:** 2.0 / 2.4 m^2
Support system	Versions for inclined and for flat roof installation, for one of more solar collectors. Durable lightweight support system of withstanding severe climate conditions. Easy installation.
Solar water heater **SN (with one coil)** **SON (with two coils)**	Floor standing solar water tanks. Volumes from 150 to 2000 liters. High efficiency insulation. Water tank of low-carbon steel. Complex corrosion protection realized by means of titanium enamel (DIN 4753-3) and anode protection (DIN 4753-6). One or two heat-exchanger coils enable water tank to utilize an external sources of energy as solar collector or/and biomass boiler.
Accessories	**Solar station** ensures forced circulation of the heat carrier fluid, performs basic system measurements, safety and maintenance functions. **Solar controller** with pump speed control, drain-back option, and 4 temperature sensors monitors the operation of the entire system. **Cross fitting 2 in 1** with sensor housing and manual air vent. **Heat carrier fluid Propylene Glycol** - ensures flawless heat carrier even at negative ambient temperatures. **Solar expansion vessel** - Fixed bladder expansion vessel designed to absorb the volume increase when temperature rises. Operating temperature tolerance: from minus 10°C to plus 110°C.

PK SL CL
Vertical models.

	Model	Code
2.15	PK SL CL 2.15	00100336006002
2.7	PK SL CL 2.7	00100336006004

PK SL FP
Vertical models.

	Model	Code
2.0	PK SL FP 2.0	21100335006101
2.4	PK SL FP 2.4	21100335006102

Support system for PK SL CL inclined roof installation

	Model	Code
2.15	ASIR 1 PK - 2.15	00151041006002
2.15	ASIR 2 PK - 2.15	00151041006005
2.7	ASIR 1 PK - 2.70	00151041006003
2.7	ASIR 2 PK - 2.70	00151041006006

Support system for PK SL CL flat roof installation

	Model	Code
2.15	ASFR 1 PK - 2.15	00151040006002
2.15	ASFR 2 PK - 2.15	00151040006005
2.7	ASFR 1 PK - 2.70	00151040006003
2.7	ASFR 2 PK - 2.70	00151040006006

Support system for PK SL FP inclined roof installation

	Model	Code
2.0 / 2.4	ASIR 1 PK SL FP	21151141000011
2.0 / 2.4	ASIR 2 PK SL FP	21151141000012

Support system for PK SL FP flat roof installation

	Model	Code
2.0 / 2.4	ASFR 1 PK SL FP	21151140000001
2.0 / 2.4	ASFR 2 PK SL FP	21151140000002

SN
with one coil.
Vertical models.

L	Model	Code
150	SN 150	09030106202001
200	SN 200	09030106202002
300	SN 300	09030106202004
400	SN 400	09030106202005
500	SN 500	09030106202006

SON
with two coils.
Vertical models.

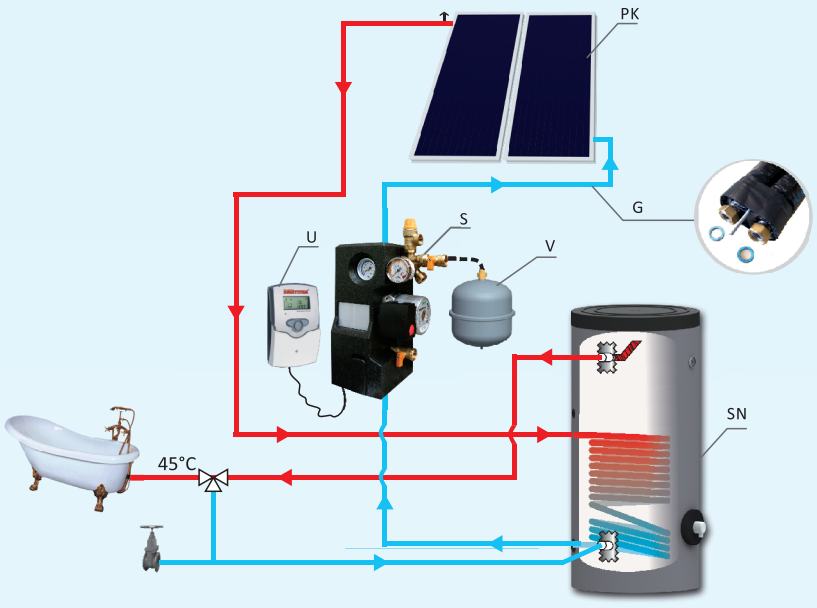
L	Model	Code
150	SON 150	09030106203001
200	SON 200	09030106203002
300	SON 300	01030106203004
400	SON 400	01030106203005
500	SON 500	01030106203006

Solar expansion vessel

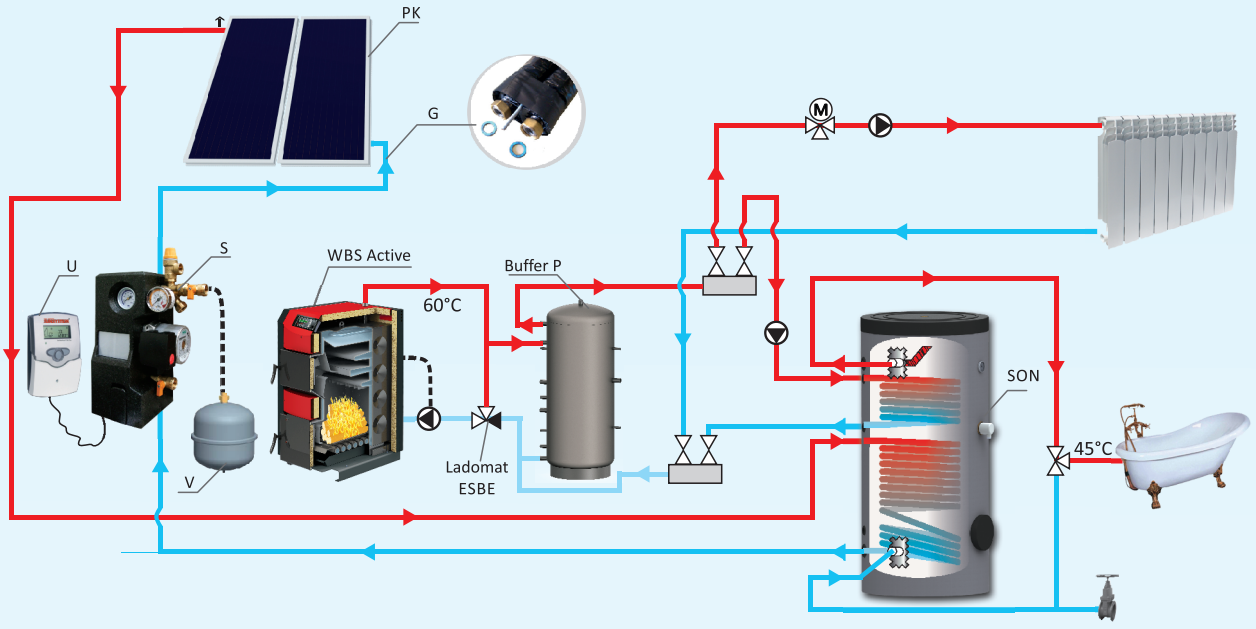
L	Model	Code
12	E. VESSEL SMF 12	21400000027002
18	E. VESSEL SMF 18	21400000027003
24	E. VESSEL SMF 24	21400000027004
35	E. VESSEL SMF 35	21400000027005
50	E. VESSEL SMF 50	21400000027006

Technical characteristics.

* 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.



		Solar kit 150 L		Solar kit 200 L	
Household size	pcs.	2 persons		3 persons	
Flat-plate solar collector		1 x PK SL CL 2.7	1 x PK SL FP 2.4	2 x PK SL CL 2.15	2 x PK SL FP 2.0
Inlet/outlet sleeves		R ½"	ø 22	R ½"	ø 22
Overall dimensions of 1xPK	mm	2125/1248/90		2125/1000/90	
Solar water tank S series		SN	SON	SN	SON
Capacity Operating pressure / Maximum temperature	L bar/°C	150 10/95	150 10/95	200 10/95	200 10/95
Height / Diameter	mm	1070/ø560	1070/ø560	1340/ø560	1340/ø560
Capacity of Lower/Upper coil Coil: Operating pressure / Maximum temperature	L bar/°C	4.56/- 16/110	4.56/2.47 16/110	5.55/- 16/110	5.55/3.70 16/110
Solar station	S	single / twin line		single / twin line	
Solar controller with 4 temperature sensors	U	✓		✓	
Solar check valve		1"		1"	
Solar filter		1"		1"	
Cross fitting 2 in 1		ø 22		ø 22	
Transition fitting		22x ½"		22x ½"	
Hollaender fitting		-		2x½"	
Solar expansion vessel	V, Liter	12		18	
Heat carrier fluid, PG 100%	L	10		10	
Double corrugated pipe Number of pipes/size connections material components insulation	G	2 x DN16 / 2 x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation		2 x DN16 / 2 x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	



Solar kit 300 L	Solar kit 400 L	Solar kit 500 L
3-4 persons	5-6 persons	7-8 persons
3 x PK SL CL 2.15 / 3 x PK SL FP 2.0	4 x PK SL CL 2.15 / 4 x PK SL FP 2.0	5 x PK SL CL 2.15 / 5 x PK SL FP 2.0
R ½" / ø 22	R ½" / ø 22	R ½" / ø 22
2125/1000/90	2125/1000/90	2125/1000/90
SN / SON	SN / SON	SN / SON
300 / 300	400 / 400	500 / 500
10/95 / 10/95	10/95 / 10/95	10/95 / 10/95
1420/ø660 / 1420/ø660	1470/ø750 / 1470/ø750	1720/ø750 / 1720/ø750
7.40/- / 7.40/5.55	9.25/6.17 / 9.25/6.17	11.10/7.40 / 11.10/7.40
16/110 / 16/110	16/110 / 16/110	16/110 / 16/110
single / twin line	single / twin line	single / twin line
✓	✓	✓
1"	1"	1"
1"	1"	1"
ø 22	ø 22	ø 22
22x ½"	22x ½"	22x ½"
4x½"	6x½"	8x½"
24	35	50
10	20	20
2 x DN16 / 2 x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2 x DN16 / 2 x DN20 ¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation	2 x DN16 / 2 x DN20 1¾" / 1" high grade stainless steel integrated sensor cable UV resistant insulation

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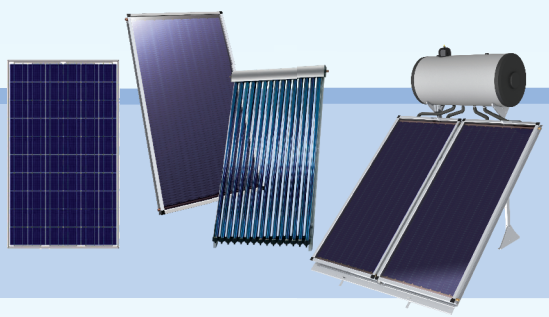

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