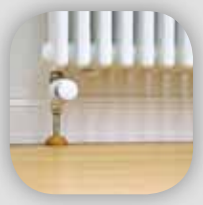
Thermodynamic Solar Energy

Energy Saving and Efficiency


Solar PST

Solar PST

PREFACE

Solar PST, located in Galicia, northwest Spain, started its growth and development in 2005 in parallel to the renewable energy business.

We are a groundbreaking company in the development and installation **Thermodynamic Solar Panels Systems** which absorb the environmental heat to heat up water applied to different uses: **central heating, swimming pool and hot sanitary water**.

Solar energy has been regarded as the major source of energy both in the past and in the present. Above all, it is the energy of the future as it is clean and free and it also avoids dependence on fossil fuels, thus being in the best interests of the planet. From the outset, *Solar PST*'s entrepreneurial vision has aimed to combine a commitment to the environment with providing consumers with efficient, **cost - cutting energy**.

Their manager and shareholders have been able to adapt their experience to this business group, in leading sectors such as telecommunications and audiovisual.

Our commitments with the development of cutting edge technologies contributes to the renewable energy with a remarkable added value, maximizing the quality of our services and improving the welfare of our customers and the habitability of our planet.

Our business plan started meeting with success at an international level in 2007, making the European Union our most prosperous market, a success which spread later to other countries such as Chile, Morocco, Argentina and New Zealand.

As of now, we are prepared to compete within an **international environment** after achieving distribution of our products in **over 20 countries** through a network of sales representatives and agents. Moreover, we offer our clients the benefit of a unique product, manufactured with **cutting edge technology**, giving high performance and an elevated added value of respect for the environment based on energy efficiency and sustainability.

All our **experience**, effort and specialization have lead us to the conviction that achieving a balance in the use of **renewable energy** will shape the future of our planet. Therefore, *Solar PST* makes an important contribution, through energy solutions, to a more **sustainable** and **efficient** world for everyone.

THE STATE OF THE ART SOLAR TECHNOLOGY

An optimised working system
An ecological fluid refrigerant
The solar panel: unique & innovative

The *Solar PST* system guarantees the production of hot sanitary water, central heating and swimming-pools providing the **maximum energy efficiency 24 hrs** a day, thanks to its revolutionary working principle.

The Thermodynamic Solar Collector technology offers high performance even at **night**, **with rain**, or **on overcast days**, this being an advantage over conventional solar panels whose performance is limited as they rely exclusively on direct solar radiation and a compulsory southward orientation (Northern Hemisphere).

Certified at European level, the *Solar PST* system complies with the highest norms of efficiency and energy saving of the market.

The working principle is based on the Thermodynamic laws, discovered by the french physician *Carnot* in 1824. This principle takes advantage of the physical properties of a refrigerant gas that, when changing its state, it is capable of transmitting the heat absorbed by the collectors down to the cylinder where the water is stored.

The *Solar PST* systems deliver energy efficiency solutions for **RESIDENTIAL**, **COMMERCIAL** and **INDUSTRIAL** applications in the public and private sectors.

AN OPTIMISED WORKING SYSTEM

• The fluid refrigerant enters the panel at -10°C that changes its state due to the heat previously captured from the ambient temperature which is present in the direct and diffuse solar radiation, external air by natural convection, wind effects and rainwater.

• The hot gas comes out of the panel and goes into the compressor that increases the refrigerant gas temperature up to 120°C. Then the gas yields the heat to the water stored in the cylinder up to 50°C.

• As it cools, the refrigerant condenses into liquid and flows through the expansion valve that measures the amount of the liquid refrigerant that will be sent to the panel. Thus the cycle starts all over again.

AN ECOLOGICAL FLUID REFRIGERANT

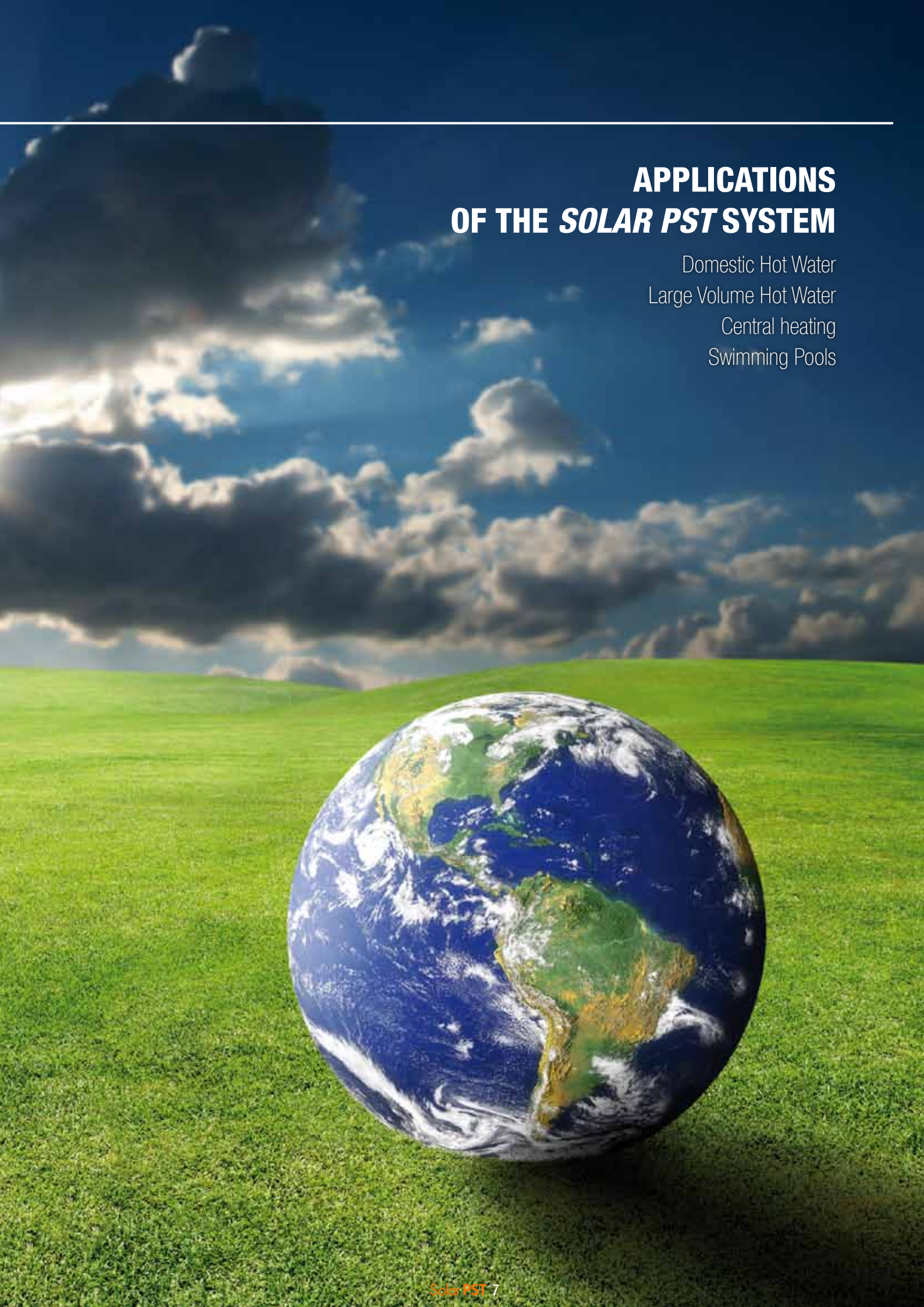
FEATURES:

- Incombustible.
- Non-corrosive.
- No toxic.
- Chemically stable either at high pressure and temperature.
- Great heat of vaporization.
- Eco-friendly.

THE FLUID REFRIGERANT USED FOR THE DOMESTIC SYSTEMS IS **134A** AND **407C** FOR SYSTEMS THAT COMPRISES MORE THAN 4 PANELS.

THE SOLAR PANEL: UNIQUE & INNOVATIVE

- Life span of more than 25 years: the panel is made of anodized aluminium 30 microm, which ensures the following properties:
  - Great toughness at high and low temperatures.
  - High surface hardness.
  - Resistance to abrasion and weakening.
  - High protection against dust and dampness.
  - Corrosion-resistant.
- Last generation solar collector: it is a roll-bond panel with double channel through which the fluid refrigerant circulates, being able of providing high performance at night and in adverse climate conditions.
- User-friendly transport and easy handling systems: small size 2,00 m x 0,80 m.
- Versatility: easy integration on facades, roofs or any other surface. It is not necessary to reinforce structures as it is a lightweigh panel, 8 kg.
- Optimized solar catchment area: both sides of the panel, 3,20 sqm.
- No need to be south orientated (Northern Hemisphere). *Solar PST* recommends to orientate the collector as much as possible to the sun and exposed to the elements, such as wind and rain.
- Regular maintenance is not necessary.



APPLICATIONS OF THE *SOLAR PST* SYSTEM

Domestic Hot Water
Large Volume Hot Water
Central heating
Swimming Pools

DOMESTIC HOT WATER

The Thermodynamic Solar Collectors provide hot sanitary water up to 50ºC, day and night, with rain, wind and in absence of sun. At present there is no superior technology on the market than this, which can provide an **energy saving of up to 80%** all year round.

The *Solar PST* technology represents the **main water heating system** either in summer and in winter time with no need of a backup system as long as the external temperature is above 0ºC.

Maintenance for the equipment is almost non-existent providing maximum safety and security.

The domestic systems are comprised of cylinders from 180L up to 500L which are supplied in kits for an easy and safe installation.

Solar PST systems are compatible with any water heating system as the *Solar PST* cylinders can be supplied with an extra coil upon request.

Our systems can be easily combined with the existent heating system.

Domestic hot water

ENAMEL DOMESTIC RANGE

MODEL	PANEL	VOL. LTS	O mm	H mm	ELECTRIC POWER W	CALORIC POWER GENERATED W
PST 200cv**	1	200	584	1.230	390 - 520	1.690 - 2.510
PST 250v*	1	250	584	1.500	390 - 520	1.690 - 2.510
PST 300v	1	300	680	1.600	390 - 520	1.690 - 2.510

(*) Domestic systems can be supplied, upon request, with an extra coil in order to be connected to a conventional heating system.
(**) PST 200cv does not include either reduction pressure valve or security valve.
PST250v and PST300v: precharged systems with gaz 134-A.

DOMESTIC STAINLESS STEEL RANGE

MODEL	PANELS	VOL. LTS	O mm	H mm	ELECTRIC POWER W	CALORIC POWER GENERATED W
PST 180iP	1	180	550	1.170	390 - 520	1.690 - 2.510
PST 200i*	1	200	550	1.270	390 - 520	1.690 - 2.510
PST 200iS*	2	200	550	1.270	595 - 880	2.800 - 3.650
PST 280i*	1	280	550	1.630	390 - 520	1.690 - 2.510
PST 300i*	1	300	550	1.630	390 - 520	1.690 - 2.510
PST 300iS*	2	300	550	1.630	595 - 880	2.800 - 3.650
PST 500iS*	2	500	720	1.650	595 - 880	2.800 - 3.650

(*) Domestic systems can be supplied, upon request, with an extra coil in order to be connected to a conventional heating system.
PST180iP and PST280i: precharged systems with gaz 134-A.

FEATURES:

- Fluid Refrigerant 134A.
- Compressor Danfoss.
- Serpentine Heat Exchanger.
- Electric power consumption: 390 W.
- Antilegionella control device.

KIT COMPONENTS:

- Thermodynamic Solar Collector.
- Cylinder.
- Thermodynamic Block (compressor included).
- Inmersion Heater Backup.
- Gasket with control panel included.
- Brackets kit made of aluminium.
- Security valve.
- Reduction pressure valve.
- Neoprene joint.
- Stainless steel bolt kit.

LARGE VOLUME HOT SANITARY WATER

The Thermodynamic Solar Collectors *Solar PST* are capable of heating any hot water volume thanks to the exceptional power and high performance of the system, guaranteeing safety and confort.

The Thermodynamic Solar System for heating large volume of sanitary water has proven to be **the most efficient and cost-effective system** in public and private entities, hotel resorts, shopping centres, industries, schools...

Large Volume Cylinders:

CYLINDER	PANELS	VOLUME (L)	ENAMEL		STAINLESS STEEL		ELECTRIC POWER W	CALORIC POWER GENERATED W
			Height mm	Diameter mm	Height mm	Diameter mm		
PST 800-A	4	800	1.840	950	1.840	950	960 - 1.800	3.600 - 7.290
PST 1000-A	4 - 6 - 8	1.000	2.250	950	2.250	950	960 - 1.800	3.600 - 7.290
PST 1500-A	6 - 8 - 12	1.500	1.830	1.360	1.830	1.360	1.230 - 2.220	4.900 - 9.680
PST 2000-B	8 - 12 - 16	2.000	2.280	1.360	2.280	1.360	1.440 - 2.625	5.500 - 11.240
PST 3000-B	16 - 24 - 32	3.000	2.305	1.660	2.305	1.660	3.210 - 5.156	14.190 - 24.200
PST 4000-B	24 - 32 - 40	4.000	2.310	1.910	2.310	1.910	4.140 - 6.025	16.495 - 31.430

Larger Volume Cylinders are available upon request, from 800 lts up to 6.000 lts.

FEATURES:

- Model A anchor flange DN200 (1 heat exchanger).
- Model B with two anchor flanges DN200 (2 heat exchangers).
- Anchor flange of 400 mm.
- Immersion heaters voltage: 230 V or 400 V.
- Cathodic protection.
- Decorative cover.

Large Volume HSW range:

MODEL	PANELS	VOLUME LTS	ELECTRIC POWER W	CALORIC POWER GENERATED W
PST 4 ACS	4	800 / 1.000	960 - 1.800	3.600 - 7.290
PST 6 ACS	6	1.000 / 1.500	1.230 - 2.220	4.900 - 9.680
PST 8 ACS	8	1.000 / 1.500 / 2.000	1.440 - 2.625	5.500 - 11.240
PST 12 ACS	12	1.500 / 2.000	2.010 - 3.120	9.215 - 16.580
PST 16 ACS	16	2.000 / 3.000	3.210 - 5.156	14.190 - 24.200
PST 24 ACS	24	3.000 / 4.000	4.140 - 6.025	16.495 - 31.430
PST 32 ACS	32	4.000 / 5.000	5.690 - 8.300	24.090 - 42.600
PST 40 ACS	40	5.000 / 6.000	7.100 - 10.150	32.540 - 52.970

Fixing brackets and rails can be supplied upon request

FEATURES:

- Fluid Refrigerant 407C.
- Compressor Copeland.
- Heat Exchanger.
- Electric power consumption 960 W.

Kit elements:

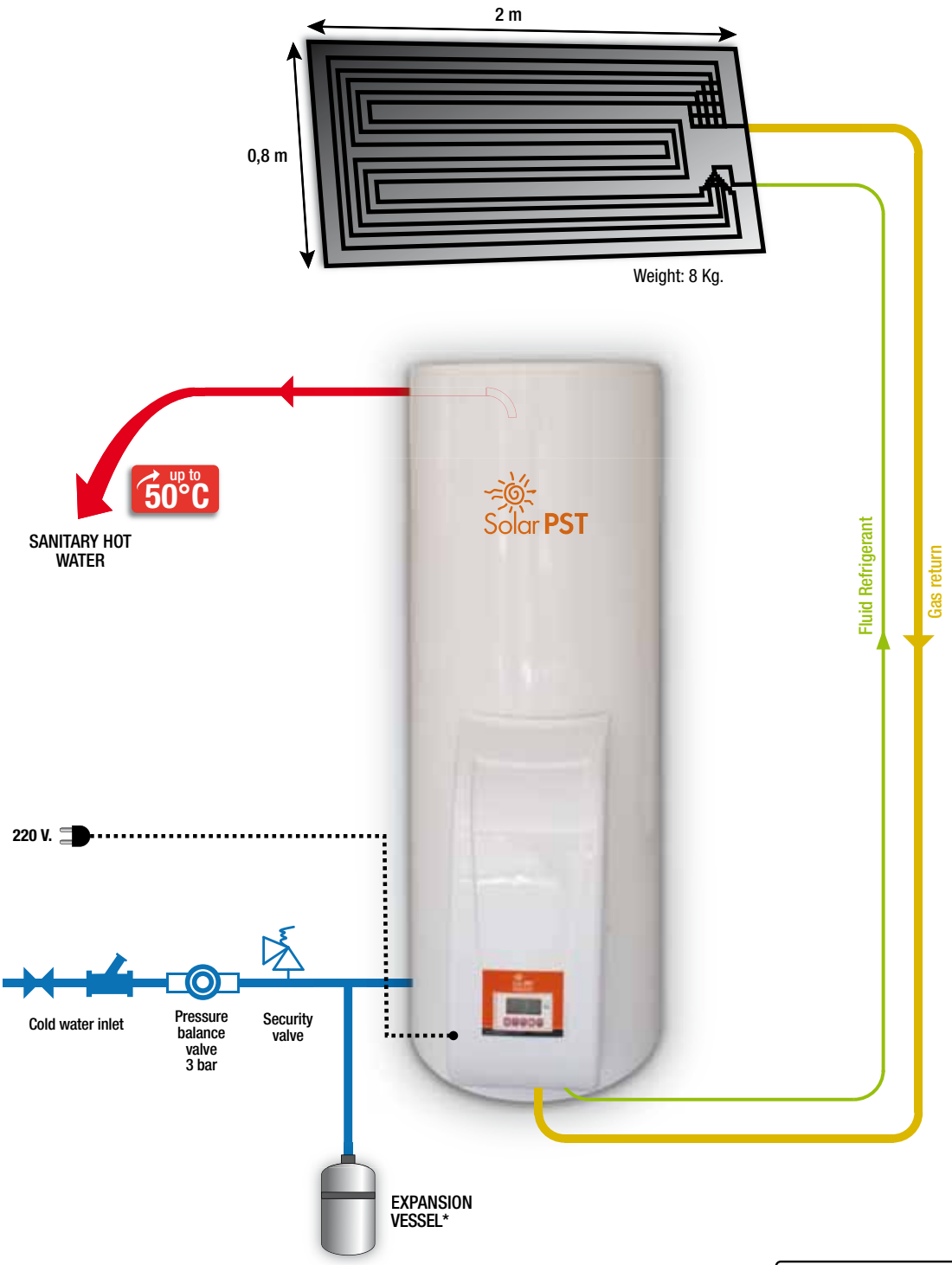
- From 4 up to 40 panels.
- Thermodynamic block.
- Liquid distributor.
- Heat Exchanger.

Security valve and pressure reduction valve are not included.

AVERAGE TIME TO HEAT SANITARY WATER

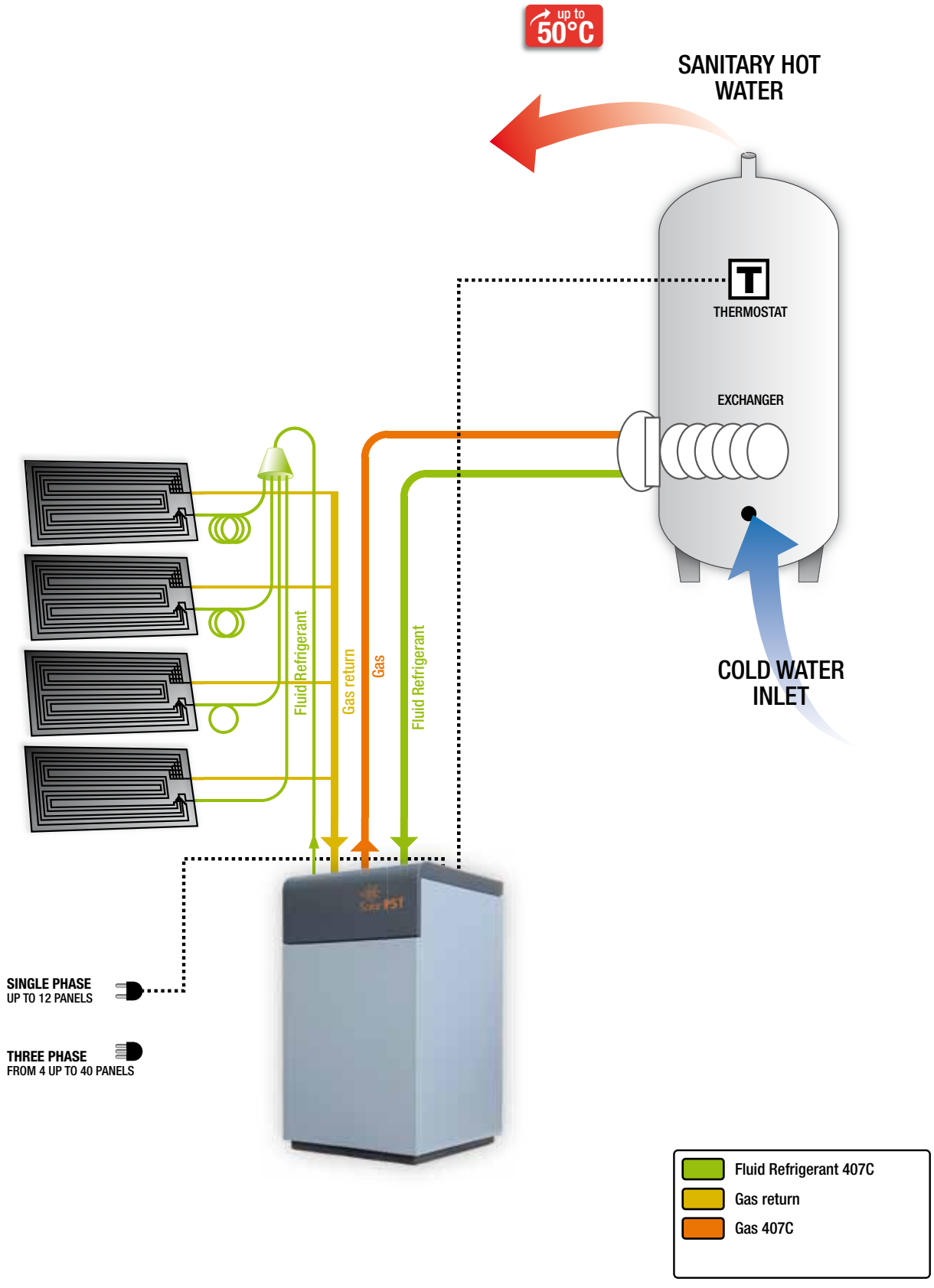
PST 1000-A	PST 4 = 11 hrs	PST 6 = 8 hrs	PST 8 = 6 hrs
PST 1500-A	PST 6 = 11 hrs	PST 8 = 9 hrs	PST 12 = 7 hrs
PST 2000-B	PST 8 = 11 hrs	PST 12 = 9 hrs	PST 16 = 6 hrs
PST 3000-B	PST 16 = 9 hrs	PST 24 = 7 hrs	PST 32 = 5 hrs
PST 4000-B	PST 24 = 10 hrs	PST 32 = 7 hrs	PST 40 = 5 hrs

DOMESTIC HOT WATER

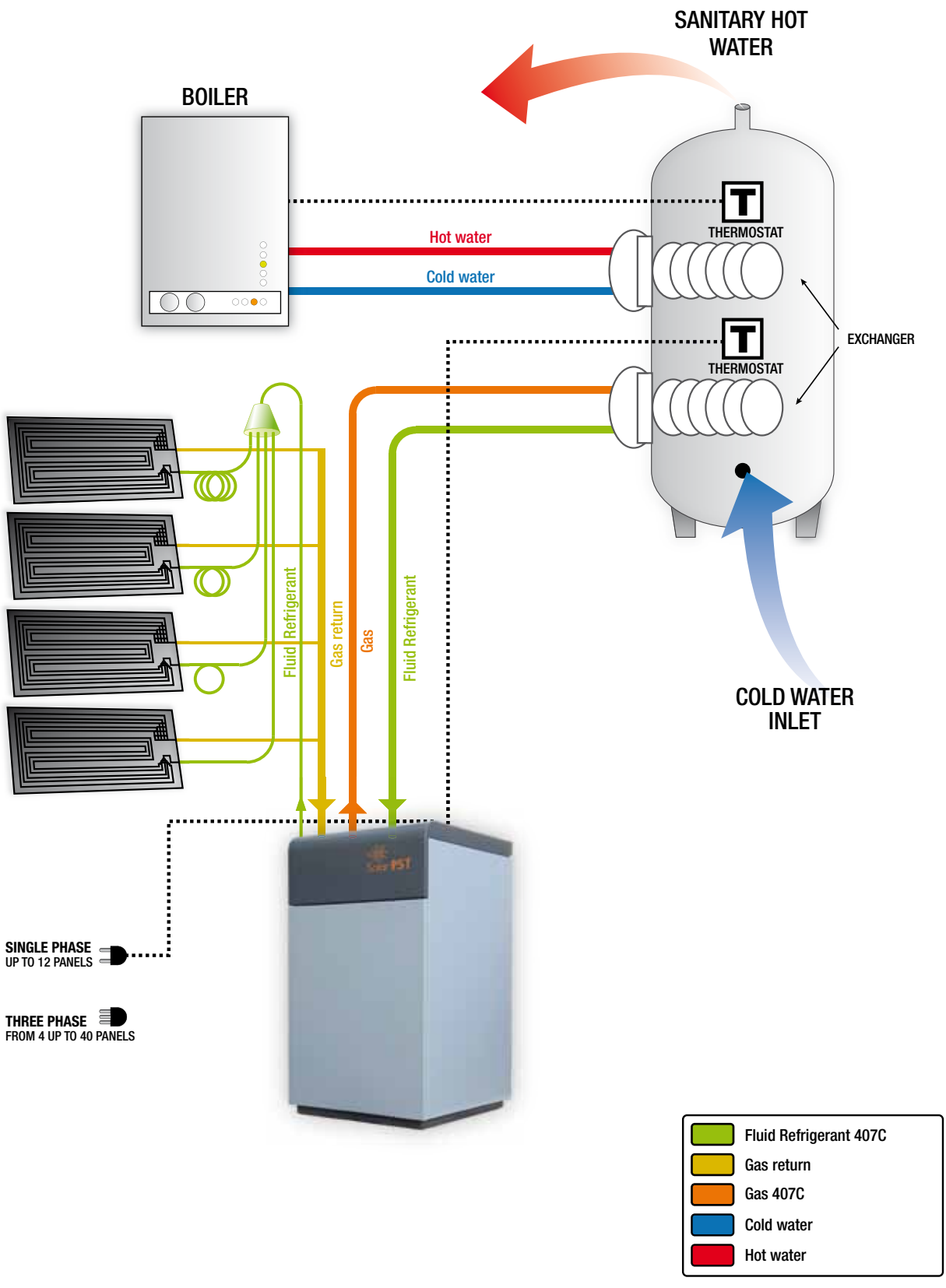


(*) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

LARGE VOLUME HOT WATER



LARGE VOLUME HOT WATER WITH BACKUP



CENTRAL HEATING

The Thermodynamic Solar Collectors are capable of capturing enough ambient heat to heat a dwelling, providing a comfortable temperature over the coldest winter days.

With a single Thermodynamic Solar System you will both heat your home in winter and your swimming-pool in spring, summer and autumn, optimizing your own resources and those from nature. Thus, your **investment** can be **recouped** in a **very short period of time**.

Solar PST technology offers you the possibility of heating or pre-heating water up to 50°C in commercial installations which will result in a dramatic reduction in energy consumption, specially in comparison with gasoil.

Our system can easily be adapted to your house with no need for major reforms to your current heating system. Thus, *Solar PST* system fulfills the main heating system or even as an energy backup of any conventional system during the coldest months where temperatures are below 0°C.

Low temperature **heating radiators**, **fan-coils** and **underfloor heating** except iron radiators are compatible systems with *Solar PST* technology.

Central Heating Range:

MODEL	PANELS	SURFACE (MAX.)	ELECTRIC POWER W	CALORIC POWER GENERATED W
PST 4C	4	60 m^2	960 - 1.800	3.600 - 7.290
PST 6C	6	80 m^2	1.230 - 2.220	4.900 - 9.680
PST 8C	8	110 m^2	1.440 - 2.625	5.500 - 11.240
PST 12C	12	120 m^2	2.010 - 3.120	9.215 - 16.580
PST 16C	16	190 m^2	3.210 - 5.156	14.190 - 24.200
PST 24C	24	260 m^2	4.140 - 6.025	16.495 - 31.430
PST 32C	32	350 m^2	5.690 - 8.300	24.090 - 42.600
PST 40C	40	420 m^2	7.100 - 10.150	32.540 - 52.970

Fixing brackets and rails can be supplied upon request.

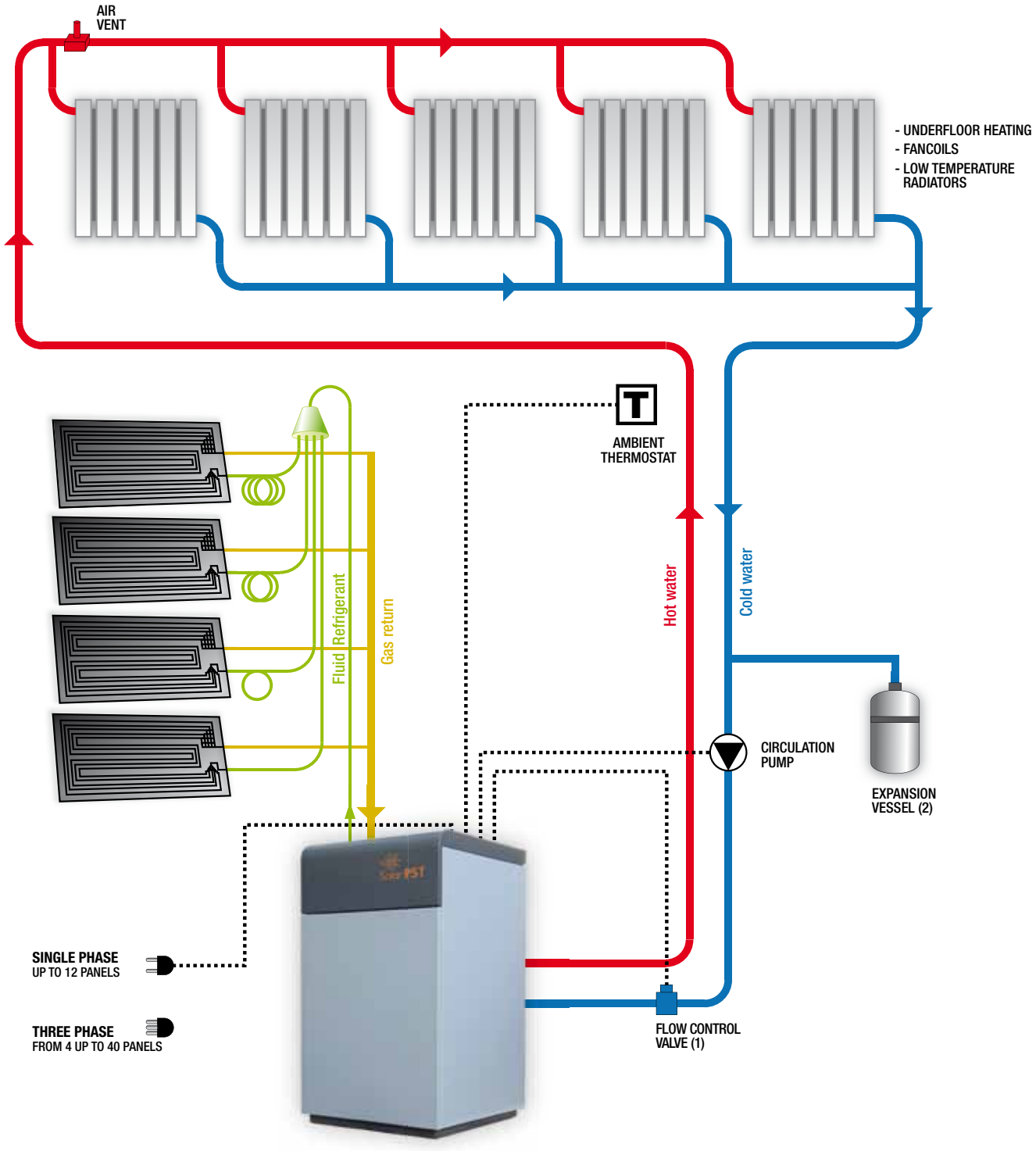
FEATURES:

- Fluid Refrigerant 407C.
- Compressor: Copeland Scroll type.
- Plate exchanger.
- Electric power consumption: 960 W.

Kit elements:

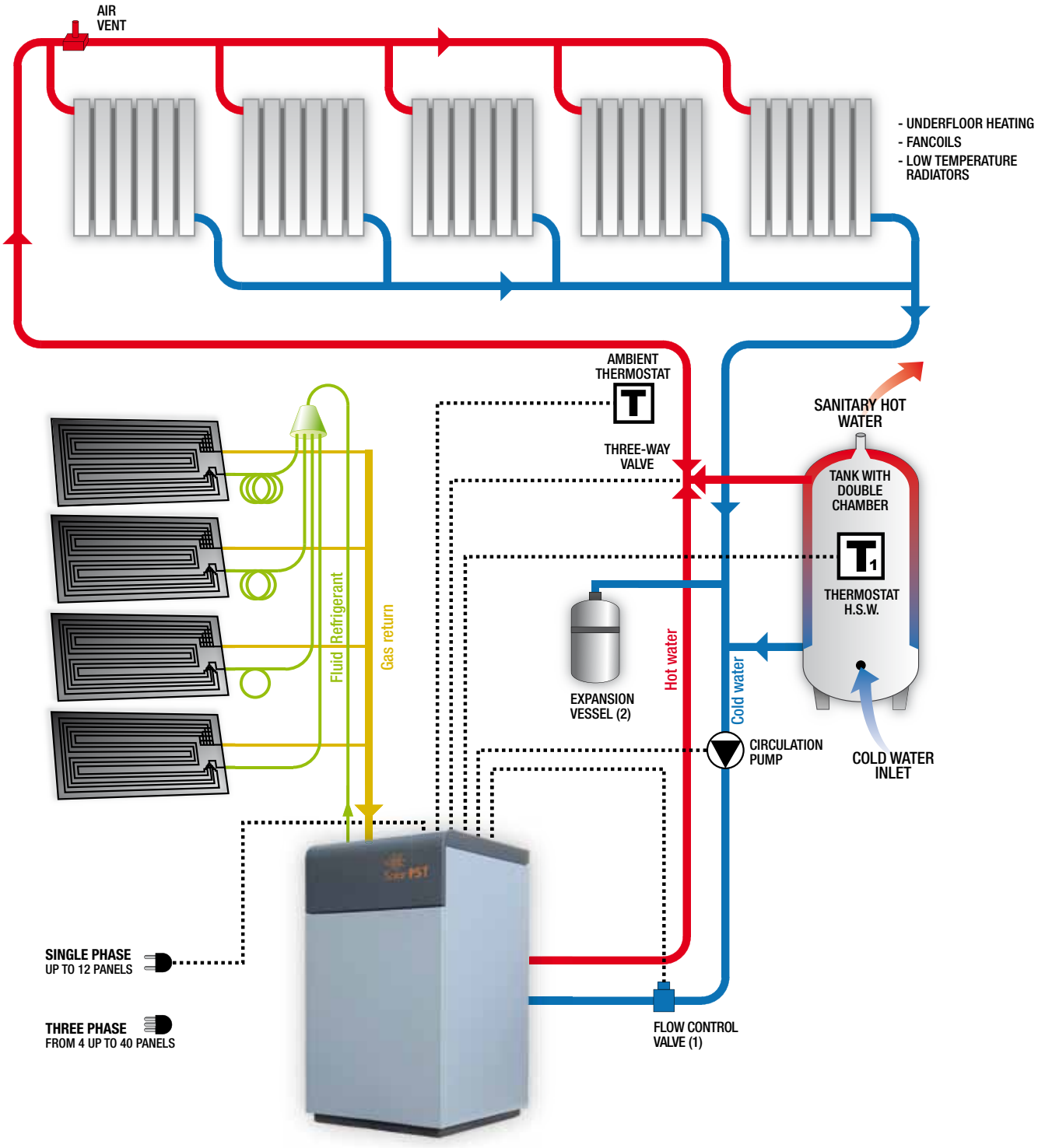
- Solar panels from 4 up to 40.
- Thermodynamic block.
- Plate exchanger.
- Liquid distributor.

CENTRAL HEATING



(1) Flow control: stops the machine when there is no water on air into the pipes.
(2) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

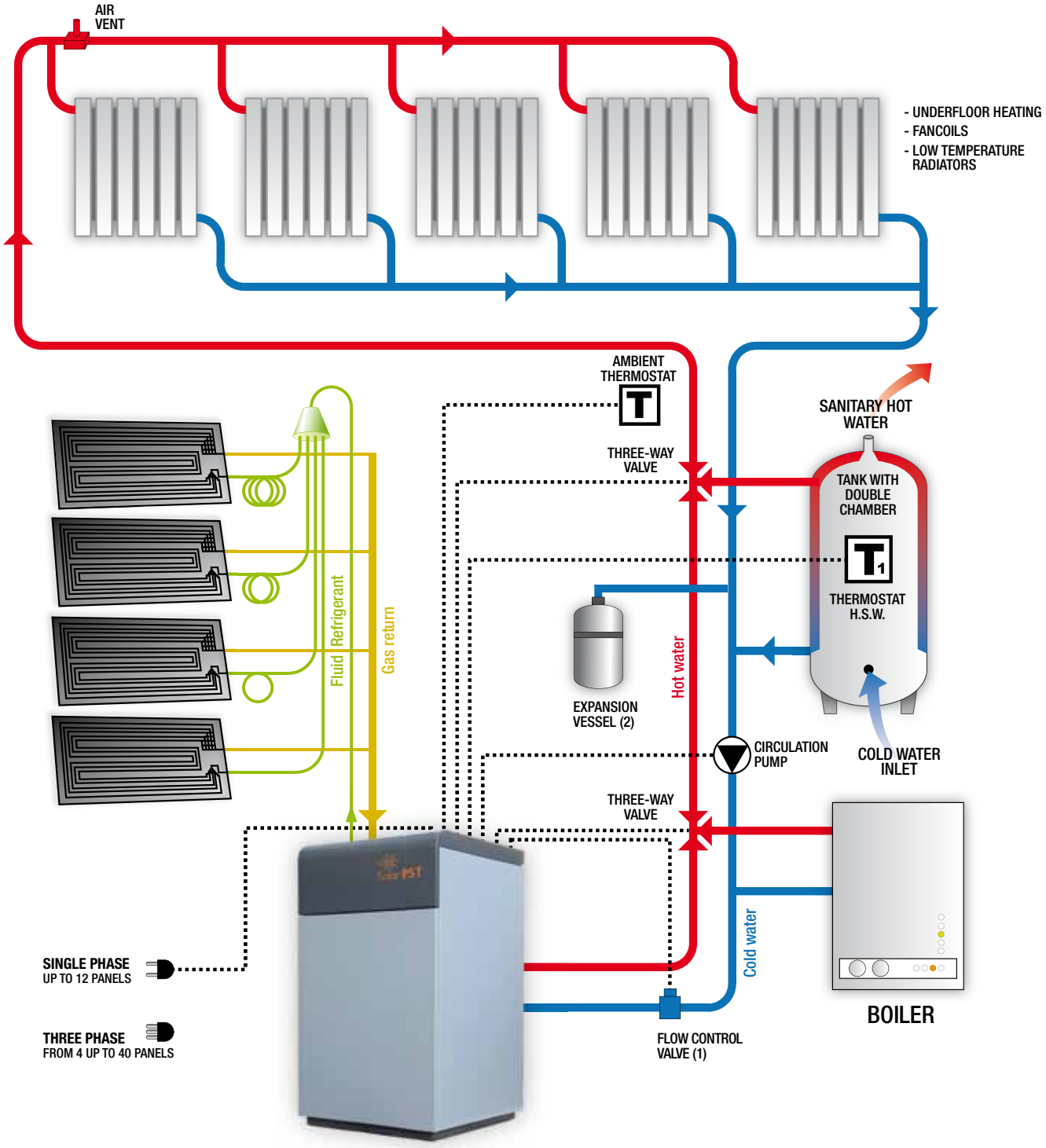
CENTRAL HEATING + DOMESTIC HOT WATER



(1) Flow control: stops the machine when there is no water on air into the pipes.

(2) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

CENTRAL HEATING + DOMESTIC HOT WATER + BACKUP



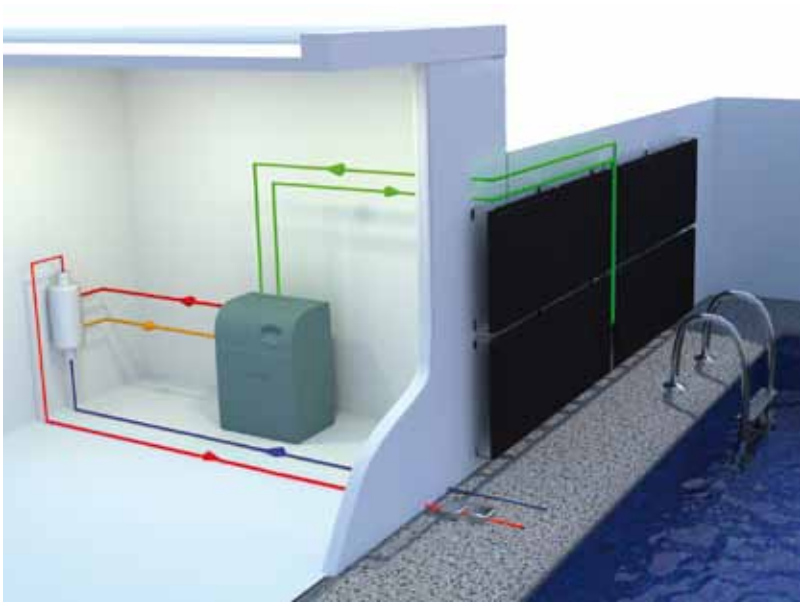
(1) Flow control: stops the machine when there is no water on air into the pipes.
(2) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

SWIMMING-POOLS HEATING

Solar PST offers you the possibility of heating your swimming-pool water all year round, guaranteeing the minimum energy consumption. No matter the volume to heat, private swimming-pools, sports clubs swimming-pools, schools, camp sites, municipal swimming-pools or even olympic pools, *Solar PST*, with its latest **innovative technology**, will allow you to reduce your energy consumption with the most reliable and cost-effective system.

Swimming-pool range:

MODEL	PANELS	TITANIUM EXCHANGER	OUTDOOR (Max.)	INDOOR (Max.)	ELECTRIC POWER W	CALORIC POWER GENERATED W
PST 4P	4	1 x 100-40	25 m^3	30 m^3	960 - 1.800	3.600 - 7.290
PST 6P	6	2 x 100-40	30 m^3	50 m^3	1.230 - 2.220	4.900 - 9.680
PST 8P	8	2 x 100-40	40 m^3	65 m^3	1.440 - 2.625	5.500 - 11.240
PST 12P	12	2 x 100-70	60 m^3	100 m^3	2.010 - 3.120	9.215 - 16.580
PST 16P	16	2 x 100-70	80 m^3	130 m^3	3.210 - 5.156	14.190 - 24.200
PST 24P	24	2 x 100-104	100 m^3	160 m^3	4.140 - 6.025	16.495 - 31.430
PST 32P	32	2 x 100-104	140 m^3	220 m^3	5.690 - 8.300	24.090 - 42.600
PST 40P	40	2 x 100-104	180 m^3	300 m^3	7.100 - 10.150	32.540 - 52.970



FEATURES:

- Fluid refrigerant 407C.
- Compressor Copeland Scroll type.
- Titanium exchanger.
- Electric power consumption: 960 W.

Fixing brackets and rails can be supplied upon request.

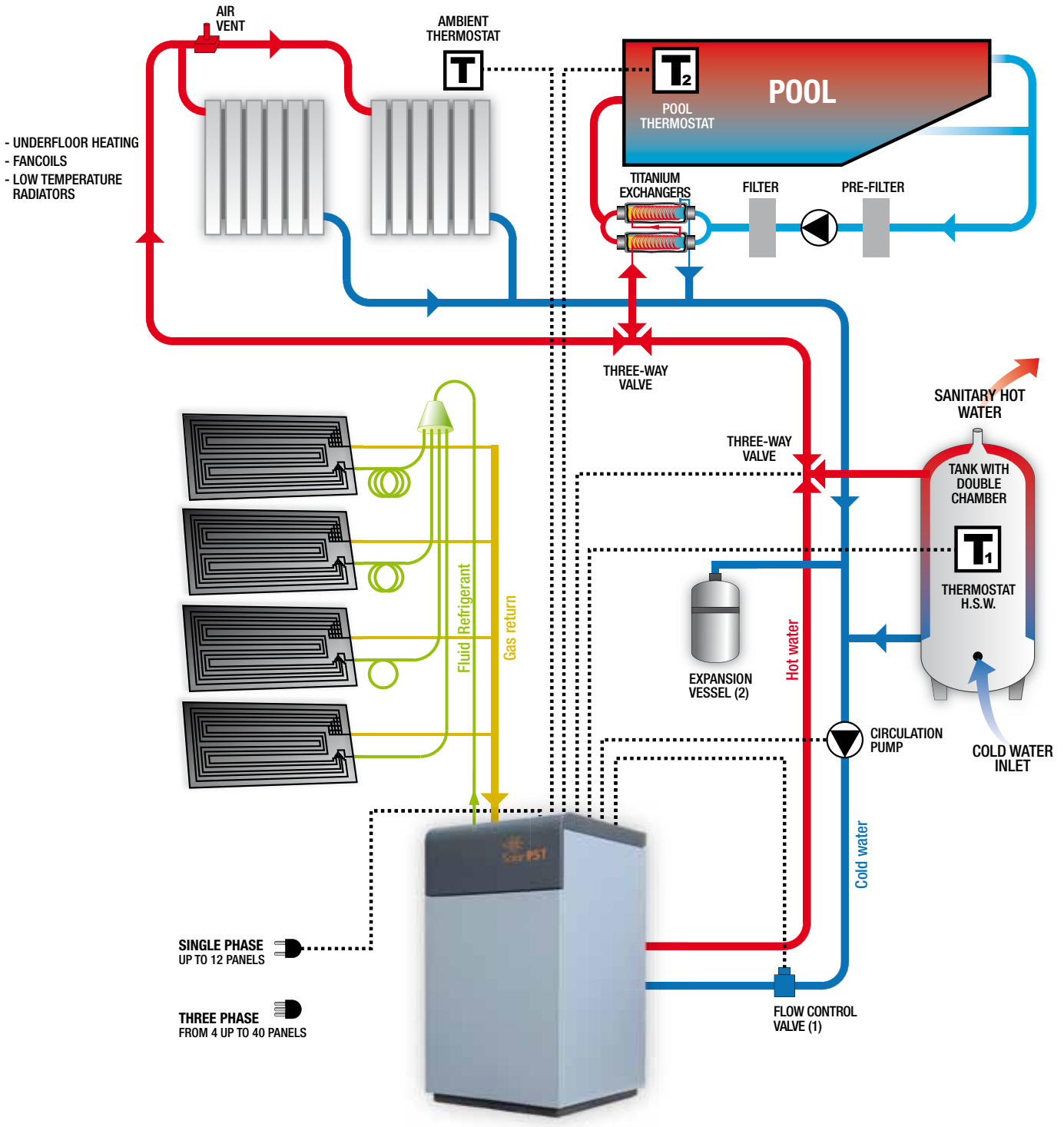
Kit elements:

- Solar panels from 4 up to 40.
- Thermodynamic block.
- Titanium exchanger.
- Liquid distributor.

Notes of interest:

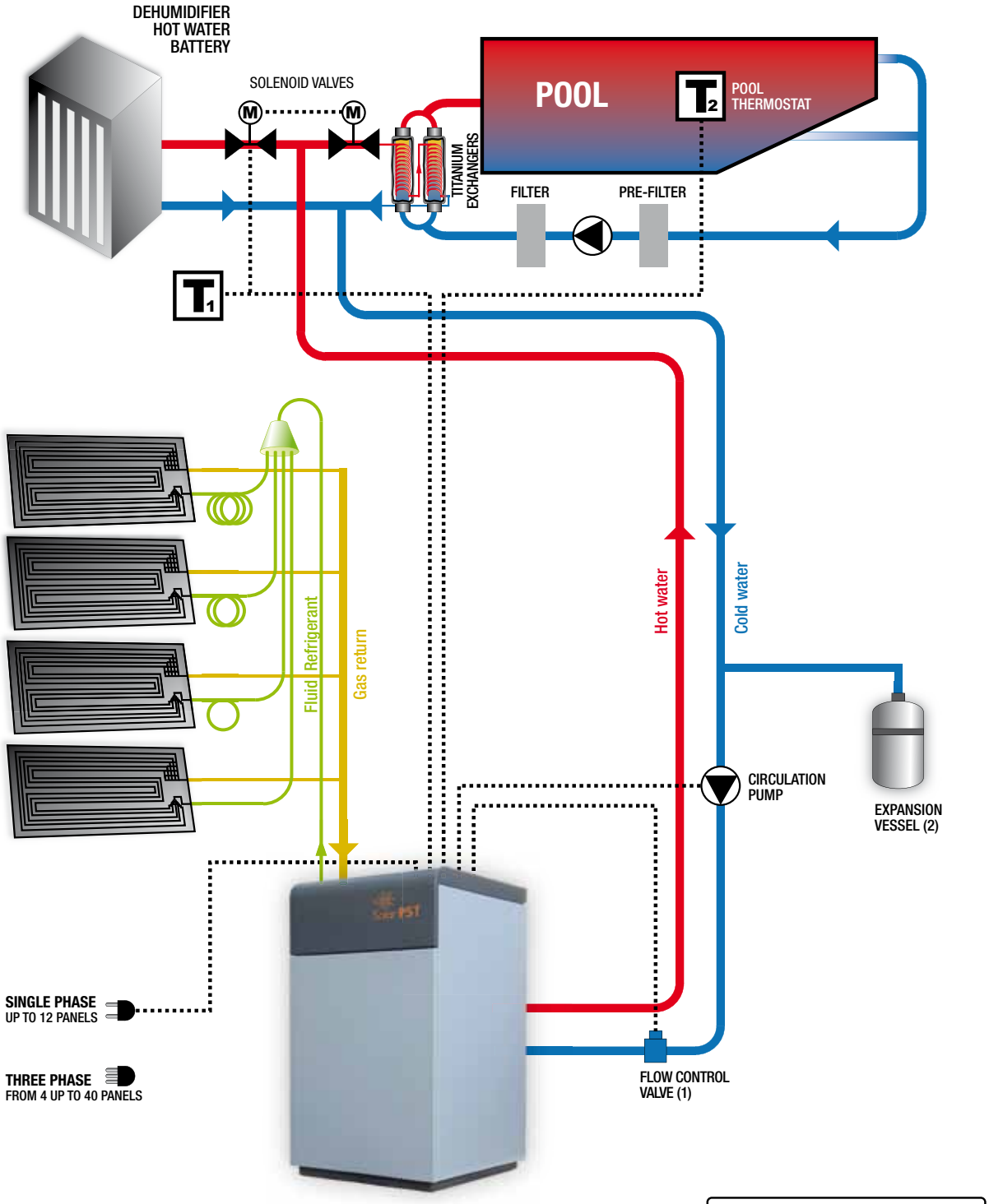
- Indoors swimming-pools must be assessed individually.
- The indoor swimming-pools must have an ambient temperature of +2ºC more than the swimming-pool water.
- Either a dehumidifier and an air-conditioning system are recommended for the installation.
- A thermal cover is recommended to avoid heat dissipation.
- The minimum external temperature must be of 18ºC so that the maximum efficiency is guaranteed.

CENTRAL HEATING + DOMESTIC WATER + SWIMMING POOL



(1) Flow control: stops the machine when there is no water on air into the pipes.
(2) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

SWIMMING POOL HEATING WITH ELECTROVALVES



(1) Flow control: stops the machine when there is no water on air into the pipes.
(2) Expansion vessel: small tank must be installed in domestic hot water systems to absorb excessive pressure.

TECHNICAL SPECIFICATIONS

Precharged domestic systems
Non-Precharged domestic systems
Systems from 4 up to 40 panels

DOMESTIC SYSTEMS

PRECHARGED

System	250v / 300v	180iP / 280i	Units
Power			
Thermal Power	1.690 - 2.510		W
Electrical Power	390 - 520		W
Backup immersion heater	1.200		W
Compressor			
Type	Airtight Alternating Type		
Noise Level	39		dB
Thermodynamic Solar Panel			
Material	Anodized aluminium		
Number	01		
Dimensions	2.000 x 800 x 20		mm
Max. Working Pressure	12 / 1,20		bar / MPa
Test pressure	15 / 1,50		bar / MPa
Max. Temp.	120		ºC
Min. Temp.	-5		ºC
Min. Exposure Temp.	-40		ºC
Water Storage Heater			
Material	Enamelled	Stainless Steel (304L)	
Insulation	Polyurethane		
Max. Working Pressure	6 / 0,6		bar / MPa
Test Pressure	10 / 1,0		bar / MPa
Max. Temp.	90		ºC
Electrolyte Protection	Magnesium Anode		
Refrigerant fluid			
Type	R134 A		
Quantity	550		gr
Pipe Connections			
Type	Dehydrated Copper Pipes and Joints		
Liquid Line	1/4”		inches
Suction Line	3/8”		inches
Max. distance from collector to thermodynamic block	10		m
Automatic Digital Display	YES		
Voltage	230V, 50Hz		V/Hz
Compressor Fuse	6,3 T		A
General Fuse	6,3 F		A

NON-PRECHARGED

System	200cv	200i / 300i	200iS / 300iS / 500iS	Units
Power				
Thermal Power		1.690 - 2.510	2.800 - 3.650	W
Electrical Power		390 - 520	595 - 880	W
Backup immersion heater		1.200	2.500	W
Compressor				
Type		Airtight Alternating Type		
Noise Level		39	43	dB
Thermodynamic Solar Panel				
Material		Anodized aluminium		
Number		01	02	
Dimensions		2.000 x 800 x 20		mm
Max. Working Pressure		12 / 1,20		bar / MPa
Test Pressure		15 / 1,50		bar / MPa
Max. Temp.		120		ºC
Min. Temp.		-5		ºC
Min. Exposure Temp.		-40		ºC
Water Storage Heater				
Material	Enamelled	Stainless Steel (304L)		
Insulation		Polyurethane		
Max. Working Pressure		6 / 0,6		bar / MPa
Test Pressure		10 / 1,0		bar / MPa
Max. Temp.		90		ºC
Electrolyte Protection		Magnesium Anode		
Refrigerant Fluid				
Type		R134 A		
Quantity	550	800	1.000	gr
Pipe Connections				
Type		Dehydrated Copper racores		
Liquid Line		3/8”	3/8”	inches
Suction Line		3/8”	½”	inches
Max. distance from collector to thermodynamic block		10	12	m
Automatic Digital Display	**YES**	**YES**	**YES**	
Voltage		230V, 50Hz		V/Hz
Compressor		6,3 T	15 F	A
General Fuse		6,3 F	6,3 F	A

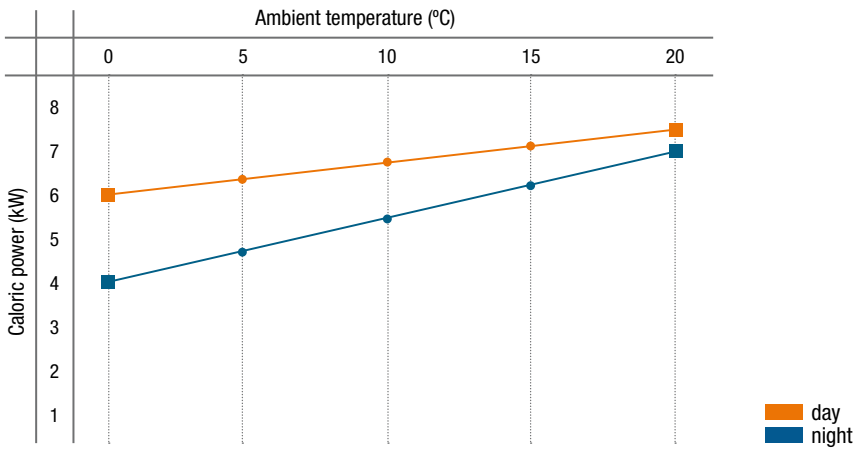
SYSTEMS FROM 4 UP TO 40 PANELS

Models: PST 4 ACS (HSW), PST 4 C (Central heating) and PST 4 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	04, total weight = 32 kg
Exposed collecting surface	6,4 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 555 mm, P = 550 mm, weight 99 kg
Imput power	Triphasic model 400 V or monophasic model 230 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 0,9 - 1,8 kW - Caloric power 3,6 - 7,3 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 1,5 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 1/2”
Suction Line	Dehydrated copper, Ø 5/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 4 C, volume min. 0,5 m^3/h., p.c. m.c.a. = 2,5 m
Titanium heat exchanger	Model PST 4 P, an exchanger model 100-40
Heat exchangers	Models PST 4 ACS, an exchanger model WRK 18
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



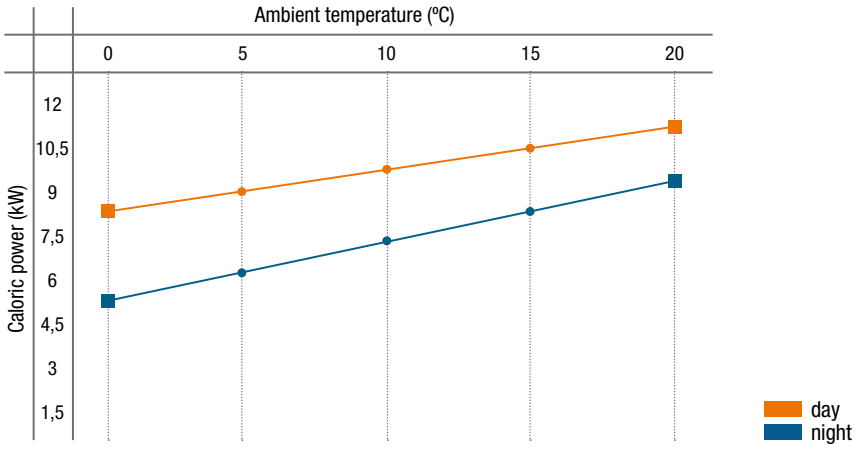
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 6 ACS (HSW), PST 6 C (Central heating) and PST 6 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	06, total weight = 48 kg
Exposed collecting surface	9,6 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 555 mm, P = 550 mm, weight 103 kg
Imput power	Triphasic model 400 V or monophasic model 230 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 1,2 - 2,2 kW - Caloric power 4,9 - 9,7 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 1,6 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 1/2”
Suction Line	Dehydrated copper, Ø 5/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 6 C, volume min. 0,7 m^3/h., p.c. m.c.a. = 2,5 m
Titanium heat exchanger	Model PST 6 P, two exchangers model 100-40
Heat exchangers	Models PST 6 ACS, an exchanger model WRK 18
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



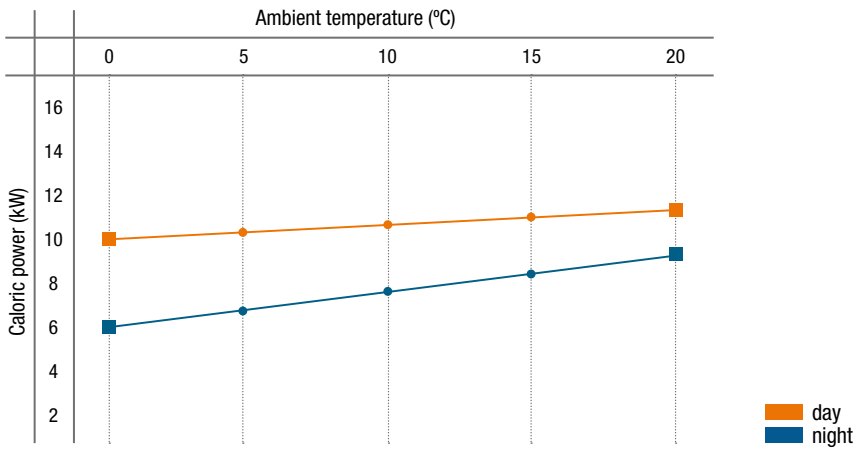
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 8 ACS (HSW), PST 8 C (Central heating) and PST 8 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	08, total weight = 64 kg
Exposed collecting surface	12,8 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 555 mm, P = 550 mm, weight 104 kg
Imput power	Triphasic model 400 V or monophasic model 230 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 1,4 - 2,6 kW - Caloric power 5,5 - 11,3 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 1,8 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 1/2”
Suction Line	Dehydrated copper, Ø 3/4”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 8 C, volume min. 0,8 m^3/h., p.c. m.c.a. = 2,7 m
Titanium heat exchanger	Model PST 8 P, two exchangers model 100-40
Heat exchangers	Models PST 8 ACS, an exchanger model WRK 18
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



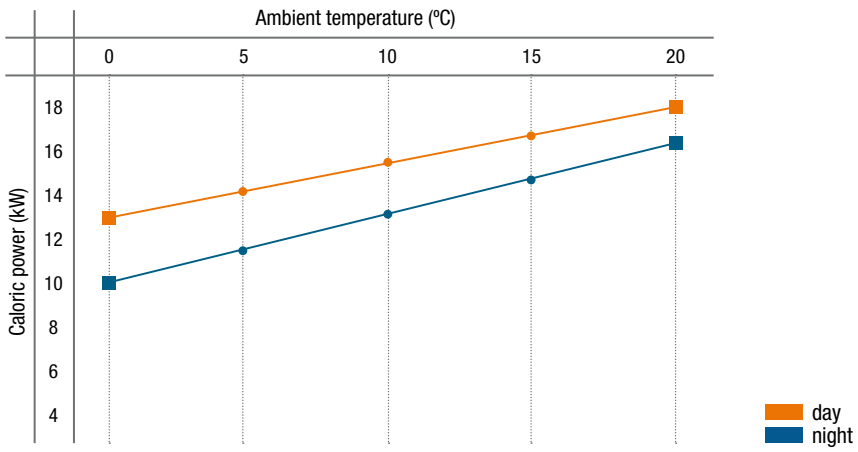
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 12 ACS (HSW), PST 12 C (Central heating) and PST 12 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	12, total weight = 96 kg
Exposed collecting surface	19,2 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 555 mm, P = 550 mm, weight 115 kg
Imput power	Triphasic model 400 V or monophasic model 230 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 1,9 - 3,1 kW - Caloric power 9,2 - 16,7 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 2,0 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 1/2”
Suction Line	Dehydrated copper, Ø 7/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 12 C, volume min. 1,0 m^3/h., p.c. m.c.a. = 3,0 m
Titanium heat exchanger	Model PST 12 P, two exchangers model 100-70
Heat exchangers	Models PST 12 ACS, an exchanger model WRK 23
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



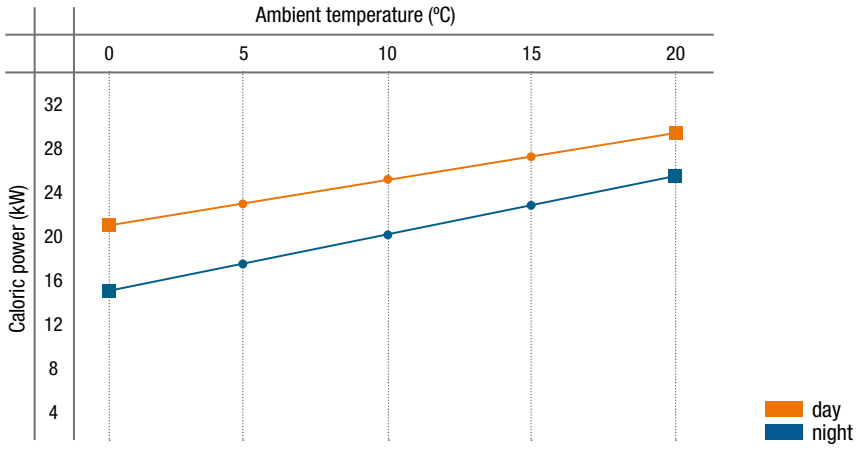
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 16 ACS (HSW), PST 16 C (Central heating) and PST 16 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	16, total weight = 128 kg
Exposed collecting surface	26,6 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 555 mm, P = 550 mm, weight 120 kg
Imput power	Triphasic model 400 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 3,2 - 5,2 kW - Caloric power 14,2 - 24,2 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 2,8 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 3/4”
Suction Line	Dehydrated copper, Ø 7/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 16 C, volume min. 1,5 m^3/h., p.c. m.c.a. = 3,5 m
Titanium heat exchanger	Model PST 16 P, two exchangers model 100-70
Heat exchangers	Models PST 16 ACS, two exchangers model WRK 23
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



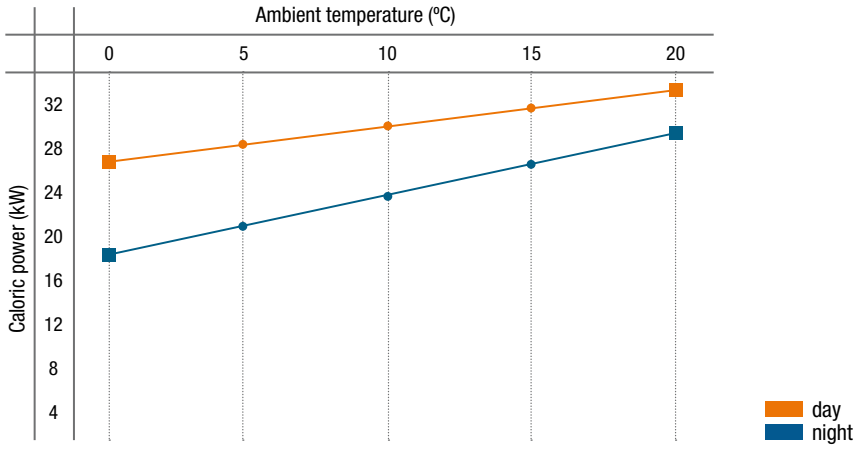
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 24 ACS (HSW), PST 24 C (Central heating) and PST 24 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	24, total weight = 192 kg
Exposed collecting surface	38,4 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 655 mm, P = 640 mm, weight 190 kg
Imput power	Triphasic model 400 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 4,2 - 6,0 kW - Caloric power 16,5 - 31,5 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 3,0 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 3/4”
Suction Line	Dehydrated copper, Ø 1 1/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 24 C, volume min. 2,8 m^3/h., p.c. m.c.a. = 5 m
Titanium heat exchanger	Model PST 24 P, two exchangers model 100-104
Heat exchangers	Models PST 24 ACS, two exchangers model WRK 23
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



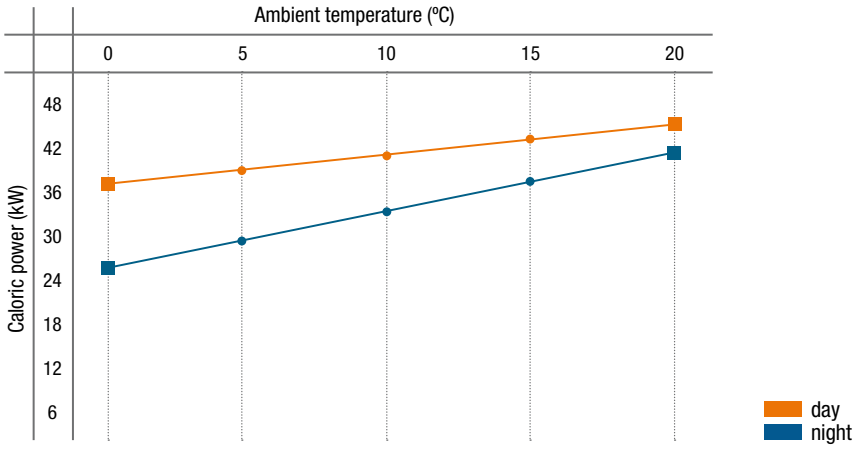
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 32 ACS (HSW), PST 32 C (Central heating) and PST 32 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	32, total weight = 256 kg
Exposed collecting surface	51,2 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 655 mm, P = 640 mm, weight 190 kg
Imput power	Triphasic model 400 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 5,7 - 8,3 kW - Caloric power 24,0 - 42,6 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 3,5 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 7/8”
Suction Line	Dehydrated copper, Ø 1 1/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 32 C, volume min. 4,0 m^3/h., p.c. m.c.a. = 6 m
Titanium heat exchanger	Model PST 32 P, two exchangers model 100-104
Heat exchangers	Models PST 32 ACS, two exchangers model WRK 23
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



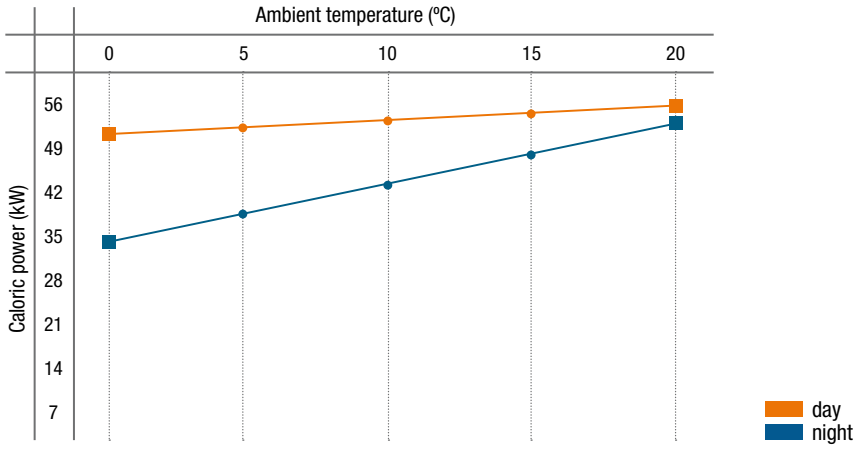
* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

Models: PST 40 ACS (HSW), PST 40 C (Central heating) and PST 40 P (Swimming pool)

TECHNICAL FEATURES	DESCRIPTION
THERMODYNAMIC SOLAR COLLECTOR	
Features	H = 800 mm, A = 2000 mm, P = 20 mm, weight 8 kg approx.
	30 micron anodized aluminium, molded-in roll-bond refrigeration circuit
Nbr. of collectors	40, total weight = 320 kg
Exposed collecting surface	64,0 m^2
THERMODYNAMIC BLOCK	
Stainless Steel case with sound insulation	H = 940 mm, A = 655 mm, P = 640 mm, weight 192 kg
Imput power	Triphasic model 400 V, 50 Hz
Hermetic compressor COPELAND, Scroll* type	Electric power 7,1 - 10,1 kW - Caloric power 32,5 - 53,1 kW
Noise emission 1 m. from the thermodynamical block	50-65 dBA
Refrigerant gas type	407 C, system load = 5,5 kg (Approximately**)
Liquid Line	Dehydrated copper, Ø 7/8”
Suction Line	Dehydrated copper, Ø 1 3/8”
Expansion valve	Danfoss
Pressure controllers, HP and LP	Yes, HP = 2,5 MPa max., LP = 0,2 MPa min.
Display digital SY250	Version 6.0
Stainless Steel welded plate heat exchanger	Model PST 40 C, volume min. 5,0 m^3/h., p.c. m.c.a. = 6 m
Titanium heat exchanger	Model PST 40 P, two exchangers model 100-104
Heat exchangers	Models PST 40 ACS, two exchangers model WRK 23
Water pump	No

OTHER FEATURES: Dehydrating filter, oil separator, fluid container, liquid viewer, motor protector switch, phase detector (only for three-phase installations), general circuit breaker, electrical connections.

EFFICIENCY CURVES



* The **electric power** corresponds to the electric consumption depending on the water temperature, from 30 to 50°C, and the **caloric power** generated corresponds to the solar radiation quantity on the panel.
** The gas charges must be suitable for each installation.

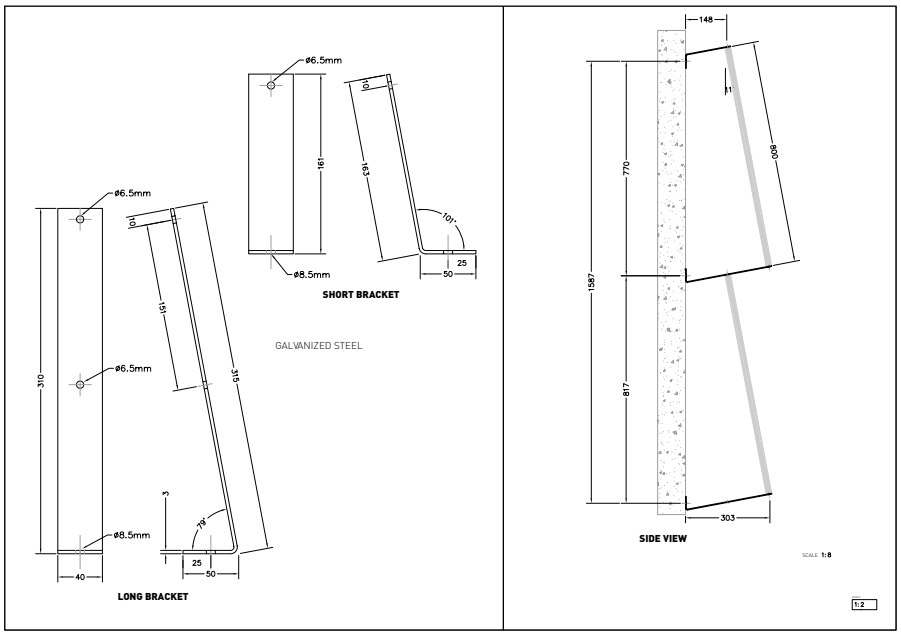
INSTALLATION ACCESSORIES

Panels arrangement

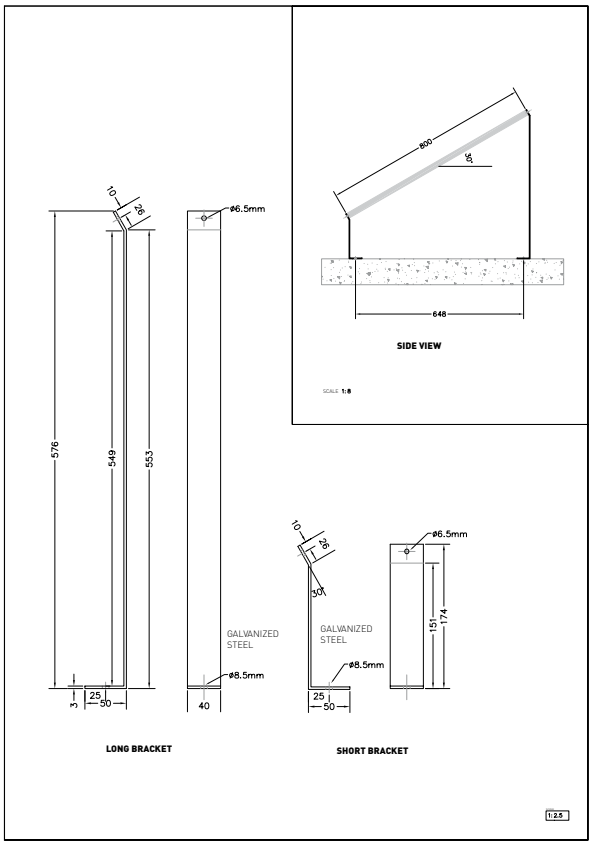
Fixing brackets, rails and other accessories for HSW large volumes, central heating and swimming-pools can be supplied only upon request.

It is necessary to know previously the location and orientation for the solar collectors, as there are specific fixing accessories depending on their tilt (0º, 30º, 45º or 60º).

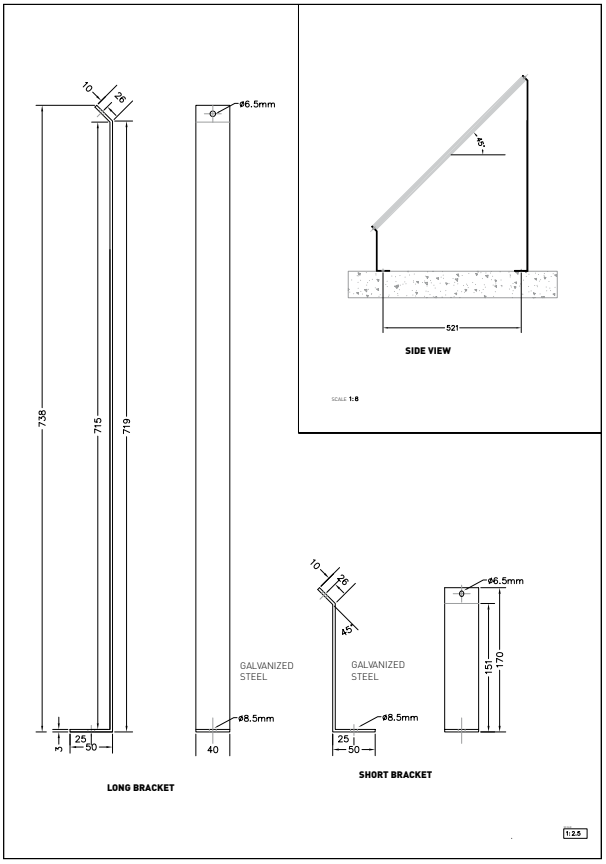
Vertical Wall Brackets (0º)



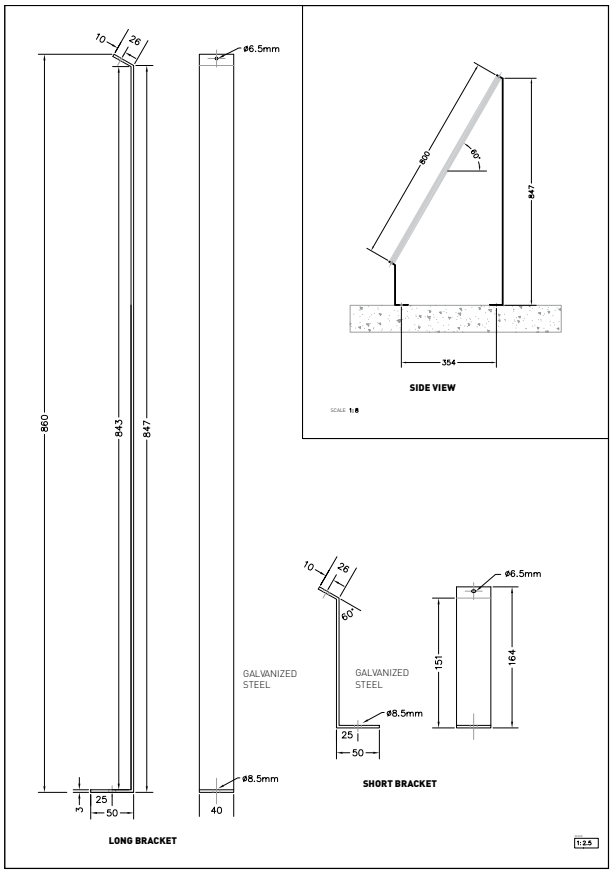
Roof Brackets (30º)



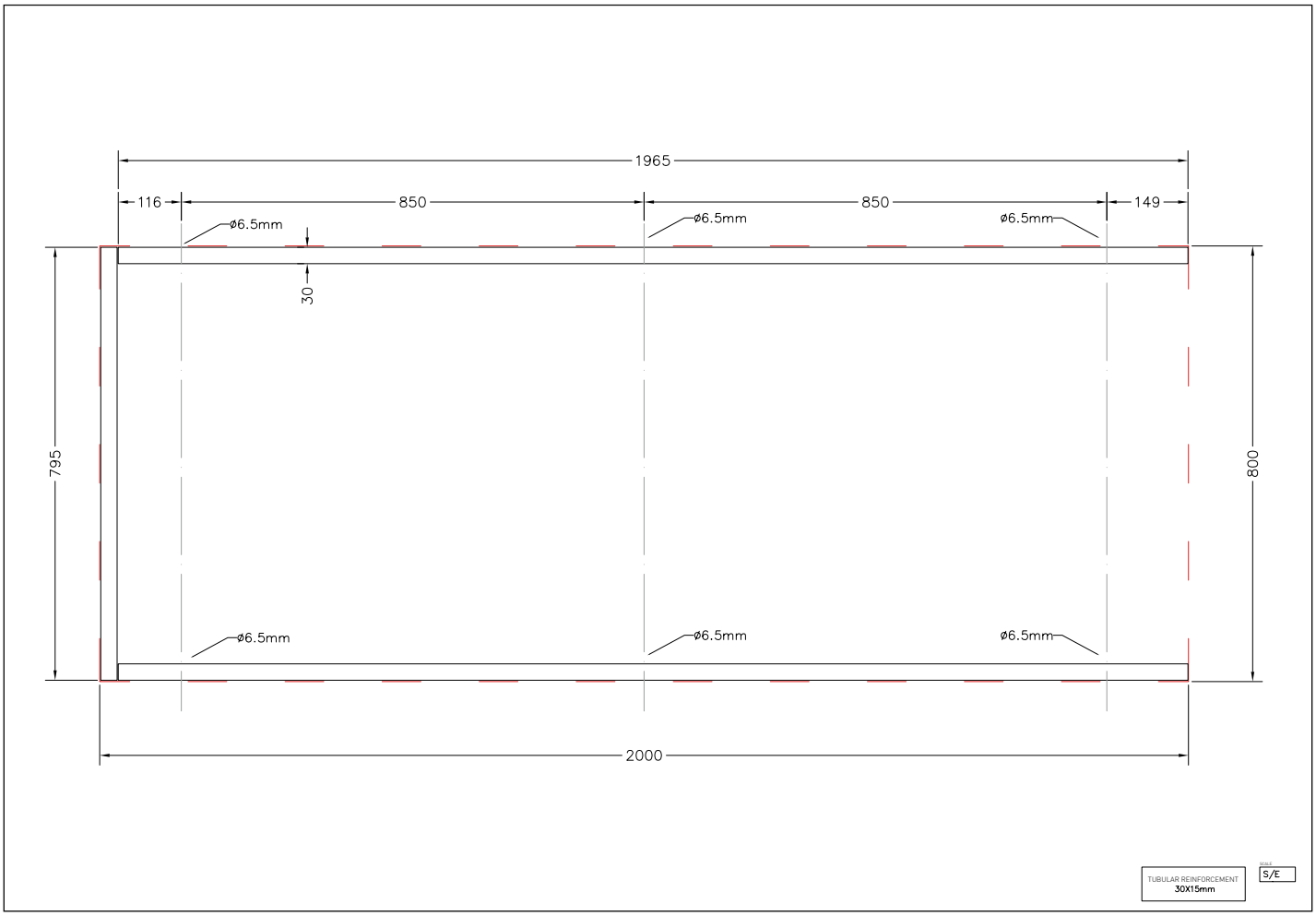
Roof Brackets (45º)



Roof Brackets (60º)



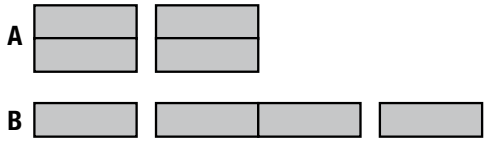
Internal reinforcements for collectors



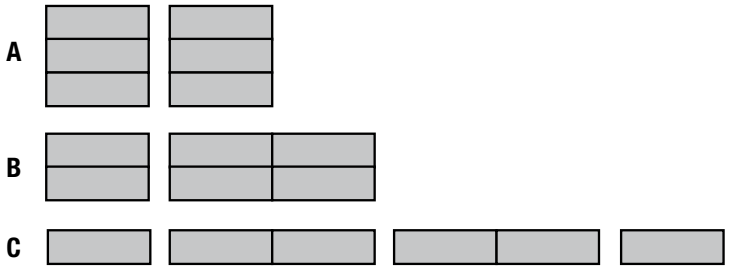
PANELS ARRANGEMENT

According to the tilt and the system to install, the solar panels will be arranged as shown in the table below.

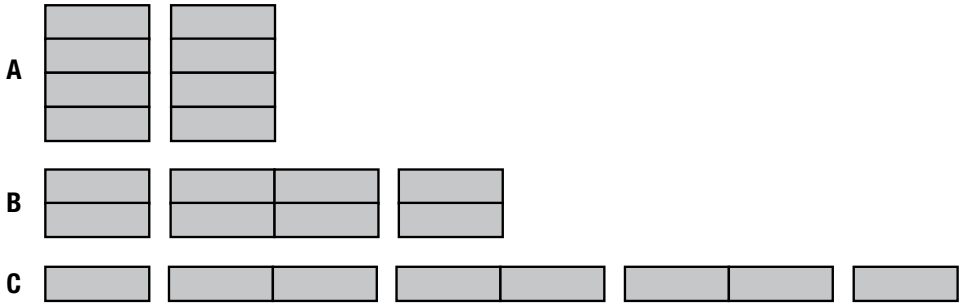
PST 4



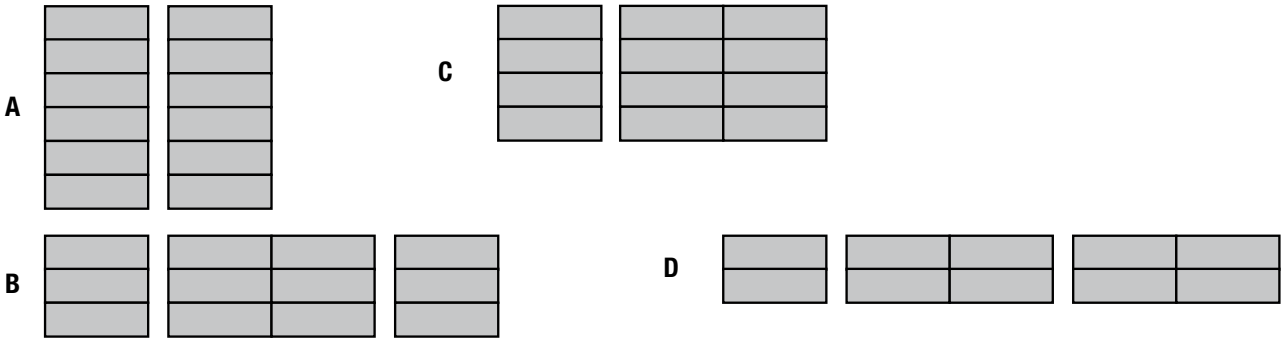
PST 6



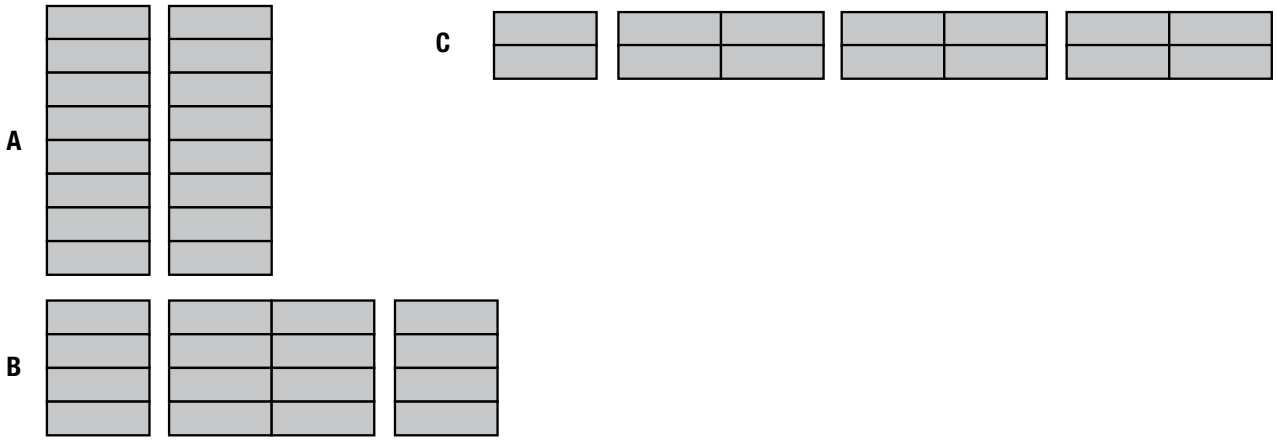
PST 8



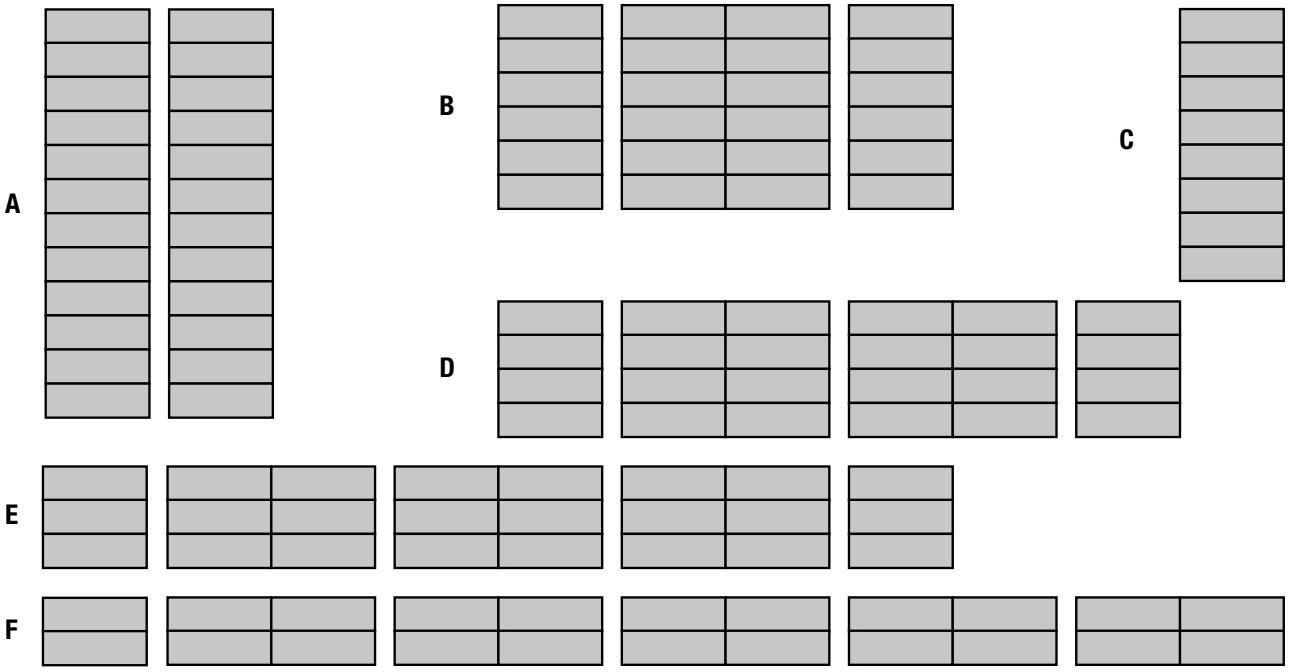
PST 12



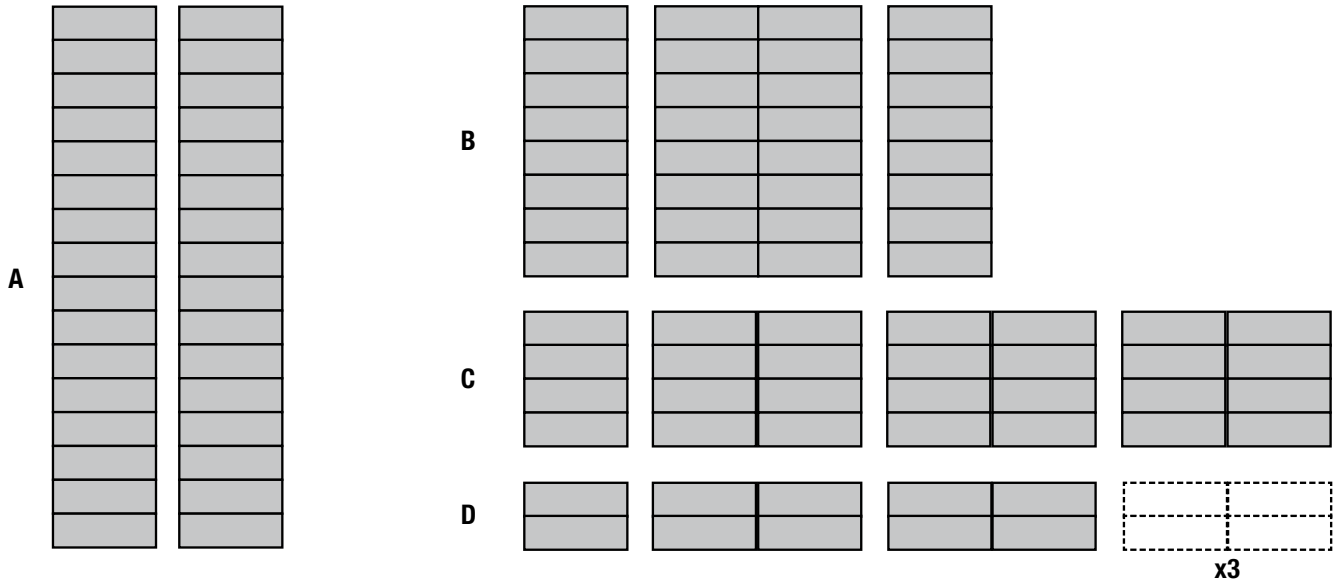
PST 16



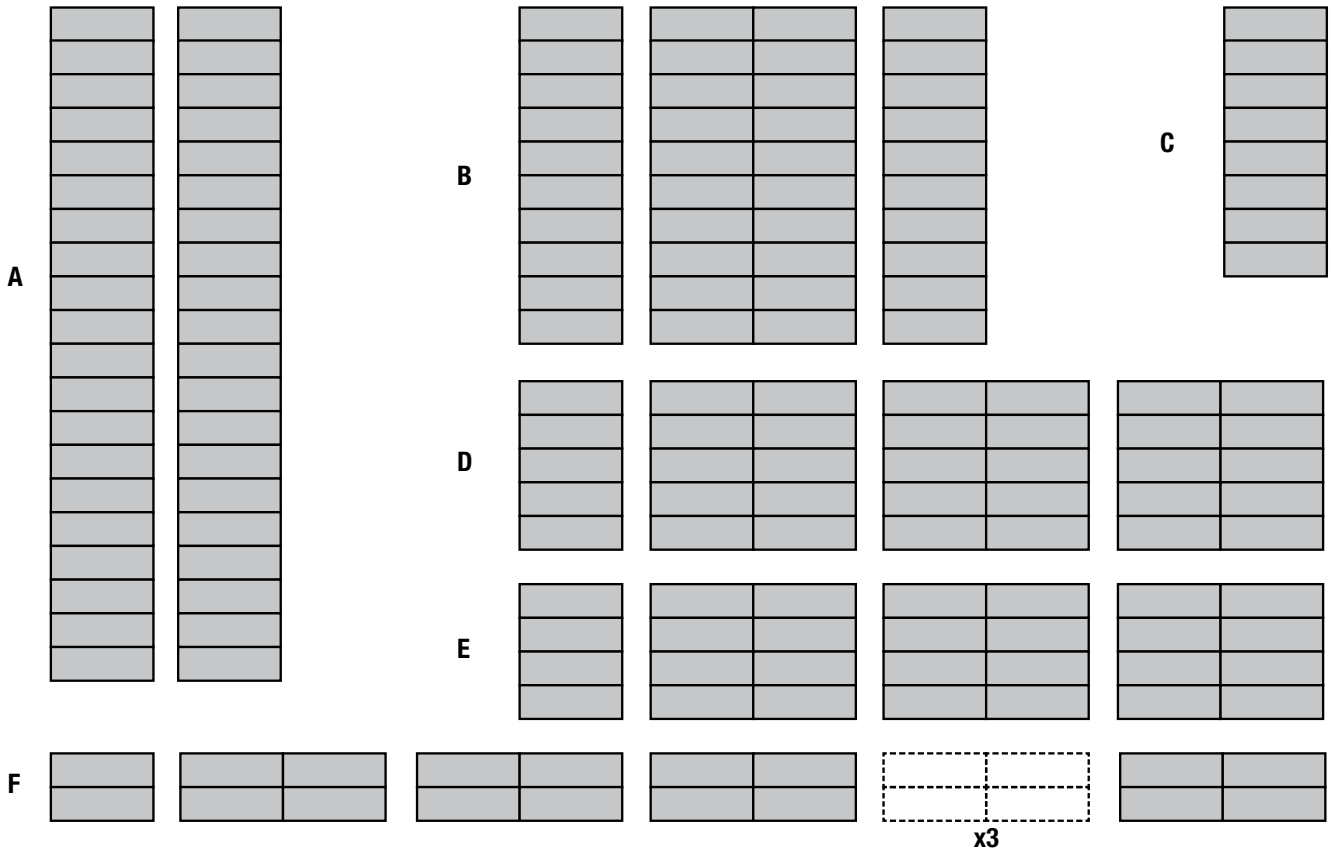
PST 24



PST 32



PST 40



GENERAL SALES CONDITIONS

WARRANTY

GENERAL SALES CONDITIONS

GENERAL:

1.1 Sales and supplies of components purchased from Paneles Solares Termodinámicos S.L., hereinafter, *Solar PST*, the Seller, shall be governed by the present General Sales Conditions, except in all those matters that are expressly agreed otherwise in the respective offer or in the acceptance of the order and which may constitute the special conditions thereof.

1.2 The present General Conditions shall be considered to have been communicated and accepted by the Buyer for all purposes upon placing the order.

PRICE:

1.1 The sales price of the products are set out in the *Solar PST* official tariff, communicated to the Buyer or previously agreed on under specific conditions between the Seller and the Buyer.

1.2 The prices of the Seller are net, exclusive of VAT or any other tax, which shall be charged subsequently in the invoice at the respective rates. The prices, likewise, do not include either insurance or transport costs, unless a clause is included that states the contrary in the general conditions.

1.3 *Solar PST* can amend the selling price of the Goods at any time with no notice. Should the selling price be increased this shall not affect orders currently being processed and previously approved by *Solar PST*.

1.4 The prices stated in the offer are for the terms of payment specified in the invoice. If the terms of payment vary, the offer prices would be subject to review.

ORDERS:

1.1 The Buyer shall place orders in writing (via fax or email), detailing the type of product and quantity. For it to be considered effective, the order has to receive acceptance by the Seller. The approved order and/or any product sent, will not be able to be cancelled, modified or sent back without previous agreement between the Buyer and the Seller.

1.2 The weights, dimensions and technical specifications referring to the Seller's products including catalogues, brochures, and technical literature are of an informative, non-binding nature.

PAYMENT CONDITIONS:

1.1 The Buyer's order previously accepted by *Solar PST*, will include the payment terms for the products, which will always be of prepayment.

1.2 Payment shall be made in the agreed terms to the Seller's bank account or by means of any other agreed procedure. Any form of payment will be set out in the proforma.

1.3 If the delivery or reception of the products should be delayed for reasons not attributable to the Seller, the agreed contractual terms and payment dates shall be maintained.

DELIVERY DATES AND CONDITIONS:

1.1 All delivery dates are estimated and goods shall be delivered in accordance with the INCOTERM stated in the proforma and previously agreed on with the customer.

1.2 The delivery dates shall be modified when:

- The Buyer does not supply the necessary documentation for the shipment.

- The Buyer requests modifications to the order and these are accepted by *Solar PST* in whose opinion justifies an extension of the delivery time.

- The Buyer has not fulfilled any of the contractual obligations of the order, especially those referring to payment.

- Delays, not attributable to *Solar PST*, occur in the production or provision of all or some of the product's components.

RETURN AND CLAIMS POLICY:

1.1 Under no circumstances will *Solar PST* accept the return of items and/or systems without previous agreement by *Solar PST*. All claims must be stated in written and forwarded to *Solar PST*.

1.2 Returns or shipments of material to *Solar PST*'s facilities, whether for their payment, replacement or repair, must be delivered under prepaid shipment.

1.3 The Buyer must inspect the goods purchased upon delivery and check whether the correct goods have been delivered as stated in the order. If not, the Buyer must inform *Solar PST* accordingly in writing within 24 hours after delivery.

1.4 If goods are found to be damaged, the Buyer must report such incidences on the Transport Carrier's Delivery note and notify *Solar PST* in writing within 24 hours after delivery. If the Buyer does not file a complaint within the aforesaid period, providing a detailed description and photos of the damage, the complaint will not be dealt with .

GUARANTEE:

1.1 The *Solar PST* system is subject to the following guarantee:

5 year warranty for the solar panel

2 year warranty for the thermodynamic block

2 year warranty for the cylinder

1.2 The Thermodynamic Solar Collectors *Solar PST* and/or its damaged or defective parts under guarantee, must be returned in their original or similar packaging and keeping the components in the same position. If not, the guarantee will not be applicable.

1.3 Under no circumstances will *Solar PST* accept liability for repairs carried out by unauthorized technicians (will *Solar PST* accept).

1.4 The guarantee does not cover damages or defects originated from inappropriate conservation or maintenance, inadequate gas/liquid use or charge, electric power fluctuations or from installations carried out without following The *Solar PST* Technical Guide.

OWNERSHIP OF GOODS:

Ownership of goods delivered by *Solar PST* will remain vested in *Solar PST* until the Buyer has paid the full purchase price. This is applicable to any form of payment.

NULLITY:

The nullity of any of the clauses of the present conditions by an amendment of the law or legislation, or by a judicial act, under no circumstances affects the legality of the rest of the General Sales Conditions stated in this agreement. Both parties accept to negotiate in good faith, the clauses which would substitute, if necessary, those which are inapplicable or have been nullified.

APPLICABLE LAW AND LEGAL COMPETENCE:

The present conditions will be subject to and interpreted in accordance with Spanish Law, including the price offer, sales agreement and all the operations involved in the sales agreement.

Any disputes will be settled by the civil court that is competent in first instance in the place where *Solar PST* has its registered office.

WARRANTY

By this warranty, Paneles Solares Termodinámicos S.L., hereafter *Solar PST*, with registered office at the Polígono Industrial de Bergondo, C/ Parroquia de Rois parcela F1, Edificio *Solar PST*, 15165 La Coruña, Spain and CIF B-15982879, guarantees that the product specifically mentioned later is free from defects in materials and workmanship from the date of its purchase by the buyer from the retailer, or at most upon its delivery, regardless of its final date of installation and/or start-up, and for the period below mentioned per item.

This warranty is valid against any manufacturing defects. It excludes any payment of damages to persons, or for direct and indirect damages to elements and/or materials. This warranty is valid only accompanied by the original purchase receipt given to the buyer, and filled in due form, including date of purchase with the following items:

a) Full name of the Buyer

b) Name, Signature and Seal of the Retailer

c) Product Model and Serial No.

d) Date of Purchase

Solar PST reserves the right to deny warranty coverage if this information has been cancelled or modified after the original purchase date of the product.

If, however, during the warranty period the product should manifest any defects in material and/or workmanship, the buyer must inform *Solar PST* within one month following the noticing of the defect, to claim the repair or replacement of the corresponding part or element. *Solar PST* official technicians shall assess the damage and repair the product according to the technical coverage available at that moment, in the area where the product is installed or at the facilities indicated by *Solar PST*. In the event that after repeated attempts it is impossible to restore the element into working order, *Solar PST* shall replace it for an equivalent one.

This warranty covers the replacement of the elements damaged during the coverage period. The replacement of any element during the framework of warranty does not extend its duration, and the replaced elements shall become the property of *Solar PST*.

Regarding the Warranty parts return, these must be returned in the same conditions as they were shipped, original or similar packaging. The compressors' valves must have their original copper caps on.

The periods stated below shall begin on the date of purchase, or at most upon the delivery of the goods, regardless of the date of installation or start-up.

a) Solar Collectors: 5-year warranty

b) Tanks: 2-year warranty

c) Thermodynamic Blocks: 2-year warranty

This warranty specifically excludes:

• Periodic inspections, maintenance and repair or replacement of parts damaged as a result of normal wear and tear.

• Consumable items, or subject to wear and tear, (switches, resistances, thermostats, timers, etcetera).

• Travel charges, labor costs and carriage costs for parts.

• Thermoaccumulators which work with water containing active chlorine, + - 0´2 p.p.m., and Ph + - 6, (Sorensen scale at 25º).

• Installing and/or configuring the product according to requirements different from the ones specific of the product, (or the ones established by *Solar PST* official service), or not compliant with the current technical or security standards.

• Manipulation or repair attempts by non-authorized technical service providers.

• Failures or damage caused to the product due to: Electric discharges, Flooding, Hail, Dampness, Impacts, Misuse of the Equipment, Galvanic Coupling, Corrosion due to Fixing with Iron Screws or Non-Stainless Steel Holders, Badly Fixed Collectors, Fracture of the Collectors Capillary Tube due to Vibrations, Acts of God such as Accidents, Natural Disasters, Unpredictable Weather Phenomena or Any Other Cause Beyond *Solar PST* Control.

The manipulation or repair attempts by technical service providers not authorized by *Solar PST* may extinguish the rights granted by this Warranty.

Solar PST
THERMODYNAMIC
SOLAR COLLECTORS

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