



SOLAR THERMAL

SYSTEMS



C A T A L O G U E

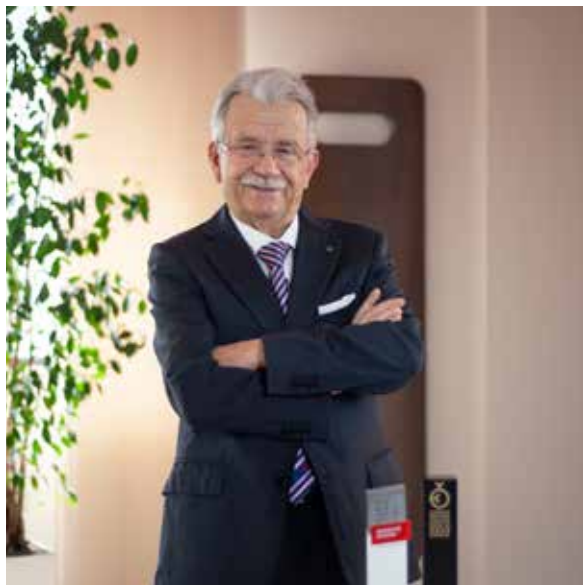
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Cordivari boasts of a consolidated industrial tradition and is one of the most important Italian companies in the plumbing and heating sector. Founded in 1972 by Ercole Cordivari, the company specializes in the production of Calorifiers, Pressure Vessels, Solar Thermal and Heat Pumps Systems, Storage and Water Treatment Tanks, Chimney Pipes Systems and Decorative Radiators.

The four Cordivari manufacturing facilities cover an area of over 370,000 square meters and employ over 700 people.

To guarantee the total quality of our products, all of them are designed and Made in Italy, in the Cordivari's plants.

Thanks to development strategies oriented towards technological innovation and continuous staff training, Cordivari is equipped with modern systems and cutting-edge production processes. The technological, ergonomic and ecological choices allow to operate in full respect of people and environment, according to UNI EN ISO 14001 Environmental Management System and UNI EN ISO 45001 Occupational Health and Safety Standard in addition to the UNI EN ISO Quality System 9001, which guarantees the full quality and reliability of our products. Cordivari's highly qualified management, the continuous search for innovative solutions and a strongly customer oriented approach, brought us today to serve more than 2.000 customers in 72 countries around the world, a market leadership position and an exclusive know-how in the production of Integrated Hydrothermal Systems. The testimony of a continuous commitment aimed at achieving Customer Satisfaction.



Cav. Ercole Cordivari

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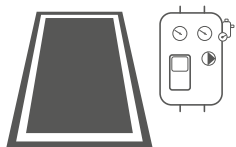
COMPACT SYSTEMS STRATOS®

THERMOSYPHON SYSTEMS

FORCED CIRCULATION SYSTEMS



CONFIGURATION AND SCHEMES



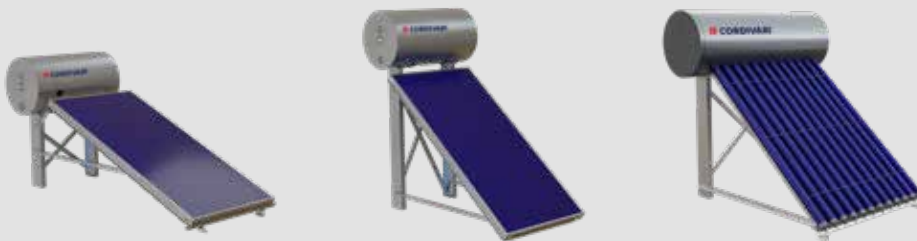
COLLECTORS AND SPARE PARTS



SUPPORT



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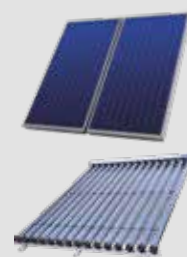


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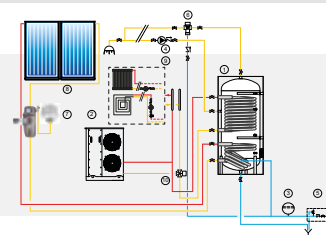


FLAT COLLECTORS

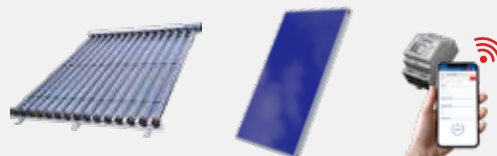
VACUUM COLLECTORS



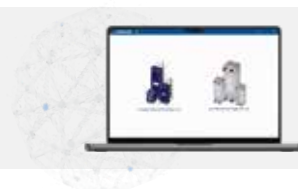
48



58



66



91



**CARING ABOUT
QUALITY, COMBINED
WITH ATTENTION TO
THE ENVIRONMENT,
HAVE ALWAYS BEEN
CONSIDERED STRATEGIC
ACTIVITIES.**



#company

This manufacturing philosophy, which today is a lifestyle for the company, means reducing emissions and energy inefficiencies, waste reduction through differentiation and recycling.

Thanks to these choices, the company can operate without harming people and environment.

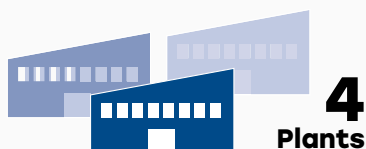
In compliance with the Quality & Environment management system, Cordivari exploit clean energy from renewable sources and uses only recyclable and environmentally friendly resources, from raw materials to packaging.

Each proposed solution has always represented the synthesis of consumer needs through reliable technical choices, ergonomic design, attention for final installation and ease of use.

The continuous evolution of the product offer testifies the company's attention to the needs of the market.

Likewise, the research and development of new solutions align with the evolutionary trends of a market oriented to the themes of efficiency and energy saving.

The different stages of production involve the best techniques of industrial automation, advanced robotics and craftsmanship, and each product is subjected more times during the production phases to a rigorous automated, manual, and visual control.



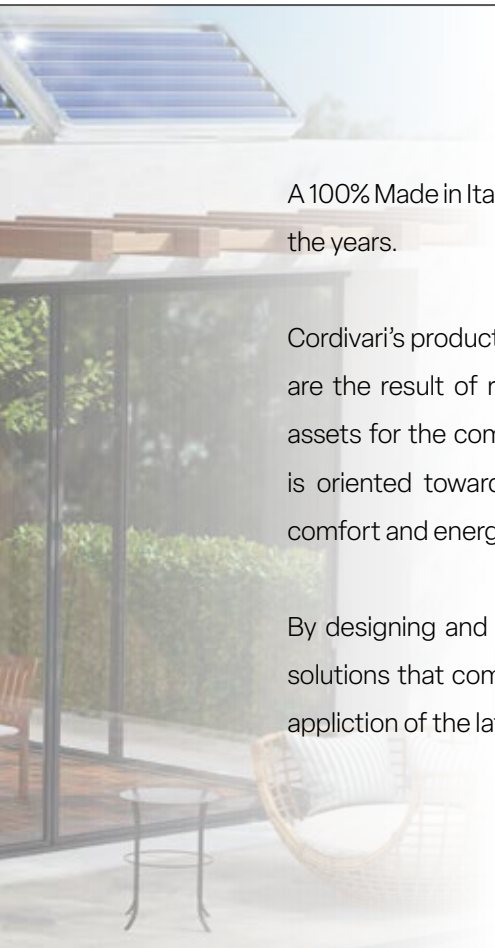


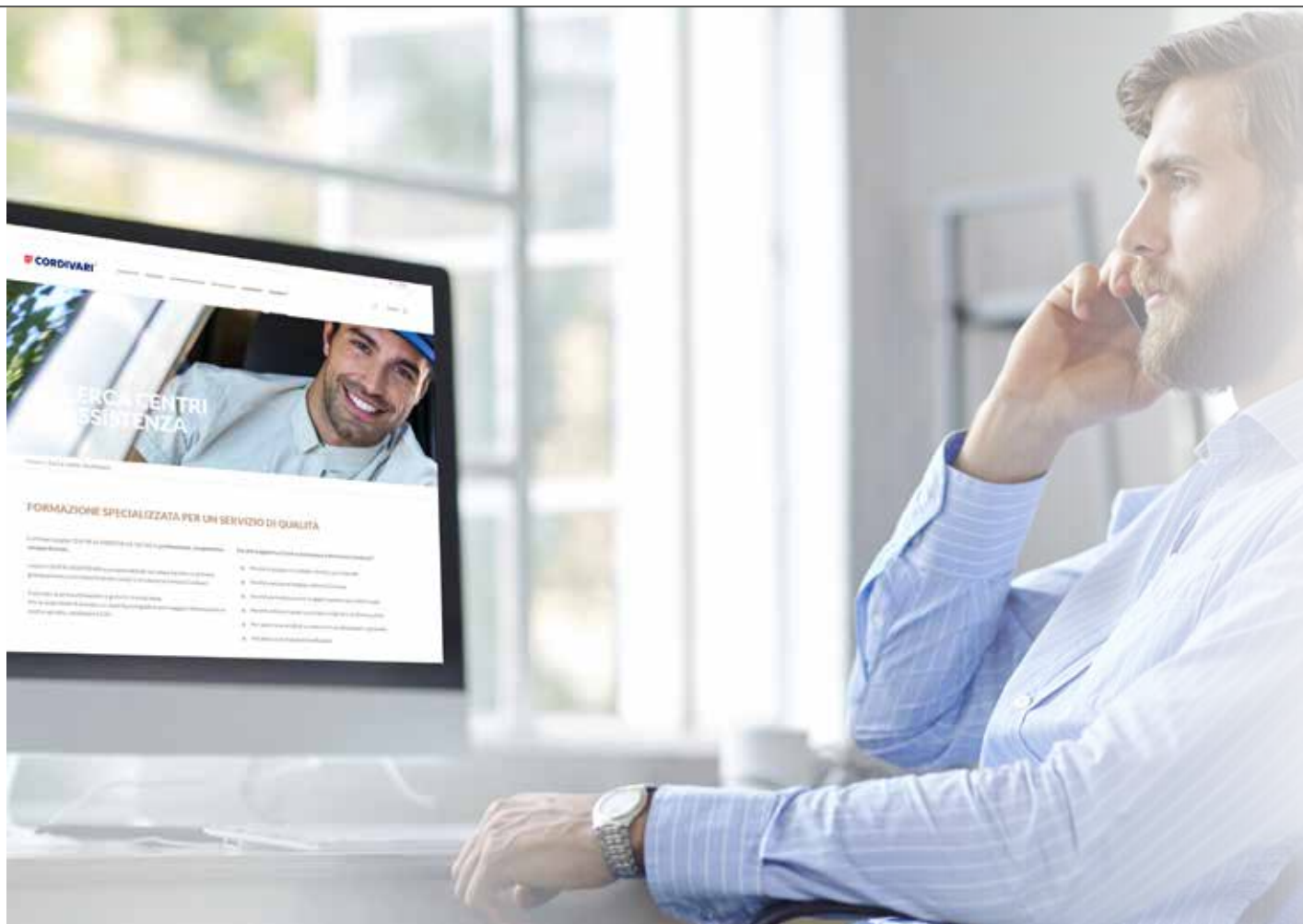
#solutions

A 100% Made in Italy production, which has constantly improved and evolved over the years.

Cordivari's products have been joined over time by systems and solutions. These are the result of research and development activities representing strategical assets for the company's growth and future. Today, the production philosophy is oriented towards high-efficiency products designed to optimize the living comfort and energy efficiency of buildings.

By designing and developing systems, Cordivari uses innovative and patented solutions that combine comfort, energy performance and savings, through the application of the latest technologies and renewable sources.





#quality

Choose serenity,

Today, more than ever, who chooses Cordivari products chooses to be peaceful!

By introducing the new ErP standards, we choose to offer you guaranteed performances and reliability.

The construction of the new building Cordivari LAB is the result of this choice.

As from 2015, the company is equipped with a laboratory and an advanced test room which allow to test any product or system, measuring and certifying its performances. Thanks to its strict procedures, conformed to European standards



EN 12975-2 e
SOLAR KEYMARK
Solar collectors are certified
according to EN 12975-2;
EN 12976 and Solar Keymark



2014/68/EU
2014/29/CE
CE and PED compliant
products



The complete solution for your **GREEN** HOUSE







STRATOS[®]4s

S Y S T E M

THE FIRST AND ONLY COMPACT SOLAR SYSTEM WITH NATURAL CIRCULATION TO PRODUCE HOT WATER ALL YEAR ROUND

The system Stratos[®] 4S is an innovative, compact, highly-efficient solar thermal system with integrated DHW storage. It is equipped with a patented self-balancing and anti-stagnation system.

It is indicated for the production of domestic hot water in all climatic zones thanks to its ability to retain the captured heat.

The system can in fact be installed in areas with temperatures up to -20 °C.

S
A
V
I
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S



SPACE



INSTALLATION COSTS



PERFORMANCE



INSTALLATION TIME



ENERGY SAVING



STRATOS® 4S SYSTEMS

Main features of the three systems versions STRATOS 4S:

- Domestic Hot Water in any zone and season
- Suitable up to -20 °C
- Retains the heat thanks to the vacuum technology
- DHW store in stainless steel AISI 316L
- Anodized aluminum frame marine grade

STRATOS® 4S SYSTEM - HEAT STORAGE

- DHW store in stainless steel AISI 316L
- Equipped as standard with electric heaters that can be remotely controlled via smartphone thanks to the HEAT MANAGER system fitted as standard

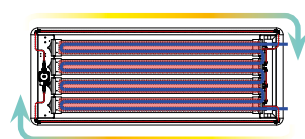


HEAT STORAGE
ENERGY STORAGE



STRATOS® 4S SYSTEM - HEAT CONTROL

- Active over-temperature protection system
- Equipped as standard with electric heaters that can be remotely controlled via smartphone thanks to the HEAT MANAGER system fitted as standard



ACTIVE
PROTECTION
SYSTEM



STRATOS® 4S SYSTEM - ROTOSHIELD®

- Patented anti-stagnation self-balancing system
- It is suitable for domestic hot water production in all climate zones due to its ability to preserve captured heat. The system can, in fact, be installed in areas with temperatures as low as -20°C

S Y S T E M
ROTOSHIELD®



STRATOS[®]4s

S Y S T E M

HEAT STORAGE

NEW

- 1 Structure of anodized marine grade 15 µm aluminium 6060
- 2 Heat Storage backup circuit (patented) with low power sanitary circulator (5W)
- 3 Sanitary water storages, in stainless steel AISI 316L
- 4 Second level heat storage (patented) in stainless steel 316L integrated in the frame and insulated with VIP
- 5 Vacuum tube Sydney type with high vacuum grade, minimum 10⁻³ pa, with highly selective PVD coating
- 6 Integration electric heaters and antifreeze
- 7 HEAT MANAGER - smart Wi-Fi controller for remote management of the electric heaters





The HEAT STORAGE SYSTEM is the new PATENTED active thermal energy management system for Stratos 4S Heat Storage. Thanks to the patented solution all the incident solar energy is captured in the system, accumulating in a dedicated storage the exceeding solar energy during periods of maximum solar radiation. Once the first level of storage is full, the exceeding energy is recirculated in the second level of storage integrated in the compact system, thanks to a low power backup system. This stratification of thermal energy permits to optimize the solar energy storage, having DHW at the right temperature even with low incident solar irradiation energy.



BREVETTATO
PATENTED

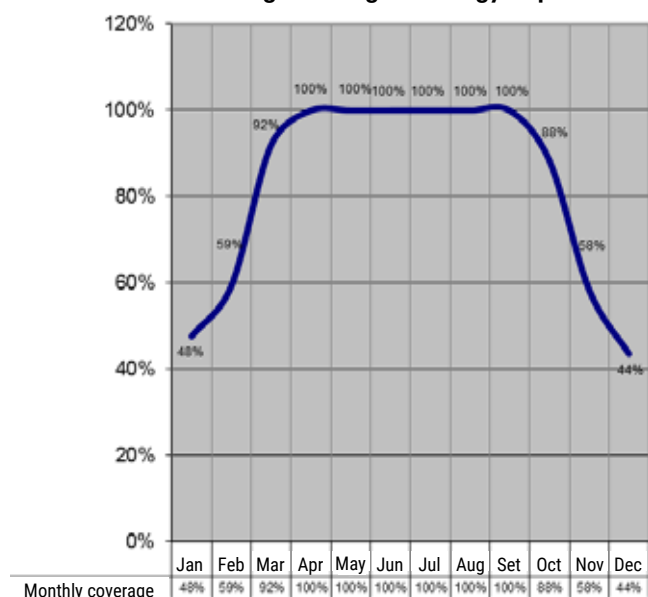
MADE IN ITALY

STRATOS® 4S - TECHNICAL INSIGHTS

USABILITY CURVE*

STRATOS® 4S SYSTEM ROTOSHIELD®

Percentage coverage of energy requirements



- ANNUAL DHW NEEDS COVERAGE EXCEEDING 80%

- HOT WATER EVEN IN THE MIDDLE SEASONS

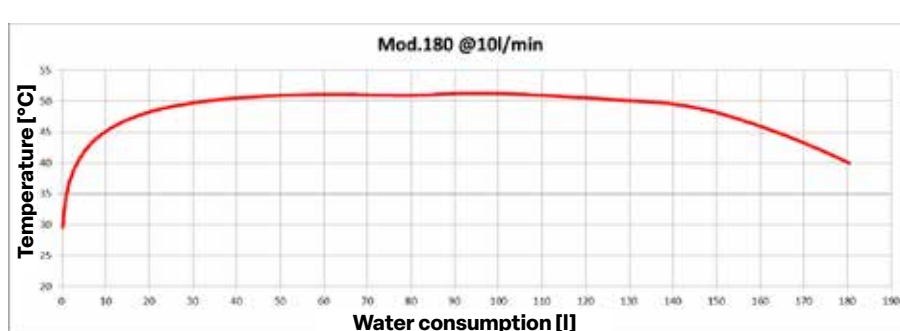
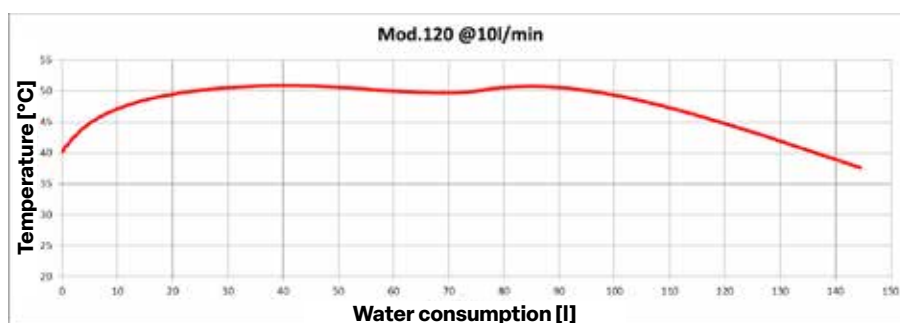
* Primary temperature 90° C

* Sanitary water inlet temperature 15° C

* DHW required 150 lt, collector oriented to the south, model 180.

EFFICIENCY TEST - STRATOS® 4S ROTOSHIELD® SYSTEM

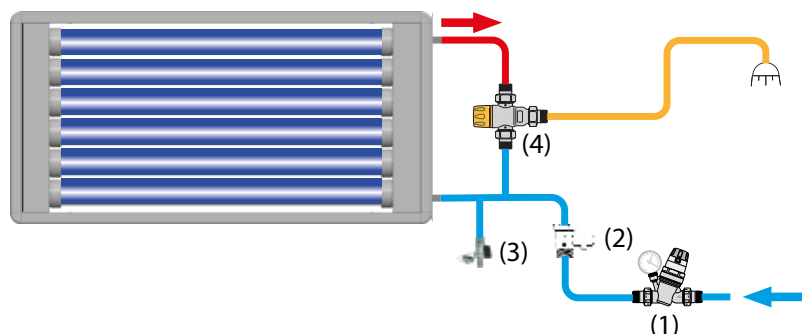
In collaboration with the Industrial engineering department and mathematical sciences – DIISM of the Polytechnic University of Marche



SINGLE LEVY TEST OF DHW AT 45 °C, WHICH CAN BE CARRIED OUT WITH PRIMARY STORAGE AT 85 °C AND DOMESTIC HOT WATER FLOW OF 10LT/MIN

STRATOS® 4S - TECHNICAL INSIGHTS

TYPICAL INSTALLATION SCHEME



CONNECTIONS LEGEND

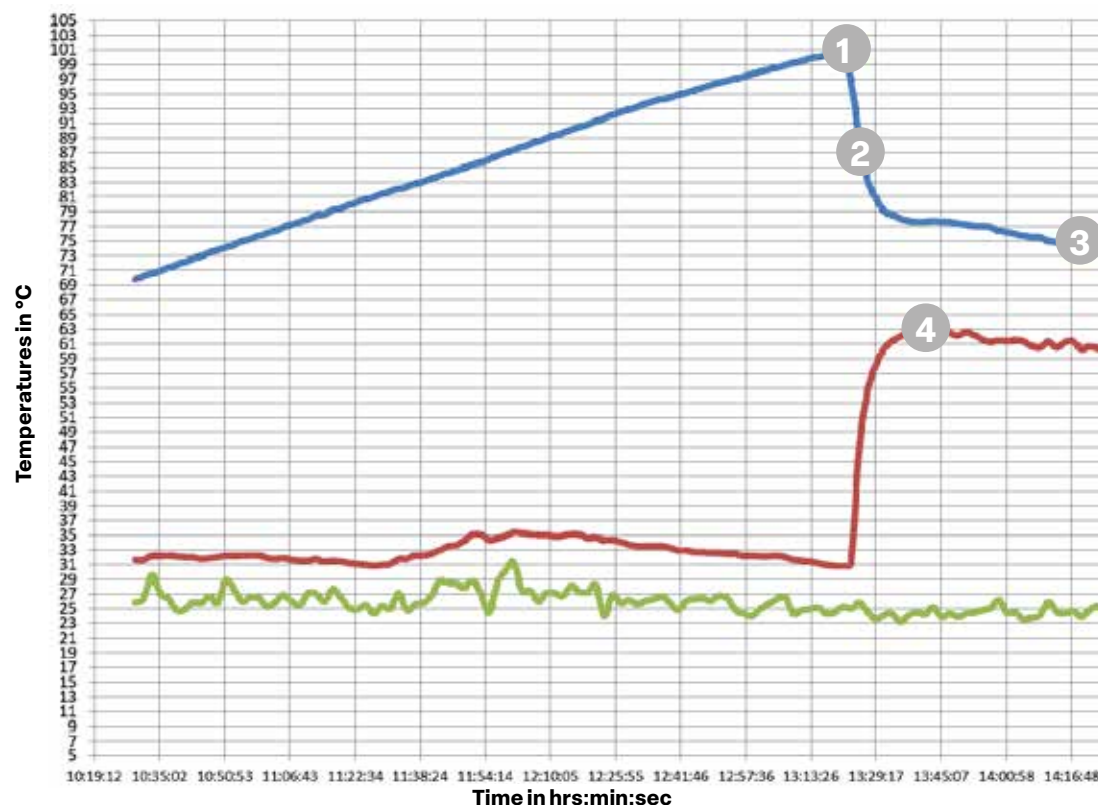
- | | |
|---|--|
| 1 | Eventual pressure reducer |
| 2 | Safety and non-return valve (included) |
| 3 | Drain tap for panel draining (to be provided by the installer) |
| 4 | Thermostatic mixing valve (optional-to be ordered separately) |

TESTS OF DISSIPATION AND TEMPERATURE MONITORING OF STRATOS® 4S HC PROFILE

Laboratory test carried out to evaluate the efficiency of the dissipation system (patented) of the STRATOS® 4S HEAT CONTROL and monitoring of the surface temperature of the heat dissipation profile.

- Blue line: Primary accumulation temperatures
- Red line: Surface temperatures of the aluminum profile
- Green line: Ambient temperatures

As shown from the chart, the profile of the solar system never reaches levels of temperature as to present a risk to the user.



- 1 Circulator ON
- 2 Initial mixing that causes a temperature collapse. Phase duration: 8 minutes
- 3 Circulator OFF
- 4 Maximum temperature reached by the surface of the heat dissipation profile

THERMAL SYSTEM **STRATOS® 4S HEAT STORAGE**

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM



The **SYSTEM STRATOS® 4S HEAT STORAGE** is the new and efficient thermal energy management system with direct heating. Thanks to this patented solution all the exceeding solar energy produced during the maximum solar radiation, is captured in the system, and accumulated in a dedicated storage tank for DHW available for further need.

STRUCTURE AND MATERIALS

- Frame structure in anodized Marine Grade aluminum. Support and fixing kit in galvanized steel
- Capturing system consisting of tubes with Sydney type vacuum technology with highly selective PVD coating and high vacuum grade.

Primary store circuit (water and glycol) in stainless steel AISI 304.

- DHW store in stainless steel AISI 316L, suitable for drinking water

INCLUDED ACCESSORIES

6 bar safety valve. Fixing kit for flat surfaces (inclination 30°) as well for pitched roofs. Integration electric heaters. TP Valve. Magnesium Anode Protection on each tube
HEAT MANAGER - smart Wi-Fi controller for remote management of the electric heaters

CONNECTIONS

2 threaded female connections of 1/2"

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

P. MAX INPUT	P. MAX ACCUMULATION	T. MAX	T. MIN	INCLINATION SLOPE
4 bar	6 bar	92 °C	-20 °C	10° - 70°

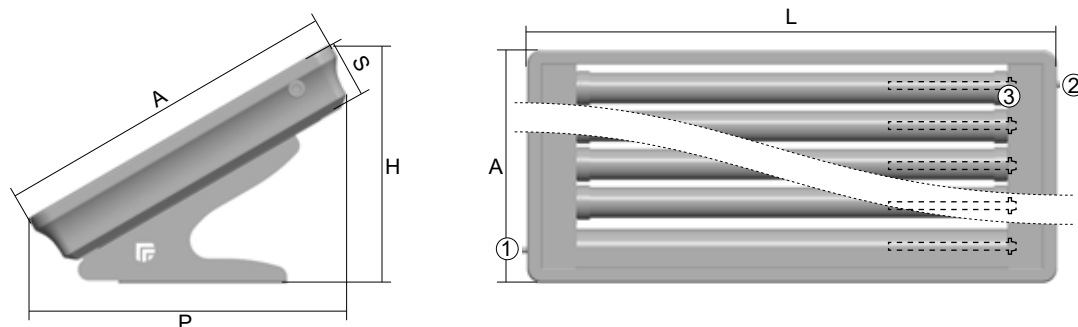


STRATOS® 4S HEAT STORAGE SYSTEM

SYSTEM COMPONENTS	INCLUDED		INCLUDED
Heat Manager system	✓	TP valve	✓
Structure of anodized marine grade 15 µm aluminium 6060	✓	Heat Storage backup circuit (patented) with low power sanitary circulator (5W)	✓
6 bar safety valve	✓	Mounted magnesium anode for protecting each tube	✓
Fixing kit for flat surfaces and pitched roofs	✓	Solar Thermal Accumulator	✓
Integrated electric heaters	✓		
Anti-freeze heater (set-up 6 °C)	✓		

THERMAL SYSTEM STRATOS® 4S HEAT STORAGE

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM



Model	No. tubes capturing	L	P	H	A	S	DHW Connections	Connections anodes of magnesium	Surface area Gross	Total weight in operation	Weight/m ² in function
		[mm]					1-2	3	[m ²]	[kg]	[kg/m ²]
160	4	2160	859	643	946	167	1/2" F	1/2" F	2,04	182	89
210	5	2160	1022	737	1134	167/209	1/2" F	1/2" F	2,45	233	95
260	6	2160	1156	814	1289	167/209	1/2" F	1/2" F	2,78	260	94
300	7	2160	1290	892	1444	167/209	1/2" F	1/2" F	3,12	288	92

STRATOS® 4S HEAT STORAGE SYSTEM

Model	Users	Daily DHW production*	Description	Art. Nr.	Power electric integration heaters** + antifreeze
160	1 person	up to 160 lt	HEAT STORAGE 160	3410316603250	1200 watt + 500 watt
210	2 people	up to 210 lt	HEAT STORAGE 210	3410316603251	1200 watt + 500 watt
260	3 people	up to 260 lt	HEAT STORAGE 260	3410316603252	1200 watt + 500 watt
300	4 people	up to 300 lt	HEAT STORAGE 300	3410316603253	1200 watt + 500 watt

* Blended at 42°C with solar energy of 26MJ/m² and mains water at 25°C (without electrical integration)

**Electrical integration heaters remotely managed with Heat Manager system.

Before starting the system, fill the system with water (all the pipes are already preloaded with glycol). Installation and filling must be performed with the covered system, only after completing this procedure it will be possible to uncover the system.

For the correct installation, always refer to the enclosed user manual.

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM

BACK-UP TANK IN SS 316L INTEGRATED IN THE SYSTEM (PATENTED)



In conditions of high incident solar energy, the thermal sensor activates the circulator (low absorption electricity 5 watts) to transfer heat to the thermal accumulator (insulated back-up tank).

In this way the overheat stagnation is avoided, and an additional reserve of DHW, to be used in times of insufficient solar radiation (e.g. in the evening) is secured. This patented solution maximizes annual DHW production and the efficiency of the 4S Heat Storage system.

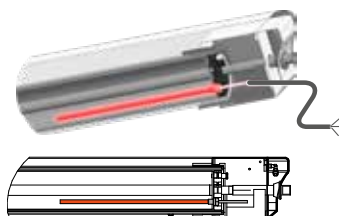


www.cordivariheatmanager.com

HEAT MANAGER - SMART CONTROLLER

Stratos 4SHC system is equipped with the Smart Controller Wi-Fi HEAT MANAGER for the remote management of the electric heaters by smartphone iOS or Android. Thanks to this app it is possible to manage, to set and to monitor the functioning of the electric heaters easily from the mobile phone, by setting the temperature and the operating time slots.

HEAT MANAGER is user friendly and intuitive. You just have to install the app and connect the smart controller to your home Wi-Fi network.



THE FIRST SOLAR WATER HEATER

Stratos® 4S HEAT STORAGE is available with electrical integration. Thanks to the integrated "Plug & Play" electric heaters, the system becomes a real solar water heater that can always offer you maximum comfort, safety and great savings in every season of the year.

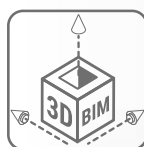


STRATOS[®]4s

S Y S T E M



- 1 Structure of anodized marine grade 15 µm aluminium 6060
- 2 Active HEAT CONTROL system, against overheating, with high efficiency circulator
- 3 Anti-stagnation heat dissipation profile
- 4 Vacuum tube Sydney type with high vacuum grade, minimum 10⁻³ pa, with highly selective PVD coating
- 5 Sanitary exchanger, corrugated anti-limescale tube in stainless steel Aisi 316L
- 6 Primary circuit store (water and glycol) in stainless steel
- 7 Integration electric heaters
- 8 HEAT MANAGER - smart Wi-Fi controller for remote management of the electric heaters





The **STRATOS® 4S HC SYSTEM**, represents the latest generation of compact solar systems.

Thanks to its patented HEAT CONTROL technology, the system allows to quickly store all the captured energy, managing to retain it for a long time without dispersion and risk of over temperature or freezing during the winter months.



BREVETTATO
PATENTED

MADE IN ITALY

Percorso
Efficienza  Innovazione

SOLAR THERMAL SYSTEM **STRATOS® 4S HC**

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM



Percorso
Efficienza Innovazione



THE **STRATOS® 4S HC SYSTEM**, represents the latest generation of Cordivari compact solar systems.

Thanks to its patented HEAT CONTROL technology, the system allows to quickly store all the captured energy, managing to retain it for long time without dispersion and risk of over temperature or freezing during the winter months.

STRUCTURE AND MATERIALS

- Frame structure in anodized Marine Grade aluminum
- Support and fixing kit in galvanized steel.
- Capturing system consisting of tubes with Sydney type vacuum technology with highly

selective PVD coating and high vacuum grade (minimum 10⁻³ pa).

- Primary store circuit (water and glycol) in stainless steel AISI 304.
- DHW exchanger in corrugated stainless steel AISI 316L, suitable and certified for drinking water, according to 98/83/CE and subsequent amendments

CONNECTIONS

2 threaded female connections of 1/2"

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

INCLUDED ACCESSORIES

6 bar safety valve. Fixing kit for flat surfaces (inclination 30°) as well for pitched roofs. Non-toxic heat transfer fluid. Integration electric heaters. Electromechanical time switch

P. MAX INPUT	P. MAX ACCUMULATION	T. MAX	T. MIN	INCLINATION SLOPE
4 bar	7,5 bar	100°C	-20°C	10° - 70°



STRATOS® 4S HC SYSTEM

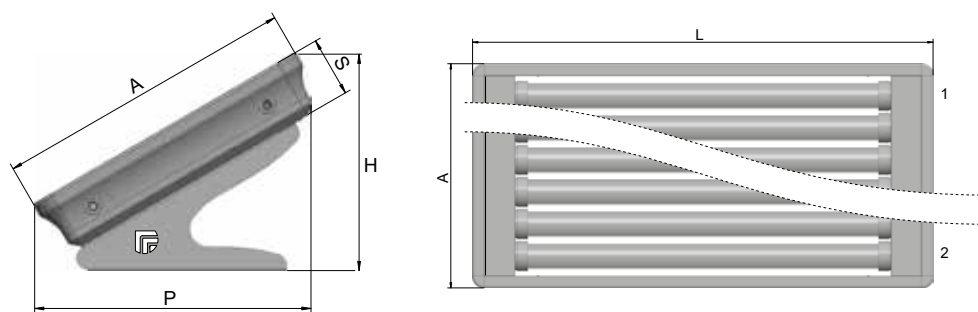
SYSTEM COMPONENTS	INCLUDED		INCLUDED
Heat Manager system	✓		Non-toxic heat transfer fluid
Frame structure in marine grade anodized aluminum 15 µm	✓		Integration electric heaters (n°4 for model 120 lt and n°6 for model 180 lt) with set point at 75°C
6 bar safety valve	✓		Automatic anti-stagnation system with high efficiency circulator and thermal switch
Fixing kit for flat surfaces and pitched roofs	✓		

SOLAR THERMAL SYSTEM **STRATOS® 4S HC**

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM



STRATOS®



Model	No. tubes capturing	L	P	H	A	S	DHW Connections	Surface area Gross	Total weight in operation	Weight/m ² in function
		[mm]						[m ²]	[kg]	[kg/m ²]
120	4	2160	752	589	822	163	1/2" F	1,77	122	69
180	6	2160	951	704	1052	163	1/2" F	2,27	178	78
NEW 210	7	2160	1080	790	1200	163	1/2" F	2,60	203	78

STRATOS® 4S HC SYSTEM

Model	Users	Daily DHW production*	Description	Art. Nr.	Power electric integration heaters** + antifreeze
120		up to 120 lt	HEAT CONTROL 120	3410316603207	1000 watt
180		up to 180 lt	HEAT CONTROL 180	3410316603208	1500 watt
NEW 210		up to 210 lt	HEAT CONTROL 210	3410316603209	1750 watt

* Blended at 42°C with solar energy of 26MJ/m2 and mains water at 25°C (without electrical integration)

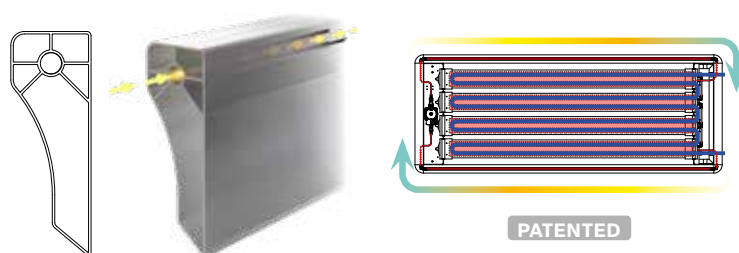
**Electrical integration heaters remotely managed with Heat Manager system.

Before starting the system, fill the system with water (all the pipes are already preloaded with glycol). Installation and filling must be performed with the covered system, only after completing this procedure it will be possible to uncover the system.

For the correct installation, always refer to the enclosed user manual.

COMPACT AND HIGH EFFICIENCY SOLAR THERMAL SYSTEM

The HEAT CONTROL SYSTEM is the new active protection system against over heating of the STRATOS® 4S HC. Thanks to the patented solution for the dissipation of the excess heat through the same structure of the system, the new STRATOS® 4S HC is always safe against over temperature in periods of maximum solar radiation, even in the absence of DHW withdrawal. The system is equipped with sensors that activate a circulation of the primary exchange fluid, that dissipates the excess heat if excessive overheating is detected.



Profile section (patented) with heat dissipation function



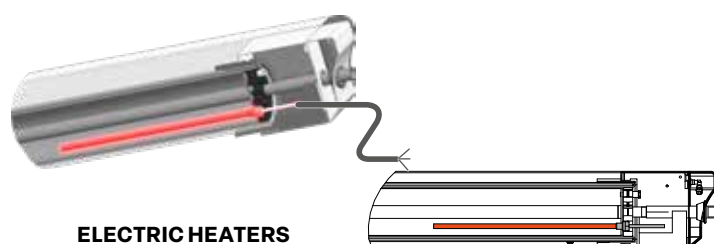
HEAT MANAGER - SMART CONTROLLER



operating time slots.

HEAT MANAGER is user friendly and intuitive. You just have to install the app and connect the smart controller to your home Wi-Fi network.

Stratos 4S HC system is equipped with the Smart Controller Wi-Fi HEAT MANAGER for the remote management of the electric heaters by smartphone IOS or Android. Thanks to this app it is possible to manage, to set and to monitor the functioning of the electric heaters easily from the mobile phone, by setting the temperature and the

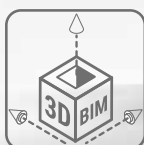


ELECTRIC HEATERS

THE FIRST SOLAR WATER HEATER

Stratos® 4S HC is the first high efficiency compact solar system with electric integration included. Thanks to the integrated electric heaters, the systems becomes a real solar water heater, able to offer always the maximum comfort, maximum safety and great savings in every season of the year. The electromechanical time switch device is included, for the rational use of the electrical integration.

- 1 Structure of anodized marine grade 15 μ m aluminium 6060
- 2 Vacuum tube Sydney type with high vacuum grade, minimum 10⁻³ pa, with highly selective PVD coating.
- 3 ROTOSHIELD[®] patented system against overheating with hydraulic cylinder with stainless steel stem, tested for more than 50.000 cycles
- 4 Sanitary exchanger, corrugated anti-limescale tube in stainless steel Aisi 316L
- 5 Primary circuit store (water and glycol) in stainless steel





The thermal solar system **STRATOS® 4S ROTOSHIELD®**, is an innovative high efficiency compact solar system with integrated DHW storage.

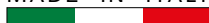
It is equipped with a patented anti-stagnation self-balancing system. The ROTOSHIELD® patent protects the system by maximizing the performance.

It is indicated to produce domestic hot water in all climatic zones, thanks to its ability to preserve the captured heat. In fact, the system can be installed in areas with temperatures up to -20°C.



BREVETTATO
PATENTED

MADE IN ITALY



Percorso
Efficienza  Innovazione



The thermal system **STRATOS® 4S ROTOSHIELD®**, is an innovative high efficiency compact solar system with integrated DHW storage. It is equipped with a patented anti-stagnation self-balancing system. The **ROTOSHIELD®** patent protects the system by maximizing the performance. It is indicated to produce domestic hot water in all climatic zones, thanks to its ability to preserve the captured heat. In fact, the system can be installed in areas with temperatures up to -20°C.

STRUCTURE AND MATERIALS

- Frame structure in anodized Marine Grade aluminum.
- Support and fixing kit in galvanized steel.

- Capturing system consisting of tubes with Sydney type vacuum technology with highly selective PVD coating and high vacuum grade.
- Primary store circuit (water and glycol) in stainless steel AISI 304.
- DHW exchanger in corrugated stainless steel AISI 316L, suitable and certified for drinking water, according to 98/83/CE and subsequent amendments.

INCLUDED ACCESSORIES

6 bar safety valve. Fixing kit for flat surfaces (inclination 30°) as well for pitched roofs. Non-toxic heat transfer fluid

CONNECTIONS

2 threaded female connections of ½"

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

P. MAX INPUT	P. MAX ACCUMULATION	T. MAX	T. MIN	INCLINATION SLOPE
4 bar	7,5 bar	100°C	-20°C	10° - 70°



STRATOS® 4S WITH ROTOSHIELD® SYSTEM

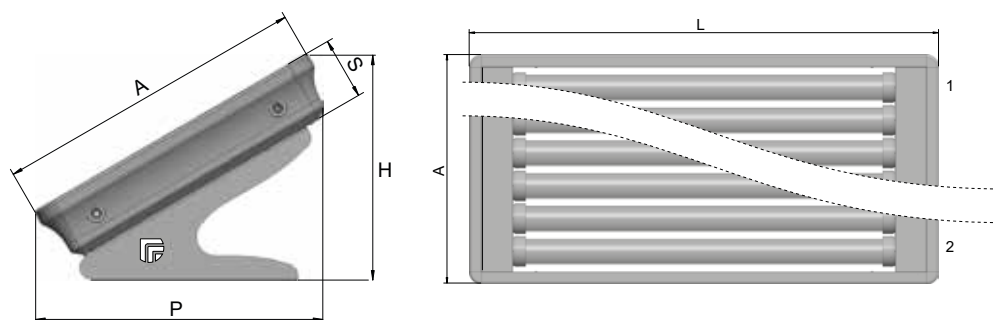
SYSTEM COMPONENTS	INCLUDED
Frame structure in marine grade anodized aluminum 15 um	✓
6 bar safety valve	✓
Fixing kit for flat surfaces and pitched roofs	✓
Non-toxic heat transfer fluid	✓
Automatic anti-stagnation and self-balancing system	✓

SOLAR THERMAL SYSTEM **STRATOS® 4S ROTOSHIELD®**

COMPACT AND HIGH-EFFICIENCY SOLAR THERMAL SYSTEM

**ROTO
SHIELD®**
SYSTEM

STRATOS®



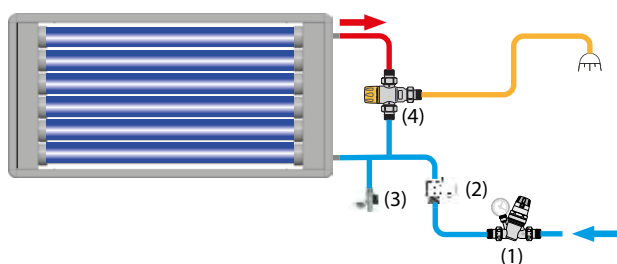
Model	No. tubes capturing	L	P	H	A	S	DHW Connections	Surface area Gross	Total weight in operation	Weight/m ² in function
		[mm]					1-2	[m ²]	[kg]	[kg/m ²]
120	4	2160	752	589	822	163	1/2" F	1,77	122	69
180	6	2160	951	704	1052	163	1/2" F	2,27	178	78

STRATOS® 4S ROTOSHIELD® SYSTEM

Model	Users	Daily DHW production*	Description	Art. Nr.
120	2	up to 120 lt	ROTOSHIELD 120	3410316603203
180	3	up to 180 lt	ROTOSHIELD 180	3410316603204

* Blended at 42°C with solar energy of 26MJ/m² and mains water at 25°C (without electrical integration)

TYPICAL INSTALLATION SCHEME



LEGEND

- 1 Eventual pressure reducer
- 2 Safety and non-return valve (included)
- 3 Drain tap for panel draining (to be provided by the installer)
- 4 Thermostatic mixing valve (optional to be ordered separately)

Before starting the system, fill the ducts tubes (already filled with glycol) with tap water. The first tube at the bottom, the motor tube, is already preloaded with both liquids, water and glycol. Only the first 5 upper tubes must be filled for Model 180 lt and the first 3 upper tubes for Model 120 lt. Installation and filling must be carried out with the covered system, only after completing this procedure it will be possible to uncover the system. **For the correct installation, always refer to the enclosed user manual.**

THE LIGHTEST SYSTEM

STRATOS® 4S ROTOSHIELD® is the lightest solar thermal system on the market. In order of functioning, thanks to the reduced weight / square meter ratio, the STRATOS® 4S SYSTEM turns out to be the lightest and the least weighty on roofs.

**ROTO
SHIELD®**
SYSTEM

The patented **ROTOSHIELD®** system has been expressly studied to avoid overheating of the system during the periods of major insolation and in absence of DHW levy. The rotation takes place in a natural way without the use of any electric device.



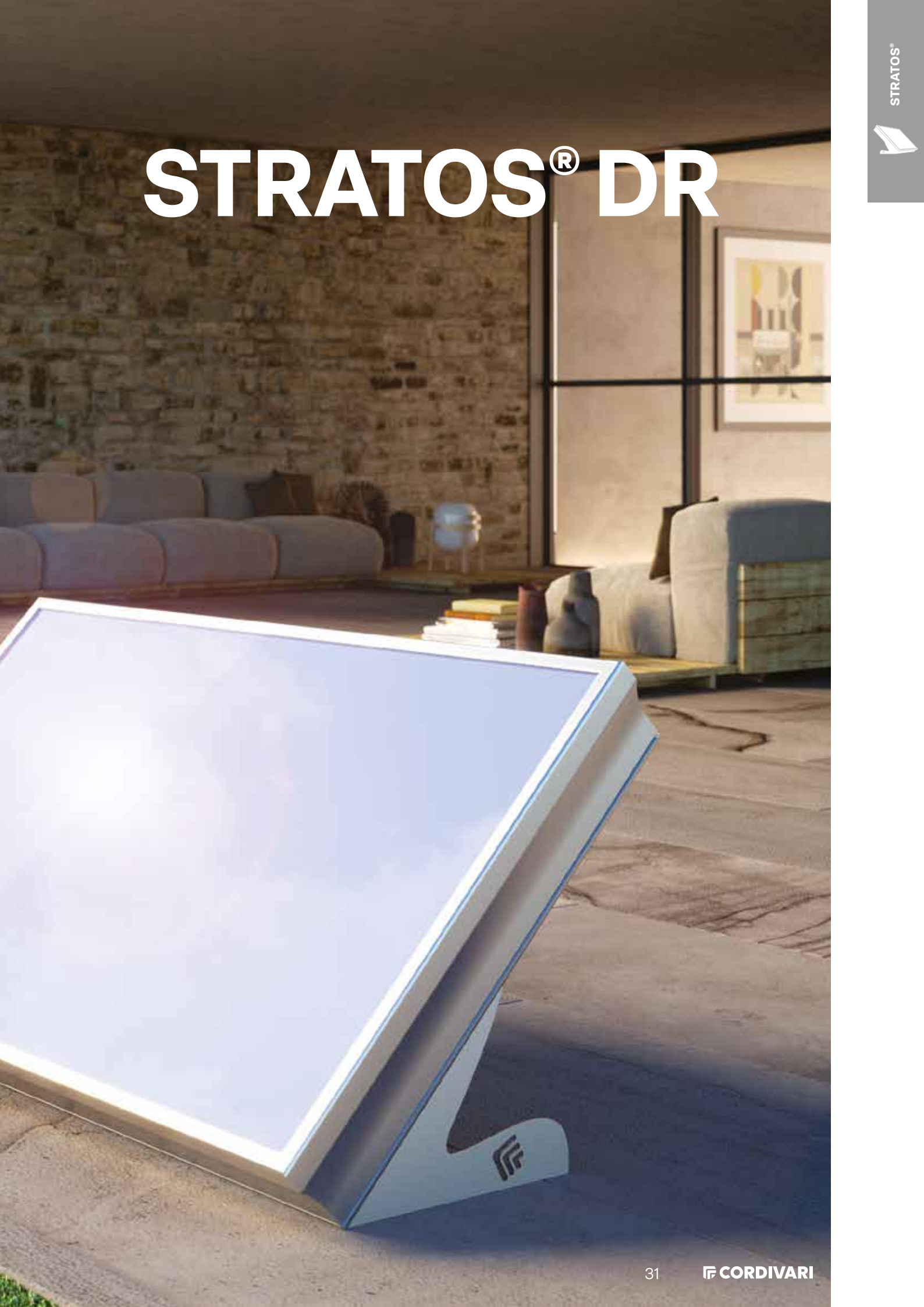


GERMAN
DESIGN
AWARD
WINNER
2018

oltre la classe A 

STRATOS® DR

STRATOS®





SOLAR THERMAL SYSTEM WITH INTEGRATED HOT WATER STORAGE



DESIGN, PERFORMANCE AND SAVINGS

INTEGRATED DHW STORAGE

MAXIMUM SPACE SAVING

HIGH PERFORMANCES

ELEGANT AESTHETICS

ENERGY SAVINGS



Percorso
Efficienza  Innovazione oltre la classe A 



WATER FROM THE SUN FOR FREE

THANKS TO THE SOLAR THERMAL SYSTEM WITH INTEGRATED STORAGE.

EFFICIENT, ECOLOGICAL AND AESTHETICAL DESIGN

MODEL 110



MODEL 150



MODEL 180



MODEL 220



MODEL 260



SOLAR THERMAL SYSTEM **STRATOS® DR**

STRATOS® DR - COMPACT SOLAR THERMAL SYSTEM WITH DIRECT HEATING



Compared to traditional solar systems with natural circulation, which have an external storage tank, separated from the collector, the revolutionary STRATOS® DR system, produces domestic hot water through direct heating of the sanitary storage tank, which is integrated in the panel. Thanks to its elegant design and extremely small dimensions, the STRATOS® system is the ideal choice to combine quality, aesthetics and energy savings.

STRUCTURE

Aluminum profile, anodizing treatment included. Tempered glass according to EN 12150, tested against impact according to EN 12976. Bottoms and walls with high insulation power (λ 0,023 W/mk), thickness 30 mm.

ABSORBING SYSTEM AND THERMAL EXCHANGE CIRCUIT

Direct heating of the integrated DHW store treated with special high selective solar painting.

DHW ACCUMULATION

Sanitary accumulation made of stainless steel AISI 316L suitable and certified for drinking water according to 98/83/CE and subsequent amendments.

INCLUDED ACCESSORIES

Vacuum break valve
6 bar safety valve
Fixing kit for flat and pitched roof
Nr. 1 Cap of 1"1/4 gas M
Nr. 1 Cap of 1/2" gas M

CONNECTIONS

3 connections 1/2" gas F
1 connection 1"1/4 gas F for heating element

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

SYSTEM COMPONENTS

INCLUDED

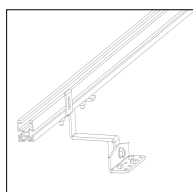
Frame structure anodized marine grade aluminum	✓
6 bar safety valve	✓
Vacuum break valve	✓
Nr. 1 cap of 1"1/4 gas M + Nr. 1 cap of 1/2" gas M	✓
Fixing kit for flat surfaces (42°) and pitched roofs	✓



P. MAX INLET	P. MAX ACCUMULATION	T. MAX
4 bar	6 bar	100°C

(*)Essential to protect the system if it is emptied during periods of non-use or in the post installation phase before initial start-up.

ACCESSORIES ON REQUEST (for more information see accessories section)



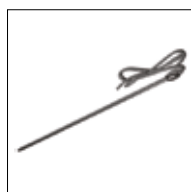
Suspended fixing kit for pitched roof



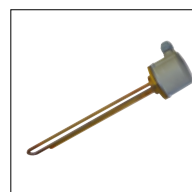
30° inclination Stratos® support kit



Protective PVC cloth (*)



Anti-freeze device



Electrical immersion heater

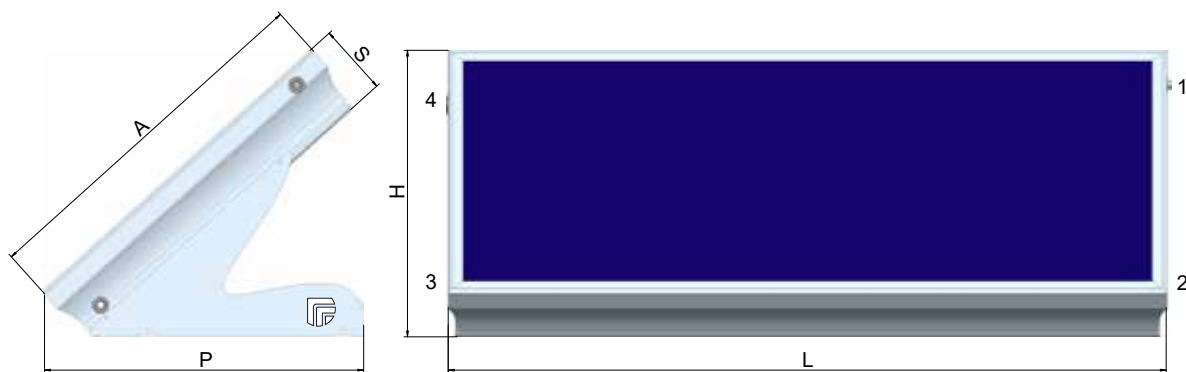


Heat Manager Smart Controller

SOLAR THERMAL SYSTEM **STRATOS® DR**

STRATOS® DR - COMPACT SOLAR THERMAL SYSTEM WITH DIRECT HEATING

STRATOS®



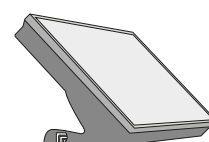
Model	L	P	H	A	S	DHW connections			Gross surface area	Empty weight	Weight per m ² In function
	[mm]					1	2-3	4	[m ²]	[kg]	[kg/m ²]
110	2288	644	528	572	198	1" 1/4 Gas F	1/2" Gas F	1/2" Gas F	1,31	40	110
150	2288	644	631	727	198	1/2" Gas F	1/2" Gas F	1" 1/4 Gas F	1,66	52	115
180	2288	926	736	882	198	1" 1/4 Gas F	1/2" Gas F	1/2" Gas F	2,02	62	117
220	2288	926	831	1036	198	1/2" Gas F	1/2" Gas F	1" 1/4 Gas F	2,37	72	120
260	2288	926	935	1192	198	1" 1/4 Gas F	1/2" Gas F	1/2" Gas F	2,73	84	120

SYSTEM STRATOS® DR

STRATOS® DR - COMPACT SOLAR THERMAL SYSTEM WITH DIRECT HEATING

Model	Net volume DHW storage [LT.]	Gross absorbing area [m ²]	Art. Nr.	Art. Nr. set of 3 pieces
110	105	1,31	3410316603215	341031660321503
150	140	1,66	3410316603216	341031660321603
180	175	2,02	3410316603217	341031660321703
220	210	2,37	3410316603218	341031660321803
260	245	2,73	3410316603219	341031660321903

PATENTED MODEL



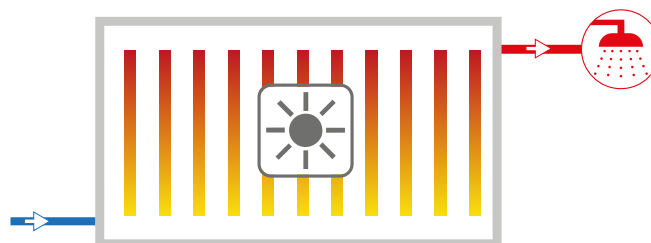
RESISTANT, RELIABLE DESIGN PRODUCT



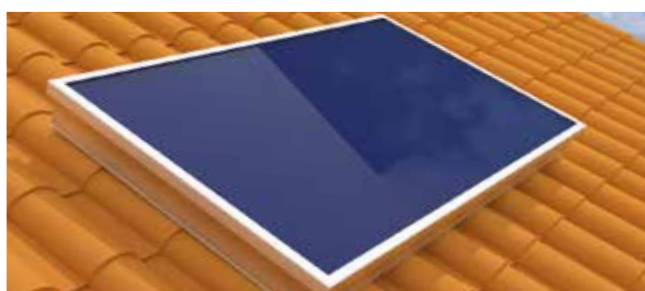
AESTHETICAL SUPPORT WITH 42° INCLINATION (FLAT SURFACES)



HEAT FROM THE SUN



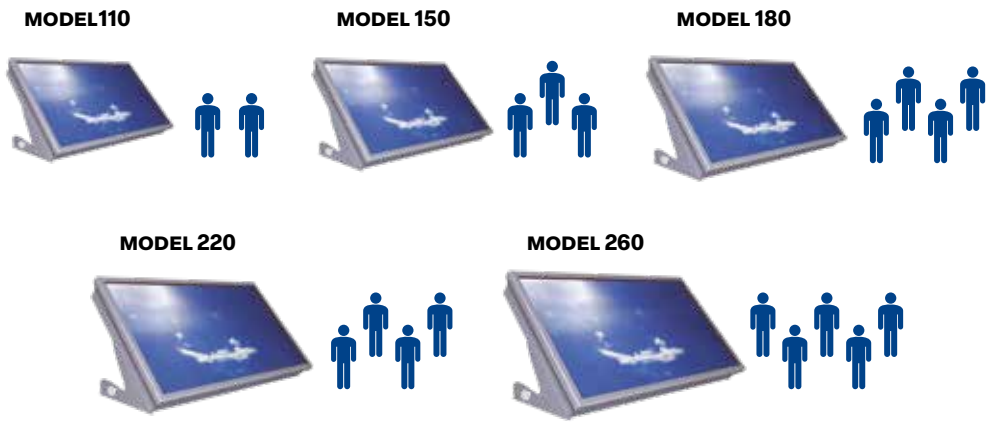
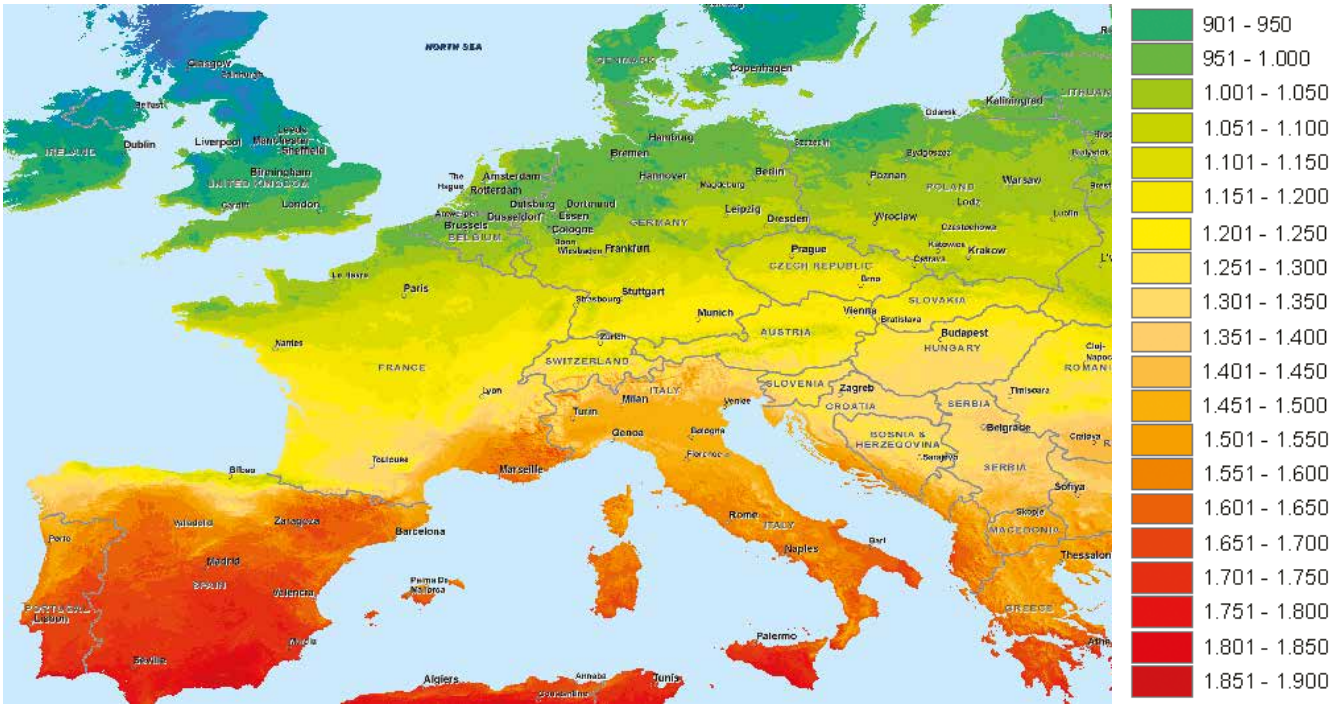
INCLINATION ANGLE FROM 10° TO 70° (PITCHED ROOFS)



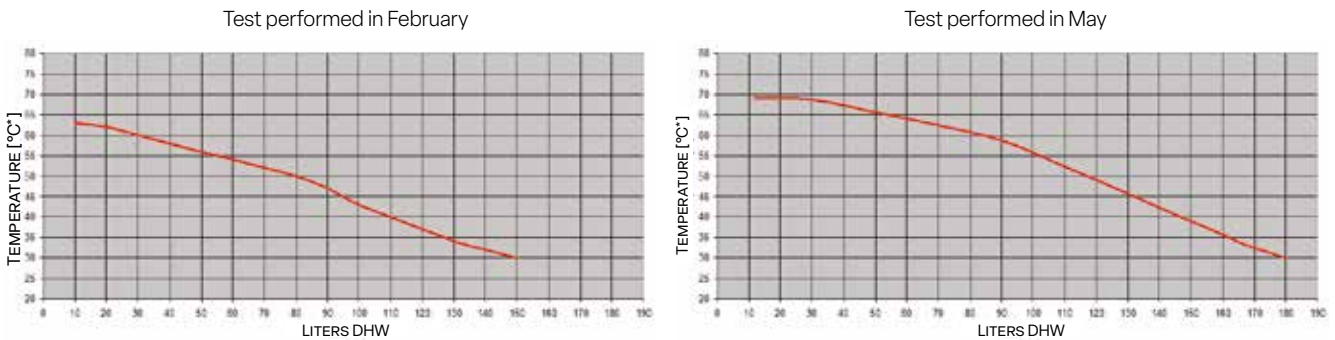


CHOICE OF THE SYSTEM

For a better overall efficiency of the system we recommend the installation of the STRATOS DR in areas with high annual solar irradiation (Min. 1600W/m2 per year). In these areas it is estimated that the needs of 3 people is covered with the model of 150 lt For 4 people the model of 200 lt is indicated.



DHW LEVY TEST

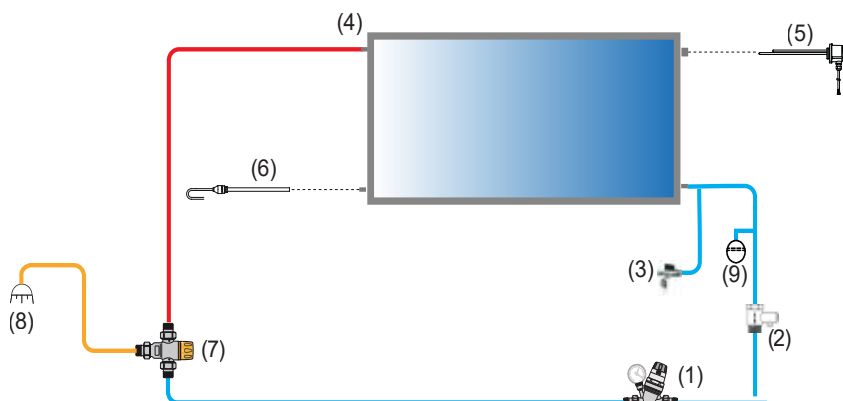


The graphic shows the result of the domestic hot water levy test performed on the 150 lt STRATOS® model installed in central Italy (latitude 42° north). Average results achieved during a period in the month of February. On the axis of the ordinates the value drawn in liters is reported according to the outlet temperature.

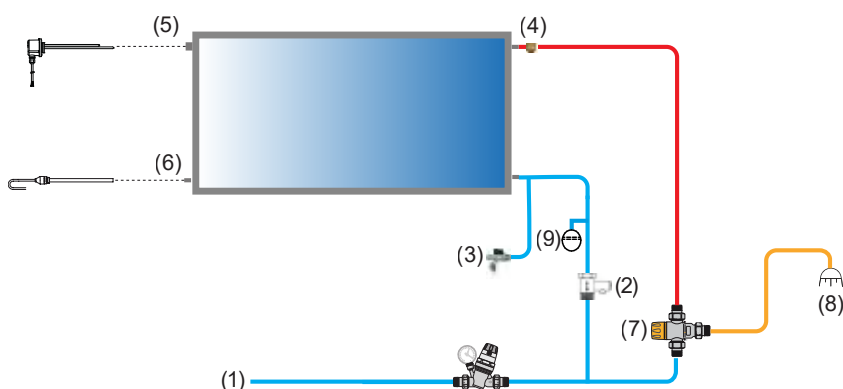
The graphic shows the result of the domestic hot water levy test performed on the 150 lt STRATOS® model installed in central Italy (latitude 42° north). Average results achieved during a period in the month of May. On the axis of the ordinates the value drawn in liters is reported according to the outlet temperature.

TECHNICAL INSIGHTS

TYPICAL INSTALLATION SCHEME



INSTALLATION SCHEME FOR MODELS 110/180/260



INSTALLATION SCHEME FOR MODELS 150/220

CONNECTION LEGEND

1 Domestic cold water inlet. If the pressure exceeds 4 bar, insert a pressure reducer. The water must be treated according to UNI 8065 standard and the adduction installation must be built according to UNI EN 806

2 6 bar safety and non-return valve (included)

3 Drain tap for panel emptying (to be provided by the installer)

4 Vacuum break valve (included)

5 1"1/4 gas F connection for integration of electrical immersion heater (to be ordered separately)

6 1/2" gas F connection for anti-freeze Electrical heating (to be ordered separately)

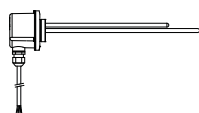
7 Thermostatic mixing valve (to be ordered separately)

8 User

9 Expansion vessel

For other schemes with preheating functions, please refer to the section TECHNICAL SUPPORT

ANTI-FREEZE PROTECTION AND USE OF HEATING ELEMENT



HEATING ELEMENT

HEATING ELEMENT

It is possible to integrate the STRATOS® DR with an electric heating element. The heater is equipped with a comfort temperature regulation thermostat as well as a manual safety reset thermostat. The use of the heating element guarantees DHW available at a comfortable temperature able to meet the minimum requirements of the user.



ANTI-FREEZE HEATING ELEMENT

ANTI-FREEZE HEATING ELEMENT

The STRATOS® DR system must be installed in areas free from frost risk. When it is exposed to temperatures below 0 °C (and in any case not below than -5 °C) the installation and use of the anti-freeze safety heater element is necessary. If the temperature falls below -5°C the system must be emptied and suitably covered and protected. Always refer to the installation manual provided with the product.

ANCHORAGE AND INSTALLATION WITH WINDPROOF BALLAST

The STRATOS® fixing systems, thanks to their specific design are extremely efficient and safe in all circumstances. Design studies and simulations carried out with the aid of highly sophisticated computer simulations such as the FEM, do not show structural criticalities and provide excellent resistance results to wind and snow loads, even in the most unfavorable conditions. The STRATOS® system if installed on flat surfaces must be secured to the ground to prevent any risk of overturning

due to wind forces. Fixing kits for flat surfaces allow anchoring directly to the ground through bolting with screws and dowels. If it is not possible to drill the support surfaces it is necessary to anchor the system through the fixing on ballast in solid and compact material with adequate overall weight. Always refer to the installation manual provided with the product.



SIMULATION WITH REM ANALYSIS OF WIND AND SNOW LOAD



INSTALLATION WITH WINDPROOF BALLAST



SOLAR THERMAL SYSTEMS

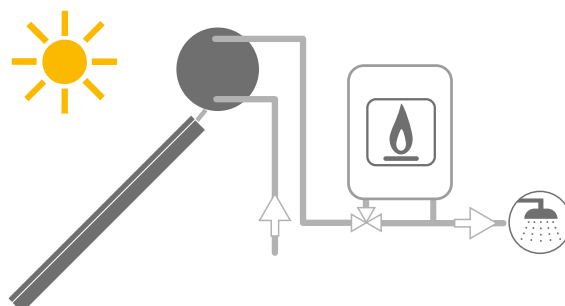
THERMOSYPHON SYSTEMS



DHW

FAVIGNANA SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Natural gravity circulation System **FAVIGNANA** for DHW production. The system is made of a DHW tank combined with **Vacuum Tubes Solar Collectors** treated with high selective absorber material.

COLLECTORS

- Heat Pipe Technology
- Realized in borosilicate glass double concentric tubes in vacuum
- High selective Treatment
- Compound Parabolic Concentrator (CPC) for conveying sun rays from different angles exactly on the absorber.
- Impact resistant according to **EN 12976 / ISO 9806** (impact resistance through the use of a steel ball weighing 150g, maximum drop height of fall 0.6 metres).

DHW TANK

- Capacities from 150 to 200L
- Mild steel Material
- Internal Polywarm® coating, suitable for drinking water according to 98/83/CE and subsequent amendments and DHW certifications ACS-SSICA -EN 16421
- Connections for integration of electrical heater.
- Direct Heat Exchanger with Heat Pipe
- Rigid insulation of polyurethane foam with high thermal insulation.
- External rigid cover with special anticorrosive treatment
- Cathode Protection with Magnesium Anode

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

To facilitate transport and handling, the product is provided to be assembled.

ACCESSORIES ON REQUEST



Heating element



Heat Manager Smart Controller

For more information see accessories section.

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

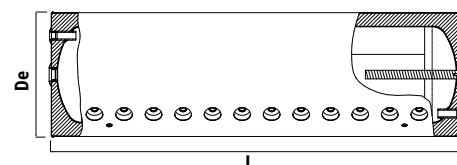
TÜV Rheinland Energie und Umwelt GmbH states that test procedures and Cordivari LAB are certified conforming to European standard EN 15332, as indicated by EArt. Nrsign ErP Directive.



SYSTEM COMPONENTS

INCLUDED

High Selective solar vacuum tube collectors with Heat pipe Technology	✓
DHW Tank Polywarm® coated and external rigid cover with special anticorrosive treatment	✓
Magnesium Anode	✓
Security valve and check valve	✓
Fittings	✓
Fastening kit for flat surfaces (40° inclination), for pitched roofs, universal or lowered for flat surfaces (25° inclination)	✓



CALORIFIER FAVIGNANA SYSTEM

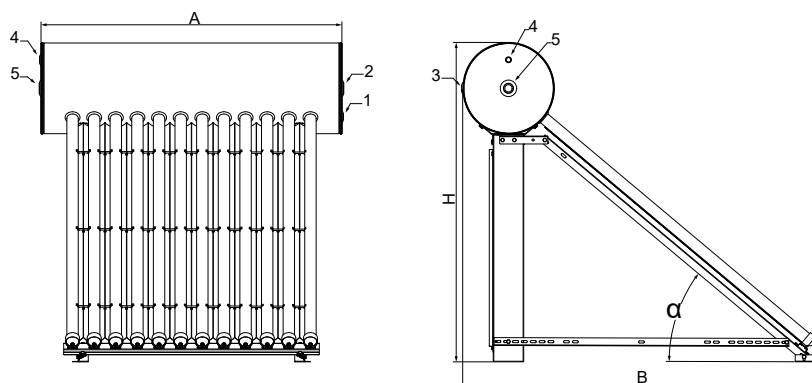
Model	De	L
	[mm]	
150	460	1530
200	460	1850

OPERATING DATA

Pmax	Tmax
4 bar	90° C

FAVIGNANA SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



- 1 Domestic hot water inlet
- 2 Magnesium anode
- 3 Instrument connection
- 4 Domestic hot water outlet
- 5 Electrical integration

FAVIGNANA POLYWARM® SYSTEM

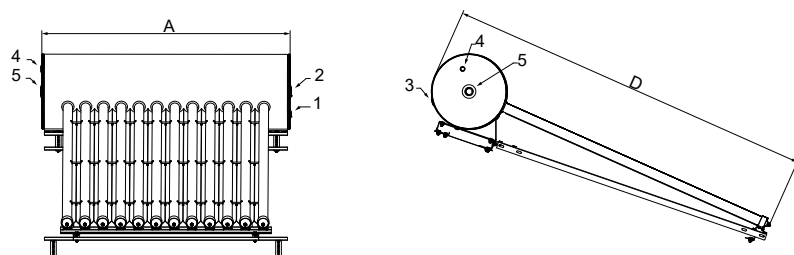
FLAT ROOF (40°)

FLAT ROOF (25°)

Model	Calorifier capacity [liters]	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users
150	150	12	2,2	1-3
200	200	15	2,8	4-5

Inclination	A	B	H	Description/ Art. Nr.
40°	1530	1797	1622	150/12 TP 3410316605300
40°	1850	1797	1622	200/15 TP 3410316605301

Inclination	A	B	H	Description/ Art. Nr.
25°	1530	2148	1022	150/12 LOW 3410316605360
25°	1850	2148	1022	200/15 LOW 3410316605361



- 1 Domestic hot water inlet
- 2 Magnesium anode
- 3 Instrument connection
- 4 Domestic hot water outlet
- 5 Electrical integration

FAVIGNANA POLYWARM® SYSTEM

PITCHED ROOF

FAVIGNANA POLYWARM® SYSTEM

UNIVERSAL KIT

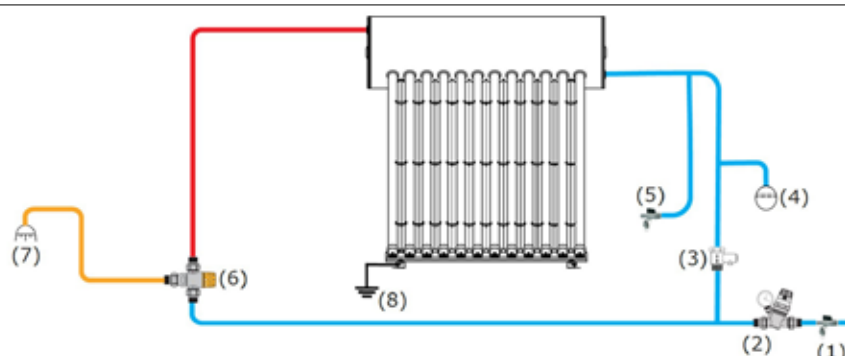
Model	Calorifier capacity [liters]	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users
150	150	12	2,2	1-3
200	200	15	2,8	4-5

Description/ Art. Nr.	A	D
150/12 TF 3410316605320	1530	2256
200/15 TF 3410316605321	1850	2256

Model	Calorifier capacity [liters]	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users
150	150	12	2,2	1-3
200	200	15	2,8	4-5

Description/ Art. Nr.	A	D
150/12 UNIV 3410316605340	1530	2256
200/15 UNIV 3410316605341	1850	2256

EXAMPLE OF AN INSTALLATION DIAGRAM



LEGEND

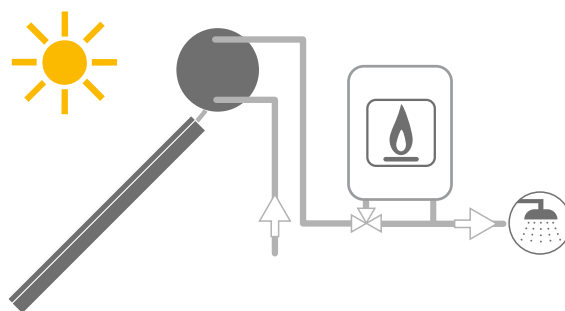
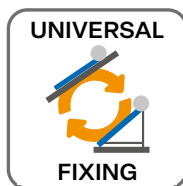
- 1 Water inlet tap
- 2 Pressure reducer
- 3 Safety valve
- 4 Expansion vessel
- 5 Drain plug valve
- 6 Thermostatic mixer
- 7 User
- 8 Grounding

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.



PANAREA UNIVERSALE SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Natural gravity circulation System **PANAREA** for DHW production. The system is made of a DHW tank combined with **Flat Solar Collector** treated with high selective absorber material. Special **Universal** fixing kit included for installation on both flat or pitched roof.

COLLECTORS

- Rockwool insulation
- Anodized Aluminium Frame
- High Selective Absorber
- Tempered Glass - Anti-Ice rain with Impact resistant according to **EN 12976 / ISO 9806** (impact resistance through the use of a steel ball weighing 150g, maximum drop height of fall 2 metres).
- **UNI EN 12975** Compliant

DHW TANK

- Capacities from 150 to 300L
- Mild steel Material
- Internal Polywarm® coating, suitable for drinking water according to 98/83/CE and subsequent amendments and DHW certifications ACS-SSICA -EN 16421
- Connections for integration of electrical heater.
- Double Wall Heat Exchanger
- Rigid insulation of polyurethane foam with high thermal insulation.
- External rigid cover with special anticorrosive treatment
- Cathode Protection with Magnesium Anode
- Safety Valve TP 1/2" M

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Kit for electrical integration



Safety valve TP 1/2" M



Heat Manager Smart Controller

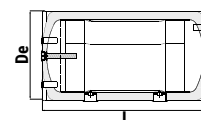
For more information see accessories section.

SYSTEM COMPONENTS	INCLUDED
Highly selective solar collector	✓
DHW INTERKA TANK Polywarm® coated and external rigid cover with special anticorrosive treatment	✓
Magnesium Anode	✓
Security valve and check valve	✓
Non-toxic heat transfer fluid	✓
Fittings	✓
Universal fixing kit for both flat surfaces (40° inclination) and pitched roofs	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

TÜV Rheinland Energie und Umwelt GmbH states that test procedures and Cordivari LAB are certified conforming to European standard EN 15332, as indicated by EArt. Nr.sign ErP Directive.



INTERKA SOLARE PANAREA

ENERGY EFFICIENCY CLASS

Model	De	L	ErP
	[mm]		
150	550	1026	B
200	550	1286	B
300	550	1840	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and buffer tanks catalogue.

PANAREA UNIVERSALE SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Type of calorifier:
**INTERKA PANAREA
UNIVERSALE
POLYWARM®**



UNIVERSAL VERSION



2 SYSTEMS PACK

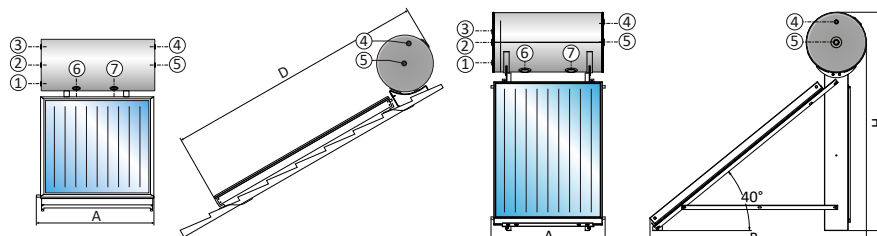
Model	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users	Description/ Art. Nr.	Description/ Art. Nr.
150	1x2	2	1-3	150/2 UNIV. 3410316605105	150/2 UNIV. 3410316603139
200	1x2	2	3-4 ^(*)	200/2 UNIV. 3410316605106	200/2 UNIV. 3410316603140
200	2x2	4	4-5	200/4 UNIV. 3410316605107	200/4 UNIV. 3410316603141
300	2x2	4	5-6 ^(*)	300/4 UNIV. 3410316605108	300/4 UNIV. 3410316603142
300	2x2,5	5	5-6	300/5 UNIV. 3410316605109	300/5 UNIV. 3410316603143
300	3x2	6	6-7	300/6 UNIV. 3410316605110	300/6 UNIV. 3410316603144

(*) Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m²

DIMENSIONS OF COLLECTOR STRINGS

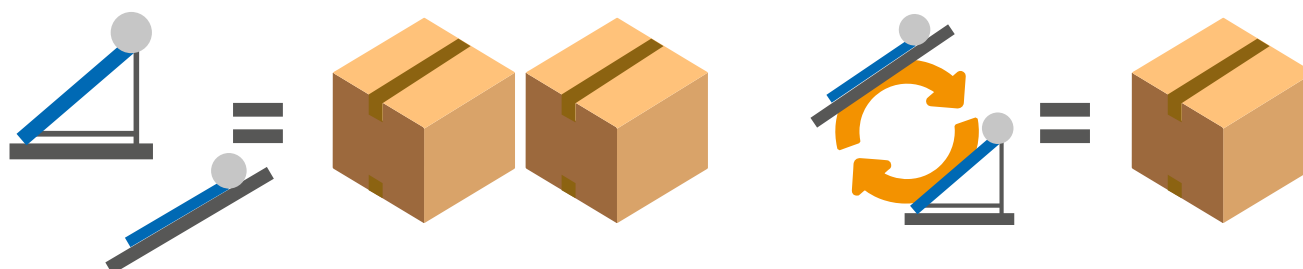
LEGEND

- 1** Sanitary water inlet
- 2** Magnesium anode
- 3** Connection for Instrumentation
- 4** DHW outlet
- 5** Electric heater (not included)
- 6** Solar collectors connection
- 7** Solar collectors connection



Solar collectors surface [m²]	2	2	4	4	5	6
Solar tank capacity [liters]	150	200	200	300	300	300
Width A [mt]	1,1	1,1	2,2	2,2	2,6	3,2
Length B [mt]	1,98	1,98	1,98	1,98	1,98	1,98
Height H [mt]	2,01	2,01	2,01	2,01	2,01	2,01
Dimensions on the roof D [mt]	2,66	2,66	2,66	2,66	2,66	2,66

ADVANTAGES OF UNIVERSAL FIXING

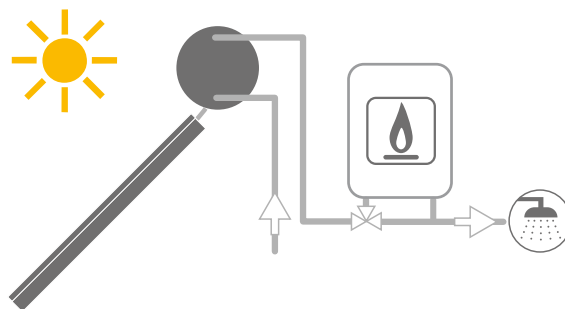


Thanks to the universal mounting of Cordivari's PANAREA systems, you have less complexity, less occupied warehouse space, optimised logistics and better customer service.



PANAREA SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Natural gravity circulation System **PANAREA** for DHW production. The system is made of a DHW tank combined with Flat Solar Collector treated with high selective absorber material. Fixing kit included for installation on flat roof

COLLECTORS

- Rockwool insulation
- Anodized Aluminium Frame
- High Selective Absorber
- Tempered Glass – Anti-Ice rain with Impact resistant according to **EN 12975 / ISO 9806** (impact resistance through the use of a steel ball weighing 150g, maximum drop height of fall 2 metres).
- **UNI EN 12975** Compliant

DHW TANK

- Rockwool insulation
- Anodized Aluminium Frame
- High Selective Absorber
- Tempered Glass – Anti-Ice rain with Impact resistant according to **EN 12976 / ISO 9806** (impact resistance through the use of a steel ball weighing 150g, maximum drop height of fall 2 metres).
- **UNI EN 12975** Compliant

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Kit for electrical integration



Safety valve TP 1/2" M



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

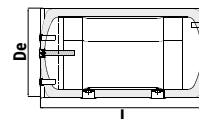
INCLUDED

Highly selective solar collector	✓
DHW INTERKA TANK Polywarm® coated and external rigid cover with special anticorrosive treatment	✓
Magnesium Anode	✓
Security valve and check valve	✓
Non-toxic heat transfer fluid	✓
Fittings	✓
Universal fixing kit for both flat surfaces (40° inclination) and pitched roofs	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

TÜV Rheinland Energie und Umwelt GmbH states that test procedures and Cordivari LAB are certified conforming to European standard EN 15332, as indicated by EArt. Nr.sign ErP Directive.



INTERKA SOLARE PANAREA

ENERGY EFFICIENCY CLASS

Model	De	L	ErP
	[mm]		
150	550	1026	B
200	550	1286	B
300	550	1840	B

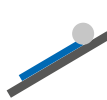
For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and buffer tanks catalogue.

PANAREA SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Type of calorifier:
**INTERKA PANAREA
POLYWARM®**

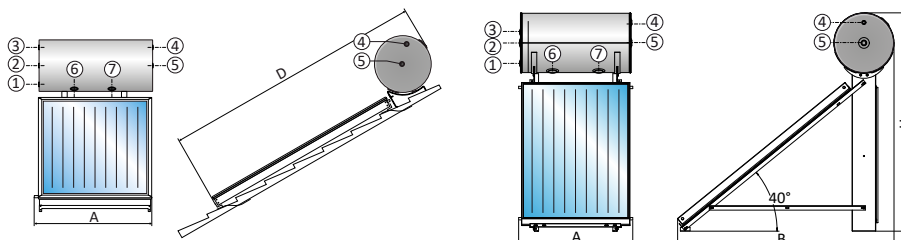
Model	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users	 FLAT ROOF  2 SYSTEMS PACK		 PITCHED ROOF  2 SYSTEMS PACK	
				Description/ Art. Nr.	Description/ Art. Nr.	Description/ Art. Nr.	Description/ Art. Nr.
150	1x2	2	1-3	150/2 TP 3410316603116	150/2 TP 3410316603133	150/2 TF 3410316603090	150/2 TF 3410316603122
200	1x2	2	3-4(*)	200/2 TP 3410316603117	200/2 TP 3410316603134	200/2 TF 3410316603091	200/2 TF 3410316603123
200	2x2	4	4-5	200/4 TP 3410316603118	200/4 TP 3410316603135	200/4 TF 3410316603092	200/4 TF 3410316603124
300	2x2	4	5-6(*)	300/4 TP 3410316603119	300/4 TP 3410316603136	300/4 TF 3410316603093	300/4 TF 3410316603125
300	2x2,5	5	5-6	300/5 TP 3410316603120	300/5 TP 3410316603137	300/5 TF 3410316603094	300/5 TF 3410316603126
300	3x2	6	6-7	300/6 TP 3410316603121	300/6 TP 3410316603138	300/6 TF 3410316603095	300/6 TF 3410316603127

(*) Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m²

DIMENSIONS OF COLLECTOR STRINGS

LEGEND

- 1 Sanitary water inlet
- 2 Magnesium anode
- 3 Connection for Instrumentation
- 4 DHW outlet
- 5 Electric heater (not included)
- 6 Solar collectors connection
- 7 Solar collectors connection



Solar collectors surface [m²]	2	2	4	4	5	6
Solar tank capacity [liters]	150	200	200	300	300	300
Width A [mt]	1,1	1,1	2,2	2,2	2,6	3,2
Length B [mt]	1,98	1,98	1,98	1,98	1,98	1,98
Height H [mt]	2,01	2,01	2,01	2,01	2,01	2,01
Dimensions on the roof D [mt]	2,66	2,66	2,66	2,66	2,66	2,66

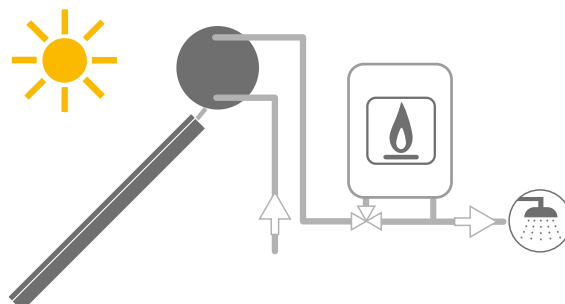


PANAREA LOW SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



INVISIBLE
LOW VISUAL IMPACT



Natural gravity circulation System **PANAREA LOW** for DHW production. The system is made of a DHW tank combined with **Flat Solar Collector** treated with high selective absorber material. Fixing kit included for installation on flat roof with **low visual impact**.

COLLECTORS

- Rockwool insulation
- Anodized Aluminium Frame
- High Selective Absorber
- Tempered Glass – Anti-Ice rain with Impact resistant according to **EN 12975 / ISO 9806** (impact resistance through the use of a steel ball weighing 150g, maximum drop height of fall 2 metres).
- **UNI EN 12975** Compliant

DHW TANK

- Capacities from 150 to 300L
- Mild steel Material
- Internal Polywarm® coating, suitable for drinking water according to 98/83/CE and subsequent amendments and DHW certifications ACS-SSICA -EN 16421
- Connections for integration of electrical heater.
- Double Wall Heat Exchanger
- Rigid insulation of polyurethane foam with high thermal insulation.
- External rigid cover with special anticorrosive treatment
- Cathode Protection with Magnesium Anode

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Kit for electrical integration



Safety valve TP 1/2" M



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

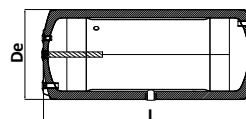
INCLUDED

Highly selective solar collector	✓
INTERKA PANAREA LOW calorifier	✓
Magnesium Anode	✓
Security valve and check valve	✓
Non-toxic heat transfer fluid	✓
Fittings	✓
Fixing kit for flat surfaces (25° inclination) with low visual impact	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

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INTERKA SOLARE PANAREA LOW

ENERGY EFFICIENCY CLASS

Model	De	L	ErP
	[mm]		
150	550	1040	B
200	550	1300	B
300	550	1839	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and buffer tanks catalogue.

PANAREA LOW SYSTEM

SOLAR THERMAL SYSTEMS WITH NATURAL CIRCULATION FOR DOMESTIC HOT WATER PRODUCTION



Tipologia bollitore:
**INTERKA PANAREA LOW
POLYWARM®**



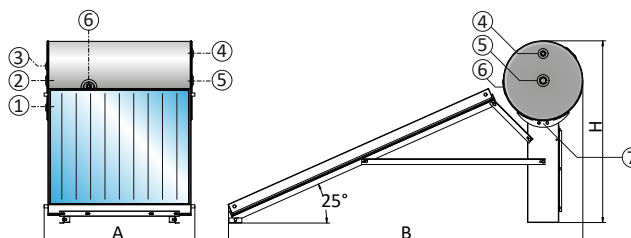
Model	Nr. of capturing tubes	Total surface area [m ²]	Nr. Recommended users	Description/ Art. Nr.	Description/ Art. Nr.
150	1x2	2	1-3	150/2 TP LOW 3410316603096	150/2 TP LOW 3410316603128
200	1x2,5	2,5	3-4 ^(*)	200/2,5 TP LOW 3410316603097	200/2,5 TP LOW 3410316603129
200	2x2	4	4-5	200/4 TP LOW 3410316603098	200/4 TP LOW 3410316603130
300	2x2	4	5-6 ^(*)	300/4 TP LOW 3410316603099	300/4 TP LOW 3410316603131
300	2x2,5	5	5-6	300/5 TP LOW 3410316603100	300/5 TP LOW 3410316603132

(*) Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m²

DIMENSIONS OF COLLECTOR STRINGS

LEGEND

- 1 Sanitary water inlet
- 2 Magnesium anode
- 3 Connection for Instrumentation
- 4 DHW outlet
- 5 Electric heater (not included)
- 6 Solar collectors connection
- 7 Solar collectors connection



Solar collectors surface [m ²]	2	2,5	4	4	5
Solar tank capacity [liters]	150	200	200	300	300
Width A [mt]	1,1	1,3	2,2	2,2	2,6
Length B [mt]	2,56	2,56	2,56	2,56	2,56
Height H [mt]	1,27	1,27	1,27	1,27	1,27





SOLAR THERMAL SYSTEMS

FORCED CIRCULATION

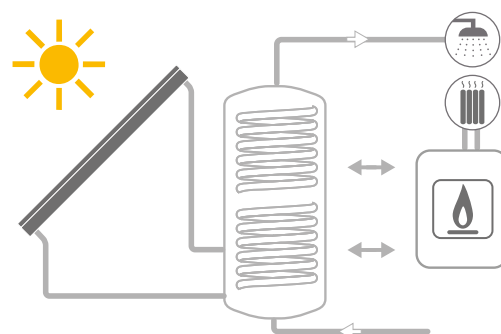


DHW



SOLAR THERMAL SYSTEM **ECO BASIC**

FORCED CIRCULATION SYSTEM WITH A DOUBLE COIL DHW TANK



BASIC electronic control



- User friendly
- Up to 6 different configuration systems



The **ECO BASIC** forced circulation solar thermal system for DHW production consists of the **BOLLY® 2 ST FB** model with double fixed heat exchanger combined with **flat solar collectors**. This system exemplifies reliability and high performance.

SOLAR COLLECTORS

- Insulation made of mineral wool
- Anodized aluminum frame
- Highly selective absorber
- Tempered hail-resistant glass in accordance with **EN 12975 / ISO 9806** (impact resistance tested using a 150g steel sphere dropped from a height of 2 meters).
- Compliant with the **UNI EN 12975** standard

CALORIFIER

- Model **BOLLY® 2 ST FB** with double fixed heat exchanger
- Made in Mild steel
- Internal coating of Polywarm®, suitable for drinking water according to D.M. n. 174 of 06.04.04, with certifications for drinking water safety: Polywarm® internal treatment – ACS, SSICA, DVGW, W270, UBA, WRAS
- Prepared for electrical integration
- Rigid insulation made of high-performance expanded polyurethane. External lining in PVC.
- Tested in accordance with the European standard EN 12897:2006.

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Electrical heater



Pre-insulated pipe



Balancing valve



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

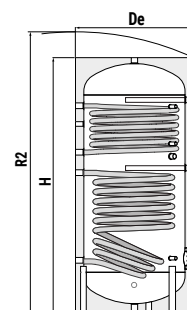
INCLUDED

Highly selective solar collector (1x2,5 m ² - 2x2,5 m ² - 3x2,5 m ²)	✓
Calorifier BOLLY® 2 ST FB (200L-300L)	✓
Circulation unit BASIC ONE complete of circulator electronic control BASIC, flow regulator, safety valve, thermometer, temperature probes	✓
Expansion vessel	✓
Non-toxic heat transfer fluid	✓
Fixing kit and fittings	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

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BOLLY® 2 ST FB

ENERGY EFFICIENCY CLASS

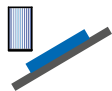
Model	De	H	R2	ErP
	[mm]			
200	550	1434	1540	B
300	650	1486	1630	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and Thermal storage catalogue.

SOLAR THERMAL SYSTEM **ECO BASIC**

FORCED CIRCULATION SYSTEM WITH A DOUBLE COIL DHW TANK

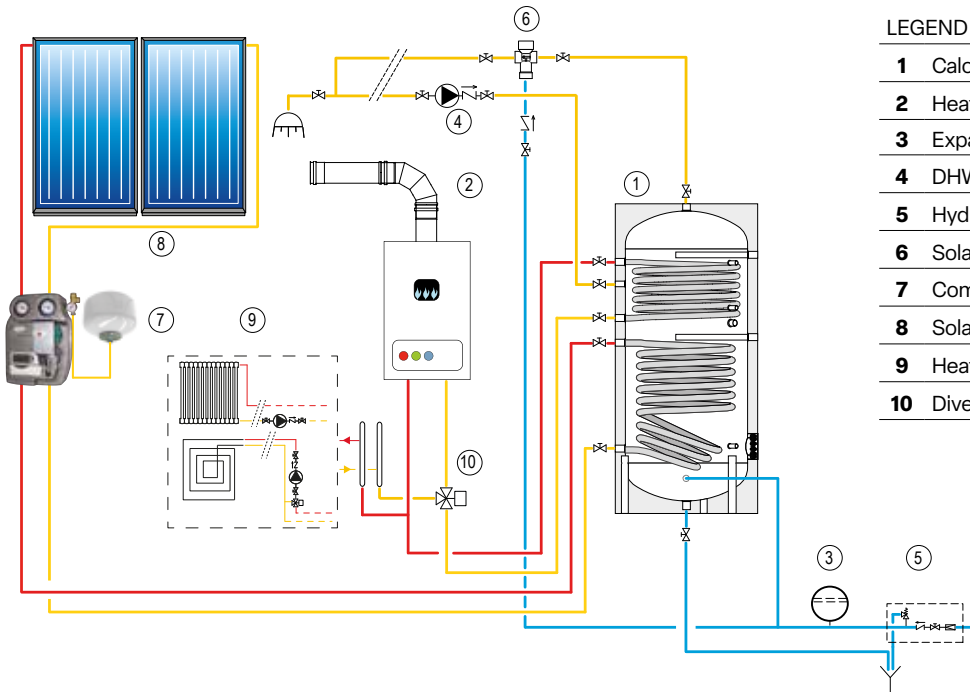


Calorifier type: BOLLY® 2 ST FB		
	VT COLLECTORS - PITCHED ROOF	VT COLLECTORS - FLAT ROOF

Calorifier model	Description/ Art. Nr.	Description/ Art. Nr.
200	200 LT/2,5MQ TF	200 LT/2,5 TP
	3410316618690	3410316618691
	200 LT/5MQ TF	200 LT/5MQ TP
300	3410316618692	3410316618693
	300 LT/5MQ TF	300 LT/5MQ TP
	3410316618570	3410316618670
	300 LT/7,5MQ TF	300 LT/5MQ TP
	3410316618572	3410316618573

Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m².
For fixing kit and other components see accessories section.

FORCED
SYSTEMS

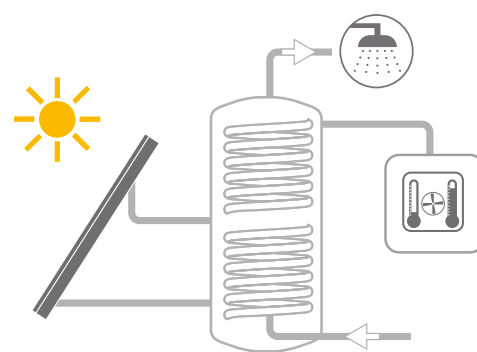


LEGEND	
1	Calorifier BOLLY® 2 ST FB
2	Heat source (gas boiler)
3	Expansion vessel
4	DHW circulation group pump
5	Hydraulic safety group
6	Solar thermostatic mixing valve
7	Complete solar circulation group
8	Solar collectors
9	Heating system
10	Diverting valve

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.

SOLAR THERMAL SYSTEM **ECO BASIC XL**

FORCED CIRCULATION SYSTEM FOR DHW WITH DOUBLE EXTRA LARGE COIL DHW TANK



BASIC electronic control



- User friendly
- Up to 6 different configuration systems



The forced circulation system **ECO BASIC XL** for DHW production is composed of the calorifier BOLLY 2 XL with double fixed extra-large heat exchanger, combined with **flat solar collectors**. The B2 XL system best expresses its performance with integration of a heat pump.

SOLAR COLLECTORS

- Insulation made of mineral wool
- Anodized aluminum frame
- Highly selective absorber
- Tempered hail-resistant glass in accordance with EN 12975 / ISO 9806 (impact resistance tested using a 150g steel sphere dropped from a height of 2 meters).
- Compliant with the UNI EN 12975 standard

CALORIFIER

- Model **BOLLY® 2 XL** (200-300L) with extra-large double fixed heat exchangers
- Made in mild steel
- Internal coating of Polywarm®, suitable for drinking water according to D.M. n. 174 of 06.04.04, with certifications for drinking water safety: Polywarm® internal treatment – ACS, SSICA, DVGW, W270, UBA, WRAS
- Prepared for electrical integration
- Rigid insulation made of high-performance expanded polyurethane. External coating in PVC.
- Tested in accordance with the European standard EN 12897:2006.

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Electrical heater



Pre-insulated pipe



Balancing valve



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

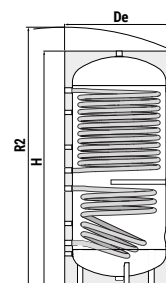
INCLUDED

Highly selective solar collector (1x2,5 or 2x2,5 m²)	✓
Calorifier BOLLY® 2 XL (200-300L)	✓
Circulation unit BASIC ONE complete of circulator electronic control BASIC, flow regulator, safety valve, thermometer, temperature probes	✓
Expansion vessel It 24	✓
Non-toxic heat transfer fluid	✓
Fixing kit and fittings	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

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BOLLY® 2 XL

ENERGY EFFICIENCY CLASS

Model	De	H	R2	ErP
	[mm]			
200	550	1434	1540	B
300	650	1486	1620	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and Thermal storage catalogue.

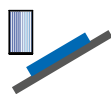
SOLAR THERMAL SYSTEM **ECO BASIC XL**

FORCED CIRCULATION SYSTEM FOR DHW WITH DOUBLE EXTRA LARGE COIL DHW TANK



Calorifier type:

BOLLY® 2 XL



VT COLLECTORS - PITCHED ROOF



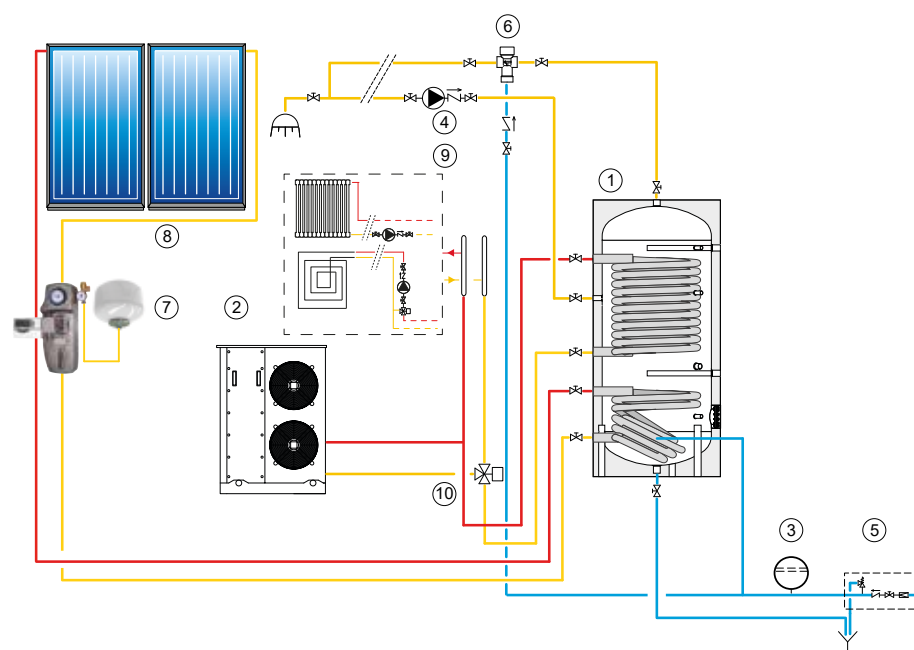
VT COLLECTORS - FLAT ROOF

Calorifier model	Description/ Art. Nr.	Description/ Art. Nr.
200	200 LT/2,5MQ TF 3410316618280	200 LT/2,5MQ TP 3410316618282
300	300 LT/5MQ TF 3410316618281	300 LT/5MQ TP 3410316618283

Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m².

For fixing kit and other components see accessories section.

FORCED
SYSTEMS



LEGEND

- 1 Calorifier BOLLY® 2 XL
- 2 Heat source (heat pump)
- 3 Expansion vessel
- 4 DHW circulation group pump
- 5 Hydraulic safety group
- 6 Solar thermostatic mixing valve
- 7 Complete solar circulation group
- 8 Solar collector/s
- 9 Heating system
- 10 Diverting valve

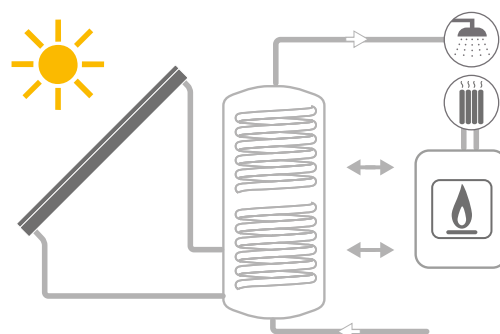
NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.

SOLAR THERMAL SYSTEM **B2 ST CVT**

FORCED CIRCULATION SYSTEMS FOR DOMESTIC HOT WATER (DHW) WITH VACUUM COLLECTORS AND DOUBLE COIL DHW TANK



BOLLY® 2 ST FB



BASIC electronic control



- User friendly
- Up to 6 different configuration systems



The **B2 CVT** forced circulation system for domestic hot water (DHW) production is composed of the BOLLY® 2 ST double fixed heat exchanger boiler combined with **CVT vacuum solar collectors**. The B2 system exemplifies reliability and high performance.

SOLAR COLLECTORS

- Highly selective PVD solar collector with Sydney-type vacuum tubes using Heat Pipe technology.
- Anodized aluminum structure.
- Parabolic CPC concentrating mirror.
- Tubes tested in accordance with EN 12975 / ISO 9806 (impact resistance tested using a 150g steel sphere dropped from a height of 0.8 meters).
- Compliant with the UNI EN 12975 standard;

CALORIFIER

- Model **BOLLY® 2 ST FB** with double fixed heat exchanger
- Constructed from carbon steel.
- Internal coating of Polywarm®, suitable for drinking water according to D.M. n. 174 of 06.04.04, with certifications for drinking water safety: Polywarm® internal treatment – ACS, SSICA, DVGW, W270, UBA, WRAS.
- Prepared for electrical integration.
- Rigid insulation made of high-performance expanded polyurethane or removable soft insulation made of recyclable NOFIRE® polyester fiber, offering high thermal insulation and a fire resistance class of B-s2d0 (EN 13501). External coating in PVC.
- Tested in accordance with the European standard **EN 12897:2006**.

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Electrical heater



Pre-insulated pipe



Balancing valve



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

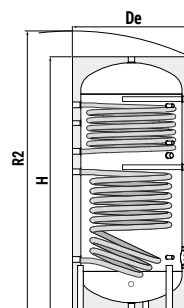
INCLUDED

High selective solar vacuum tube collector PVD, of the type Sydney with heat pipe technology	✓
Calorifier BOLLY® 2 ST FB (200-300L)	✓
Circulation unit BASIC ONE complete of circulator electronic control BASIC, flow regulator, safety valve, thermometer, temperature probes	✓
Expansion vessel It 24	✓
Non-toxic heat transfer fluid	✓
Solar thermostatic mixing valve	✓
Fixing kit and fittings	✓

ALWAYS ASK FOR CERTIFIED LABORATORIES DATA RESULTS

CORDIVARI Lab

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BOLLY® 2 ST FB

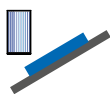
ENERGY EFFICIENCY CLASS

Model	De	H	R2	ErP
	[mm]			
200	550	1434	1540	B
300	650	1486	1630	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and Thermal storage catalogue.

SOLAR THERMAL SYSTEM **B2 ST CVT**

FORCED CIRCULATION SYSTEMS FOR DOMESTIC HOT WATER (DHW) WITH VACUUM COLLECTORS AND DOUBLE COIL DHW TANK



Calorifier type:

BOLLY® 2 ST FB

VT COLLECTORS - PITCHED ROOF

VT COLLECTORS - FLAT ROOF

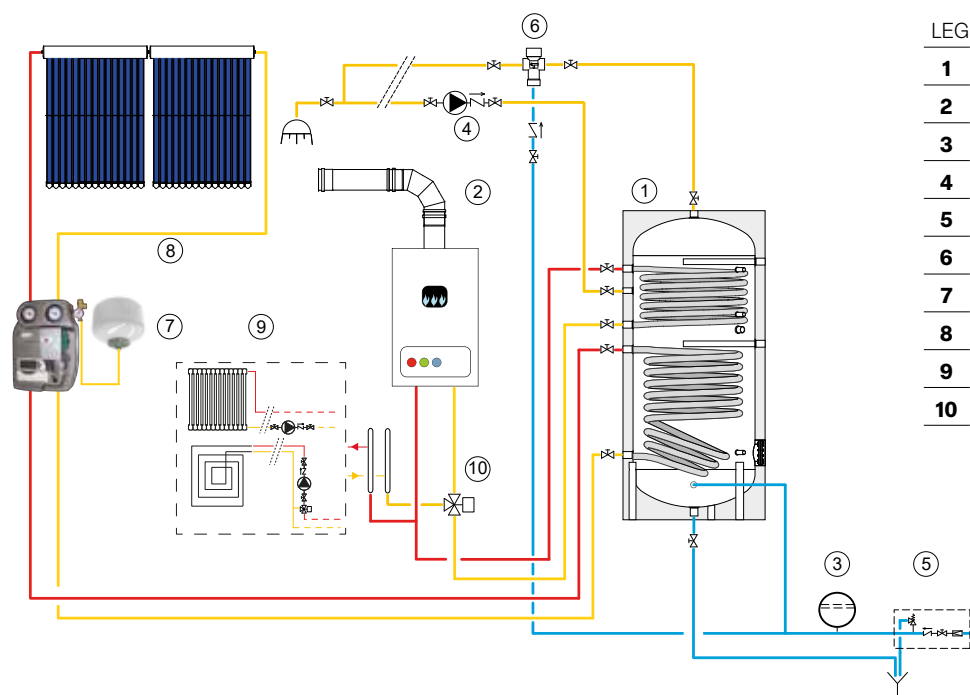
Model	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users	Description/ Art. Nr.	Description/ Art. Nr.
200	1x10	2,17	3-4(*)	200 B2 CVT10 TF 3410316618902	200 B2 CVT10 TP 3410316618915
200	1x15	3,22	4-5	200 B2 CVT15 TF 3410316618903	200 B2 CVT15 TP 3410316618916
300	2x10	4,34	5-6	300 B2 2CVT10 TF 3410316618904	300 B2 2CVT10 TP 3410316618917
300	2x15	6,44	5-7	300 B2 2CVT15 TF 3410316618905	300 B2 2CVT15 TP 3410316618918

(*) Vacuum tube collectors CVT 10 and CVT 15 Cordivari (VACUUM TUBE HEAT PIPE)

(*) Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m².

For fixing kit and other components see accessories section.

FORCED
SYSTEMS



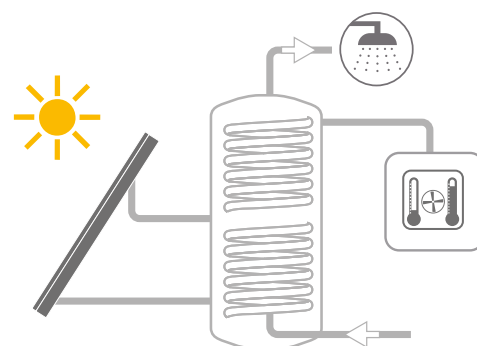
LEGEND

1	Calorifier BOLLY® 2 ST
2	Heat source (gas boiler)
3	Expansion vessel
4	DHW circulation group pump
5	Hydraulic safety group
6	Solar thermostatic mixing valve
7	Complete solar circulation group
8	Solar collector/s
9	Heating system
10	Diverting valve

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.

SOLAR THERMAL SYSTEM **BOLLY® 2 XL CVT**

FORCED CIRCULATION SYSTEMS FOR DOMESTIC HOT WATER (DHW) WITH VACUUM COLLECTORS AND DOUBLE COIL DHW TANK



BASIC electronic control



- User friendly
- Up to 6 different configuration systems



The **BOLLY® 2 XL CVT** forced circulation system for domestic hot water (DHW) production consists of the extra-large double fixed heat exchanger boiler BOLLY 2 XL combined with **CVT vacuum solar collectors**. The BOLLY® 2 XL system performs optimally when integrated with a heat pump.

SOLAR COLLECTORS:

- Highly selective PVD solar collector with Sydney-type vacuum tubes using Heat Pipe technology.
- Anodized aluminum structure.
- Parabolic CPC concentrating mirror.
- Tubes tested in accordance with **EN 12975 / ISO 9806** (impact resistance tested using a 150g steel sphere dropped from a height of 0.8 meters).

- Compliant with the **UNI EN 12975** standard;

CALORIFIER

- Model **BOLLY® 2 XL** with extra-large double fixed heat exchanger
- Constructed from carbon steel or 316L stainless steel
- Internal coating of Polywarm®, suitable for drinking water according to D.M. n. 174 of 06.04.04, with certifications for drinking water safety: Polywarm® internal treatment – ACS, SSICA, DVGW, W270, UBA, WRAS
- Prepared for electrical integration
- Rigid insulation made of high-performance expanded polyurethane. External coating in PVC.

- Tested in accordance with the European standard **EN 12897:2006**.

ACCESSORIES

See accessories section

WARRANTY

See general conditions of sale and warranty

ACCESSORIES ON REQUEST



Electrical heater



Pre-insulated pipe



Balancing valve



Heat Manager Smart Controller

For more information see accessories section.

SYSTEM COMPONENTS

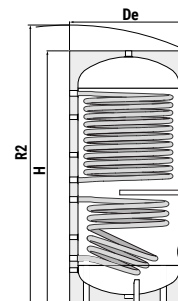
INCLUDED

High selective solar vacuum tube collector PVD, of the type Sydney with heat pipe technology	✓
Calorifier BOLLY® 2 XL (200-300L)	✓
Circulation unit BASIC ONE complete of circulator electronic control BASIC, flow regulator, safety valve, thermometer, temperature probes	✓
Expansion vessel It 24	✓
Non-toxic heat transfer fluid	✓
Solar thermostatic mixing valve	✓
Fixing kit and fittings	✓

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CORDIVARI Lab

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BOLLY® 2 XL

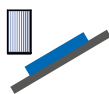
ENERGY EFFICIENCY CLASS

Model	De	H	R2	ErP
	[mm]			
200	550	1434	1540	B
300	650	1486	1620	B

For more information and technical data of the calorifiers and buffer tanks please refer to the Cordivari Calorifiers and Thermal storage catalogue.

SOLAR THERMAL SYSTEM **BOLLY® 2 XL CVT**

FORCED CIRCULATION SYSTEMS FOR DOMESTIC HOT WATER (DHW) WITH VACUUM COLLECTORS AND DOUBLE COIL DHW TANK



Calorifier type:

BOLLY® 2 XL

VT COLLECTORS - PITCHED ROOF

VT COLLECTORS - FLAT ROOF

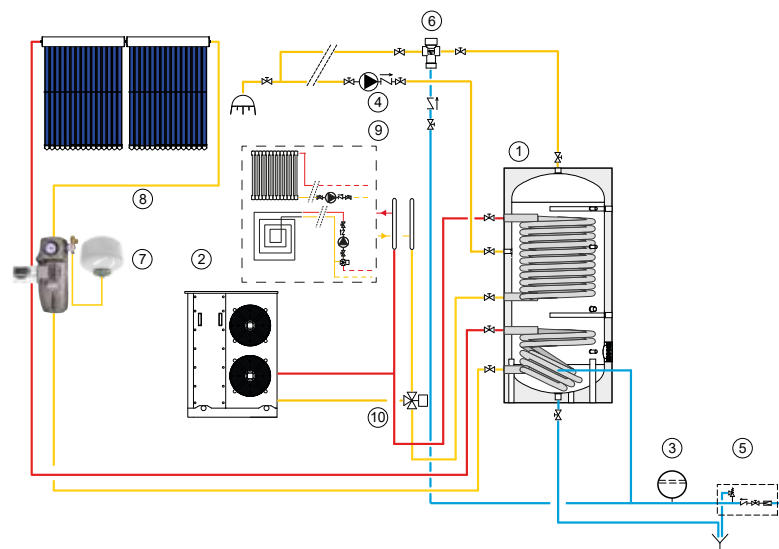
Model	Nr. of capturing tubes	Total surface area [m²]	Nr. Recommended users	Description/ Art. Nr.	Description/ Art. Nr.
200	1x10	2,17	4-5(*)	200 B2 XL CVT10 TF 3410316618977	200 B2 XL CVT10 TP 3410316618983
200	1x15	3,22	5-6	200 B2 XL CVT15 TF 3410316618978	200 B2 XL CVT15 TP 3410316618984
300	2x10	4,34	5-6	300 B2 XL 2CVT10 TF 3410316618979	300 B2 XL 2CVT10 TP 3410316618985
300	2x15	6,44	6-7	300 B2 XL 2CVT15 TF 3410316618980	300 B2 XL 2CVT15 TP 3410316618986

(*) Vacuum tube collectors CVT 10 and CVT 15 Cordivari (VACUUM TUBE HEAT PIPE)

(*) Systems designed for use in areas with high annual sun irradiation more than 1600 Kw/h m².

For fixing kit and other components see accessories section.

FORCED
SYSTEMS



LEGEND

1	Calorifier BOLLY® 2 XL
2	Heat source (heat pump)
3	Expansion vessel
4	DHW circulation group pump
5	Hydraulic safety group
6	Solar thermostatic mixing valve
7	Complete solar circulation group
8	Solar collector/s
9	Heating system
10	Diverting valve

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.



CONFIGURATION AND SCHEMES



CONFIGURATION SCHEME

5 STEP TO CREATE YOUR SYSTEM STEP BY STEP

DIMENSIONING

0

COMPACT

REGULAR

LARGE

1

COLLECTORS

- See page to **14** from **37** for compact collectors **STRATOS®**
- See page to **68** from **71** for **CVT** and **FLAT PANEL COLLECTORS**



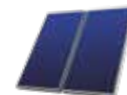
STRATOS® 4S



STRATOS® DR



CVT vacuum solar collectors



FLAT solar collectors

2

TANK



Refer to the Cordivari
Calorifiers and Thermal
Storage catalogue



BOLLYTERM®
HOME



BOLLY®
2 ST FB



BOLLY®
1 HY XL



EXTRA 2

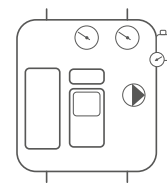
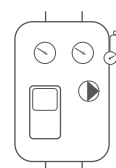
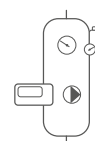


PUFFERMAS®
3 CTS POWER

3

CIRCULATION GROUP

See page to **78** from **79**



4

EXPANSION VESSEL KITS

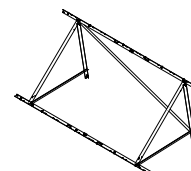
See page **86**



5

FIXING KIT AND FITTINGS

See page from **72** to **77**



6

ACCESSORIES (OPTIONAL)

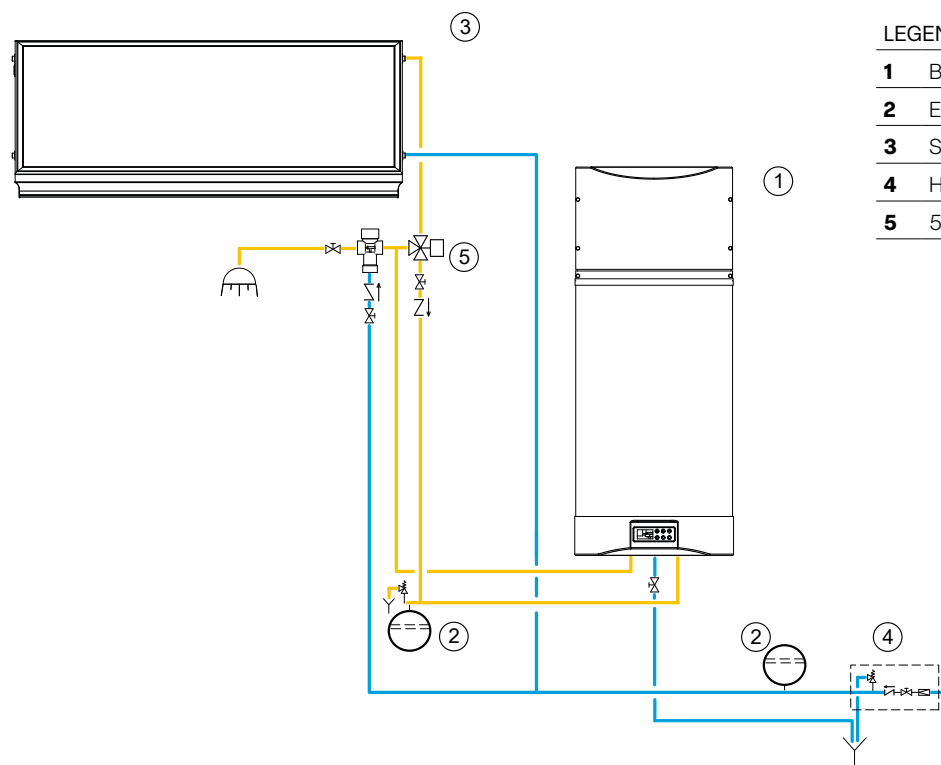
See page from **80** to **90**



CONFIGURATION

*For quotation request and plant sizing refer to the documents on page 64-65

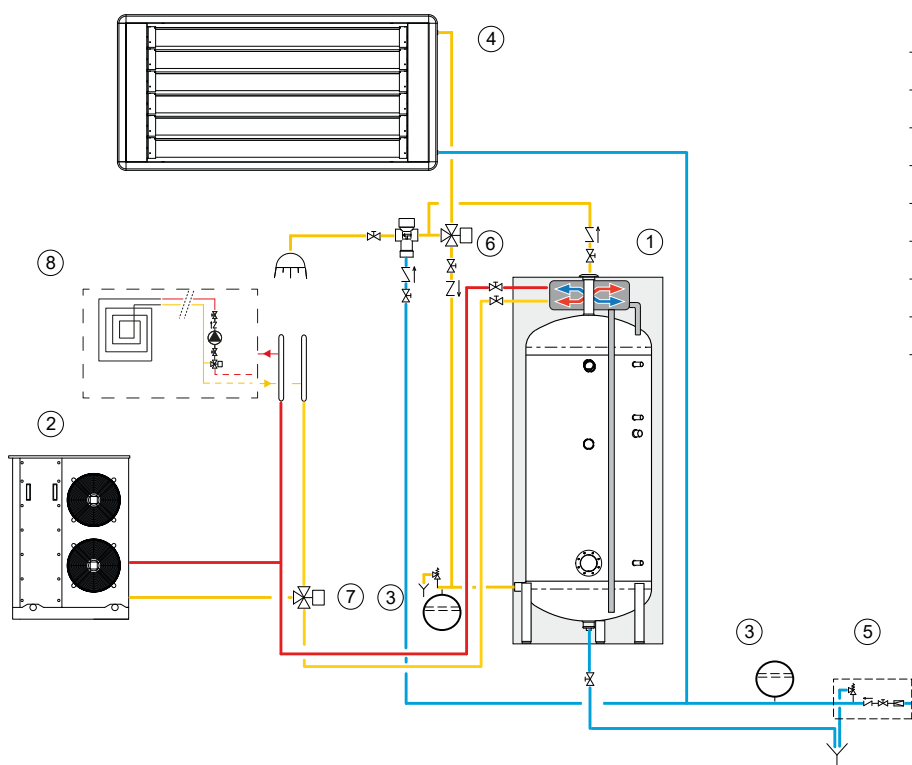
SOLAR THERMAL SYSTEM STRATOS® DR SYSTEM WITH BOLLYTERM® HOME



LEGEND

- | | |
|---|--------------------------------|
| 1 | BOLLYTERM® HOME |
| 2 | Expansion vessel |
| 3 | STRATOS® DR |
| 4 | Hydraulic safety group |
| 5 | 5-way diverting / mixing valve |

SOLAR THERMAL SYSTEM STRATOS® 4S ROTOSHIELD® SYSTEM WITH BOLLY® 1 PDC



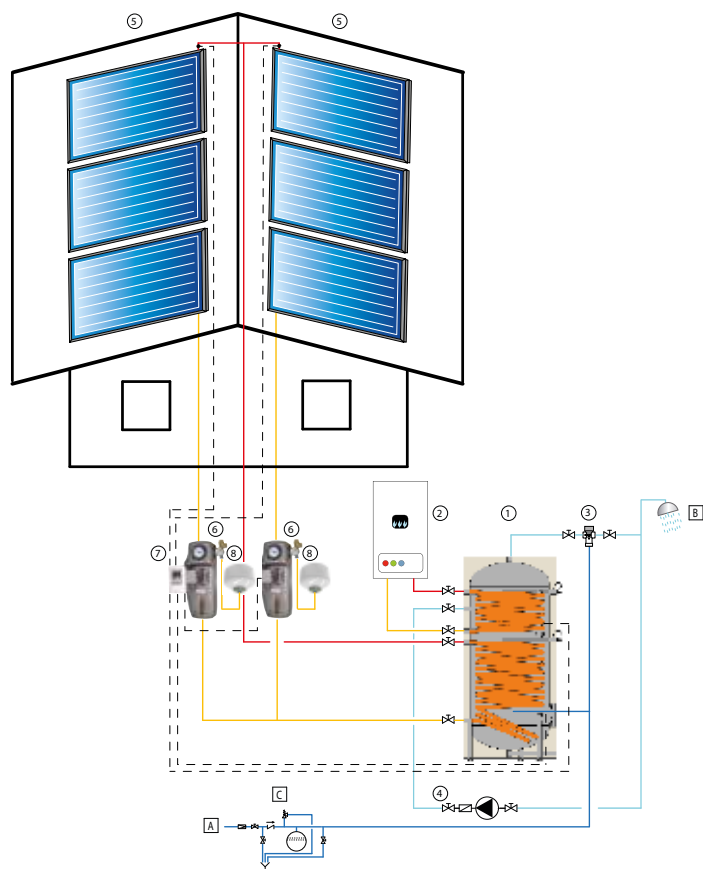
LEGEND

- | | |
|---|--------------------------------|
| 1 | Calorifier BOLLY® 1 PDC |
| 2 | Heat source |
| 3 | Expansion vessel |
| 4 | Stratos® 4S Rotoshield® |
| 5 | Hydraulic safety group |
| 6 | 5-way diverting / mixing valve |
| 7 | Diverting valve |
| 8 | Heating and cooling system |

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.



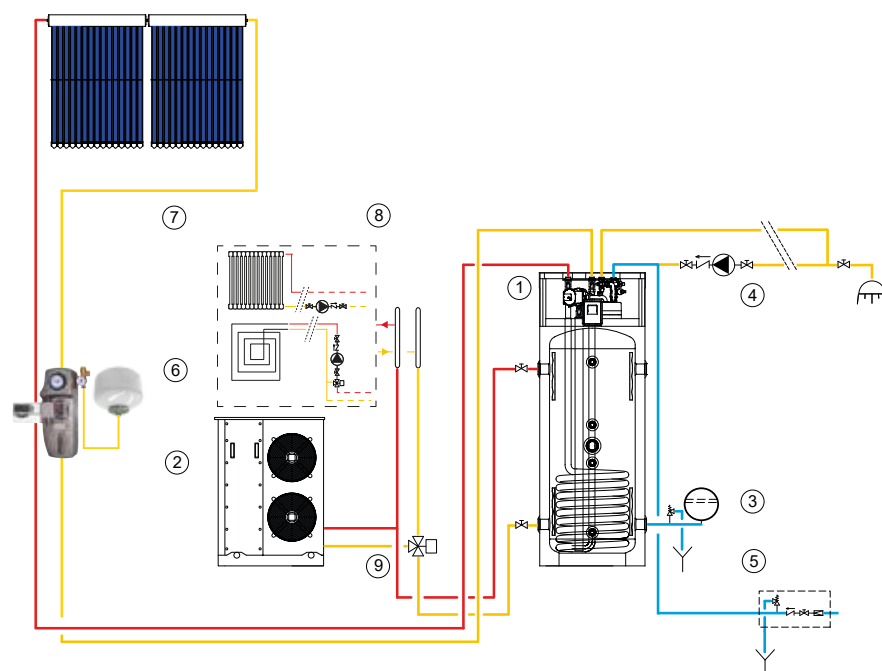
SOLAR THERMAL SYSTEM PITCHED ROOF EAST/OVEST



LEGEND

A	DHW inlet
B	DHW utilities
C	Hydraulic safety group
1	Calorifier BOLLY® 2
2	Heat source
3	Solar thermostatic mixing valve
4	DHW circulation group
5	Solar collectors (Roof pitch East/Ovest)
6	Solar circulation group
7	Professional electronic control unit
8	Solar system expansion vessel

SOLAR THERMAL SYSTEM WITH PUFFERMAS® 2 DOMUS AND CVT

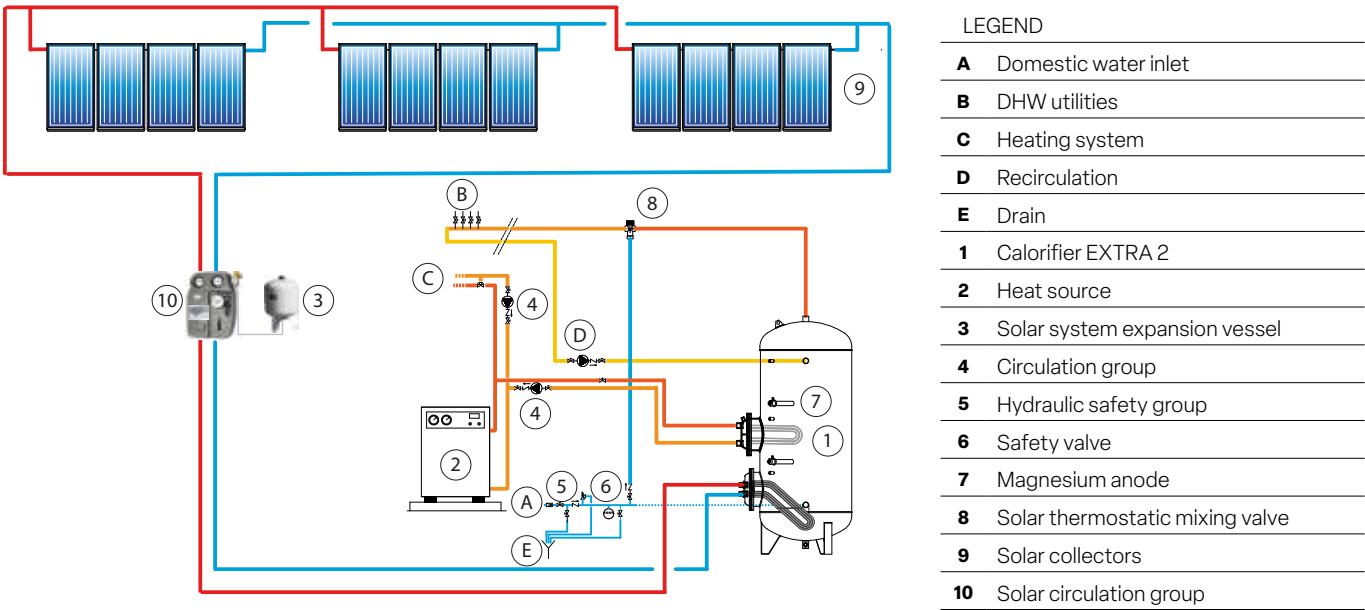


LEGEND

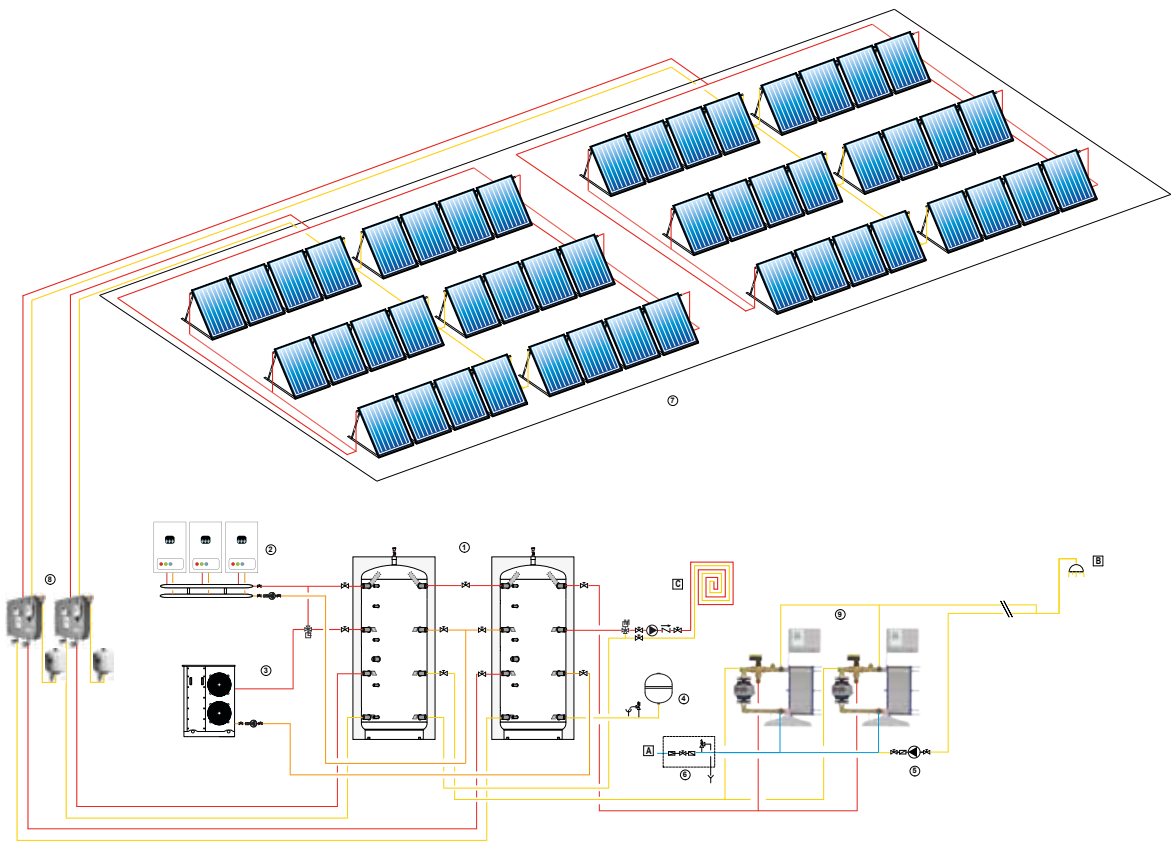
1	PUFFERMAS® 2 DOMUS Tank
2	Heat source (Heat source)
3	Expansion vessel
4	DHW recirculation circulator
5	Hydraulic safety group
6	Complete solar circulation group
7	Solar collectors
8	Heating system
9	Diverting valve

NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.

SOLAR THERMAL SYSTEM EXTRA 2



SOLAR THERMAL SYSTEM BIG INSTALLATION WITH PRS MODULES CONNECTED IN SERIES AND PARALLEL



NOTE: The shown installation examples are for illustrative purposes only. For the correct configuration always refer to a qualified installer.

SOLAR THERMAL SYSTEMS - REQUEST FOR QUOTATION

DHW SYSTEM

APPLICANT: _____

Tel.: _____ Fax: _____ E-mail: _____

ENGINEER/INSTALLER NAME: _____ Tel.: _____

DHW DATA:

Daily consumption in liters: _____ Distribution temperature °C: _____ Recirculation: ☐ YES ☐ NO

If you do not know your daily water consumption, please fill in the following data:

☐ Residential buildings:	N° of people _____	N° of apartments _____
	Usage period: Annual ☐ Seasonal (indicate period): _____	
	Working washing machine with DHW: ☐ YES ☐ NO	N° washes per day _____
	Working dishwashing machine with DHW: ☐ YES ☐ NO	N° washes per day _____
☐ Hotel ☐ Inn	☐ Farmhouse	High category ☐ Low category ☐
	N° rooms _____	N° people per room _____ N° of meals per day restaurant: _____
☐ Camping	N° of people _____	N° of showers _____ Usage period _____
☐ Gym		N° daily users _____
☐ Hospital		N° beds/guests _____
☐ School:		N° people (students + staff): _____
☐ Laundry:		Kg of material washed each day: _____
☐ Restaurant:		N° meals per day _____
☐ Office ☐ Industries ☐ Army camps		N° of people _____

SOLAR COLLECTOR DATA:

Municipality or alternatively Province where the plant will be built: _____

Type of roof: flat roof ☐ pitched roof ☐

Orientation of the pitched roof: _____ Inclination of the water table: _____

Available space: Length metres: _____ Width metres: _____

EXISTING OR PLANNED ENERGY SOURCES IN THE PLANT:

☐ Instantaneous boiler type and power	_____
☐ Instantaneous boiler with storage type and power:	_____
☐ Floor-standing boiler type and power:	_____
☐ Biomass generator type and power	_____
☐ Electrical resistance power: _____	☐ Other: _____

TECHNICAL ROOM:

Door width: _____ Door height: _____ Local height: _____ Local width: _____ Local length: _____

Accumulator collector distance: _____

SOLAR THERMAL SYSTEMS - REQUEST FOR QUOTATION**SWIMMING POOL HEATING**

APPLICANT: _____

Tel.: _____ Fax: _____ E-mail: _____

ENGINEER/INSTALLER NAME: _____ Tel.: _____

SWIMMING POOL DATA:

Daily recirculation water intake: lt _____

Nr. of daily users: _____

Type of swimming pool: Indoor ☐ Outdoor ☐

Temperature of the cold water in February °C: _____ and in August: _____

Temperature of the ground in February °C: _____ and in August: _____

Bathing season period: From _____ to _____

Swimming pool refill before the bathing season: ☐ YES ☐ NOBeginning 10 days before the bathing season: ☐ YES ☐ NO

Length of the pool in meters: _____ Width: _____ Depth: _____

Theoretical temperature of the pool °C: _____

Maximum temperature of the pool °C: _____

For outdoor swimming pools only:

Pool bottom color: white ☐ light blue ☐ turquoise ☐ dark blue ☐Wind protection: not present ☐ partial ☐ complete ☐Surrounding environment: highly exposed ☐ exposed ☐ protected ☐ highly protected ☐

Only if a water cover is envisaged:

Effective coverage of the swimming pool in %: _____

Type of cover: not transparent shutters ☐ transparent shutters ☐
tarpaulin ☐ semi transparent shutters ☐
transparent tarpaulin ☐ foam material ☐

For indoor swimming pools only:

Indoor temperature: _____

Outdoor temperature: _____

Humidity %: _____

SOLAR COLLECTORS DATA:

Municipality or Province in which the plant will be realized:

Type of roofs: flat roof ☐ pitched roof ☐

Pitched roof orientation: _____

Pitch inclination: _____

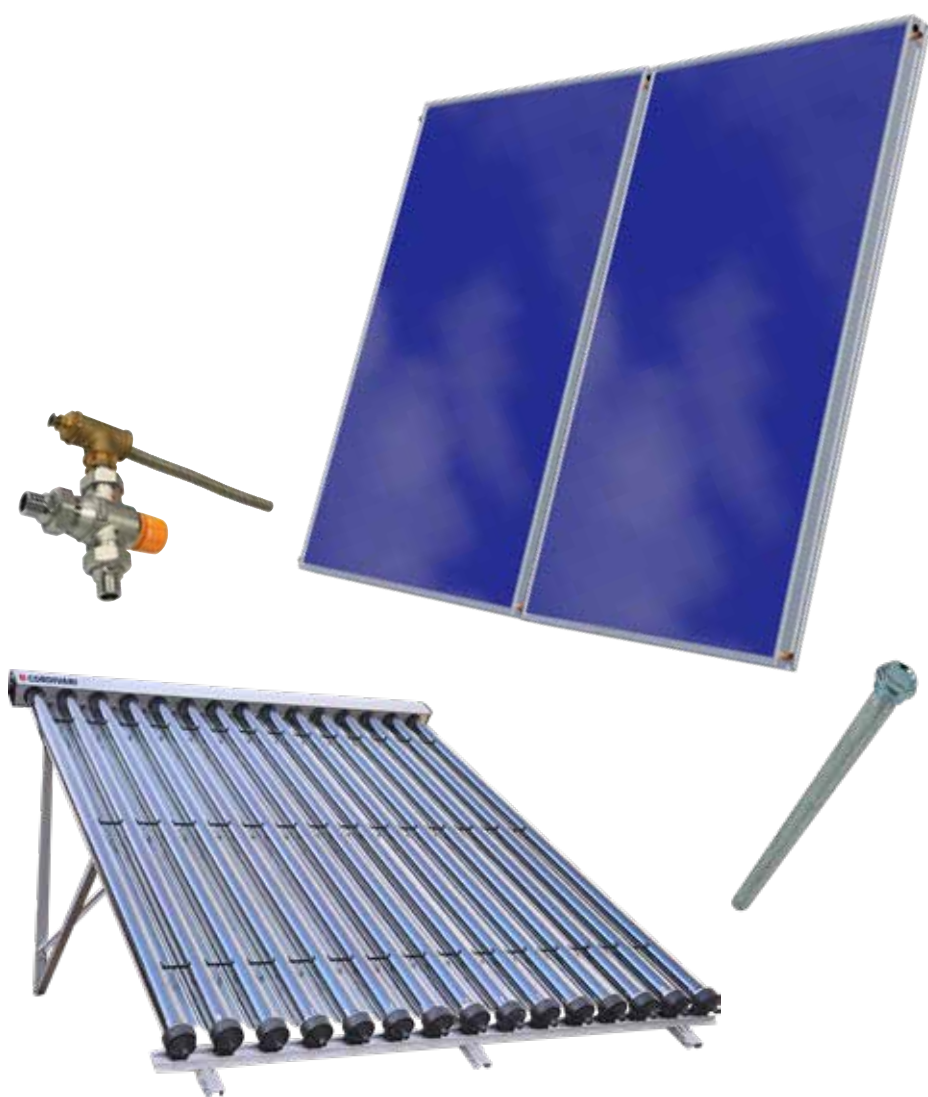
Available space: length meters: ☐ width meters: ☐

NOTE: _____

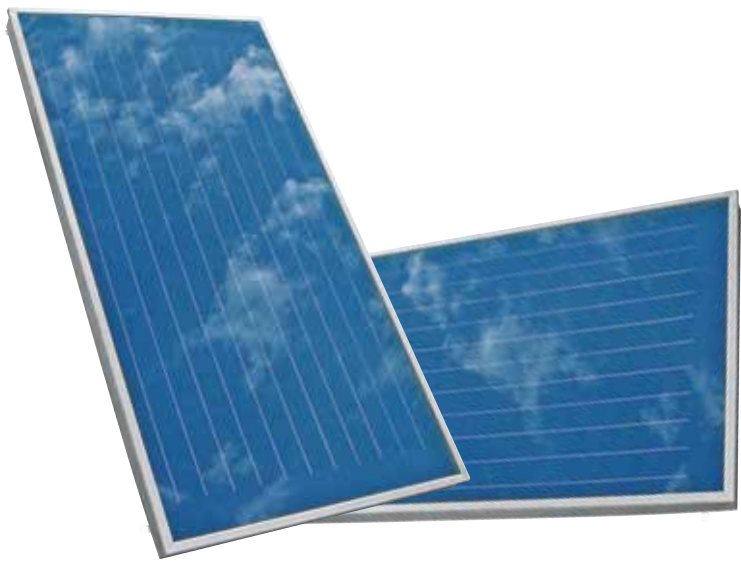




COLLECTORS AND ACCESSORIES



FLAT PLATE SOLAR COLLECTORS



Applications:
Forced circulation thermal systems

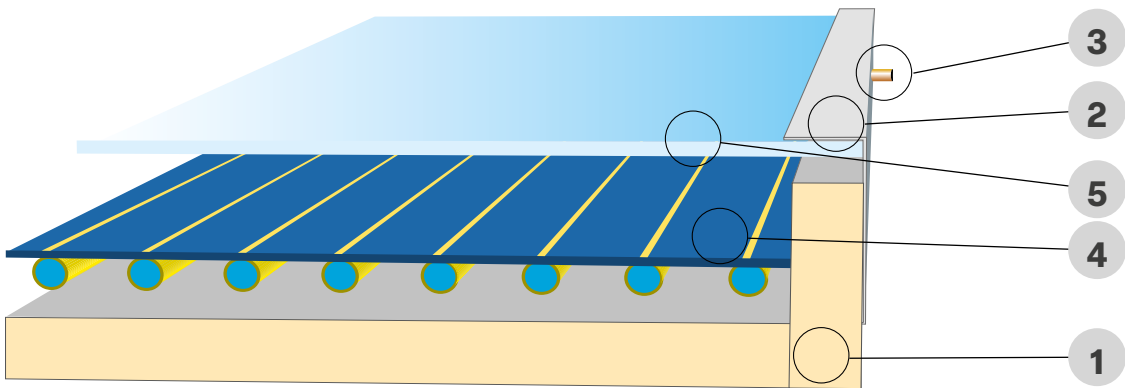
Characteristics:
Lateral connections, universal collector for forced circulation systems

Solar Keymark

TECHNICAL DATA	
P. Max	10 bar
T. Max	199° C
Gaskets	EPDM - Silicone

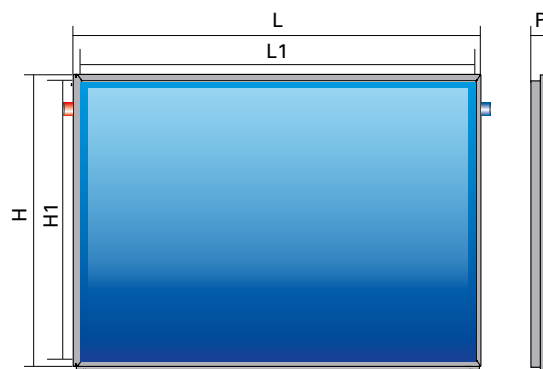
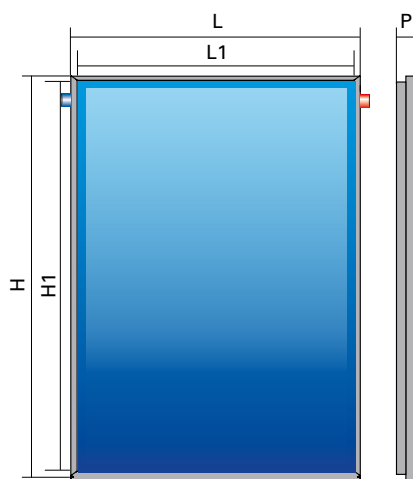
Cordivari flat plate solar collectors are manufactured with aluminum frame, insulation of mineral wool, highly selective absorber covered in titanium oxides and tempered glass according to EN 12150, tested against impact according to EN 12975 and EN 9806. Cordivari flat plate solar collectors are the best solution for efficient

and high-performing solar thermal systems thanks to the quality of the materials, the reliability of the functioning and to the multiple opportunities of integration.



DESCRIPTION	
1	Insulation in mineral wool
2	Aluminium frame
3	Connections Ø 22 mm
4	Full plate absorber with high selective coating
5	Impact test according to EN 12975 and EN 9806 Tempered according to EN 12150

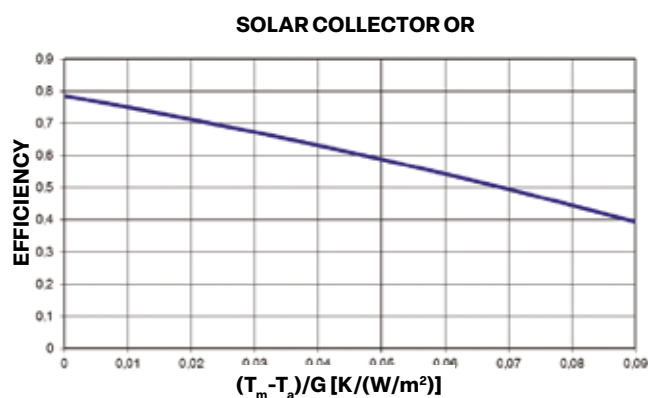
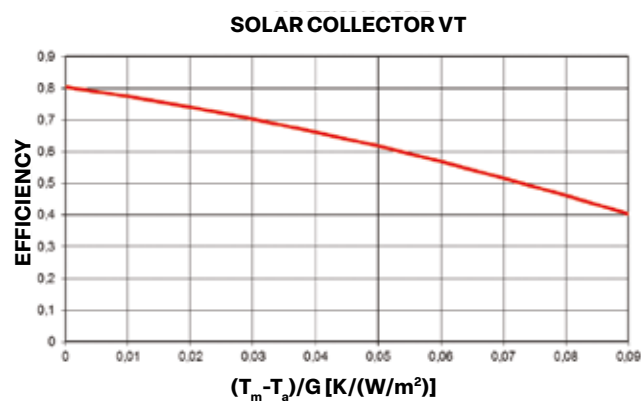
FLAT PLATE SOLAR COLLECTORS



Art. nr.	Version	Gross dimensions				Opening surface	Weight	Cap.	Connections	
Collector		L	H	P	Surface				N°	[mm]
ASAK		[mm]			[m²]					
3400306501310	VT	1250	2000	85	2,5*	2,32	34	1,9	2	ø 22
3400306501350	VT	1250	2000	85	2,5*	2,32	34	1,9	2	ø 22
Collector										
ASA										
3400306501311	OR	2000	1250	85	2,5*	2,32	34	1,9	2	ø 22

*For the detailed calculation please always refer to the product certification and to test reports

EFFICIENCY CURVES (Solar radiation values $G_{dir} = 850 \text{ W/m}^2$ $G_{dif} = 150 \text{ W/m}^2$)



FLAT PLATE COLLECTORS EFFICIENCY CURVES

The immediate efficiency curve of a solar collector represents its performances "ID", that allows to quantify the collector capacity to turn solar energy into thermal energy.

Efficiency is defined as the relationship between the thermal power captured by the heat transfer fluid and the solar radiation that affects the collector. For the sake of convenience, the ratio is always applied to a square meter (1 m^2) of surface.

So on the vertical axis, the efficiency η (eta) is the relationship between the power absorbed by the heat transfer fluid circulating in one square

meter of the solar collector (W/m^2) and the solar radiation on the collector surface.

It is clear that the efficiency so defined is an instantaneous value depending on test conditions as well as on the collector type.

On the horizontal axis we find the relationship between the difference in temperature Δt and the power of the solar radiation affecting the collector.

Δt is the difference between the average temperature of the heat transfer fluid inside the solar collector and the environment temperature.



VACUUM TUBE COLLECTORS CVT



TECHNICAL DATA

P. Max	10 bar
T. Max	280° C
Gaskets	EPDM - Silicone

Applications:

Forced circulation thermal systems

Characteristics:

Lateral connections, universal collector for forced circulation systems

Solar Keymark

Cordivari CVT solar collectors are composed of a series of vacuum tubes Sydney type, that captures the incidence of solar energy. Thanks to the vacuum technology, this kind of collector can reach high performances

even in colder seasons.

The collectors CVT are designed with heat pipe technology that allows a better maintenance and protection against stagnation.

HEAT PIPE TECHNOLOGY

The pipe heats up with the heat coming from the absorber and vaporizes the small quantity of fluid that naturally raises to the top, then it condenses and transfers heat to the heat-transfer fluid of the primary circuit and comes back to liquid state.

Heat pipes are placed inside the double concentric tubes made in borosilicate glass (Sydney type). Thanks to its insulating properties (thermos effect), the vacuum between the glass pipes drastically reduces the heat loss, increasing the available energy captured from the sun.

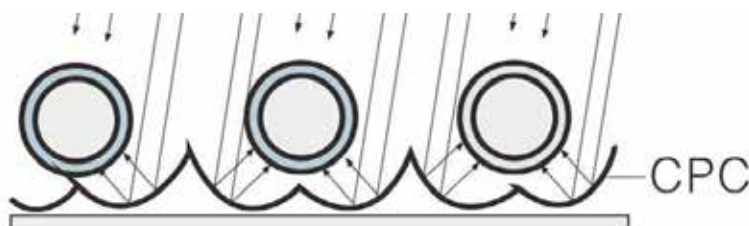
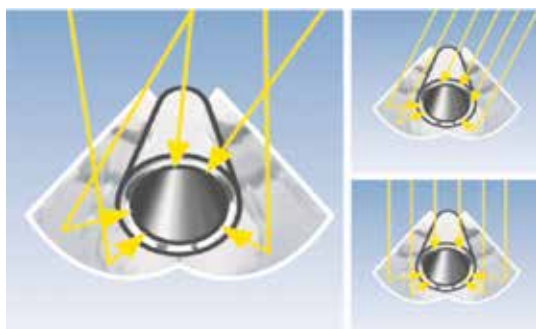


DESCRIPTION

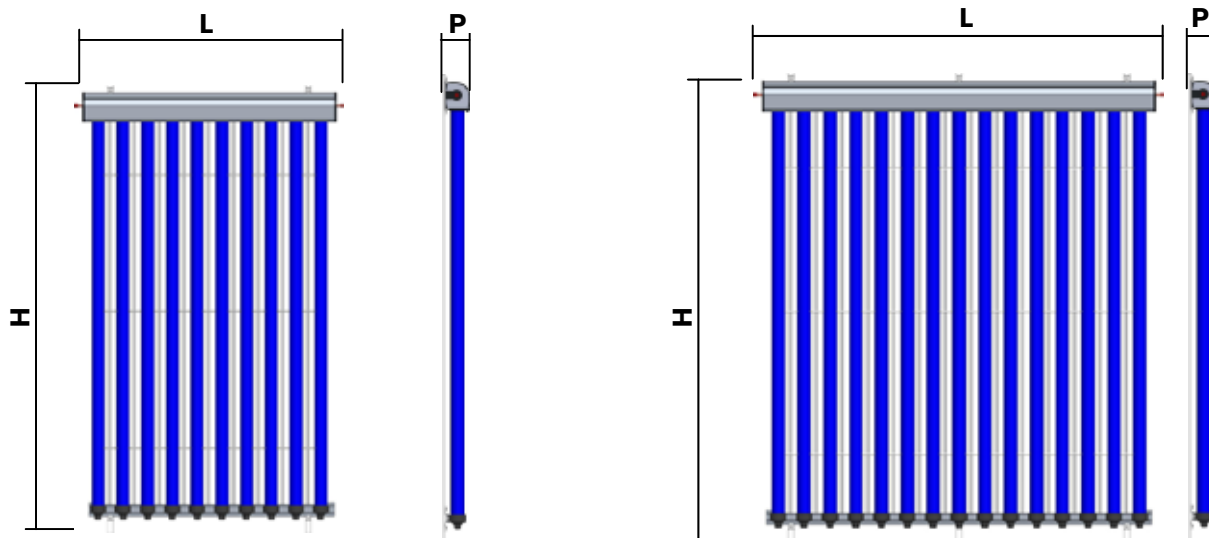
1	Insulation in mineral wool
2	Anodized aluminum structure
3	Connection Ø 22 mm
4	Heat pipe
5	Vacuum glass tube Sydney type Ø 58 mm

COMPOUND PARABOLIC CONCENTRATOR (CPC)

A special CPC behind the tubes leads the sunlight, even from different angles, exactly to the absorber. This system allows Cordivari vacuum tube collectors CVT to reach high performances with small dimensions and maximum energy absorption, direct or indirect.



VACUUM TUBE COLLECTORS CVT

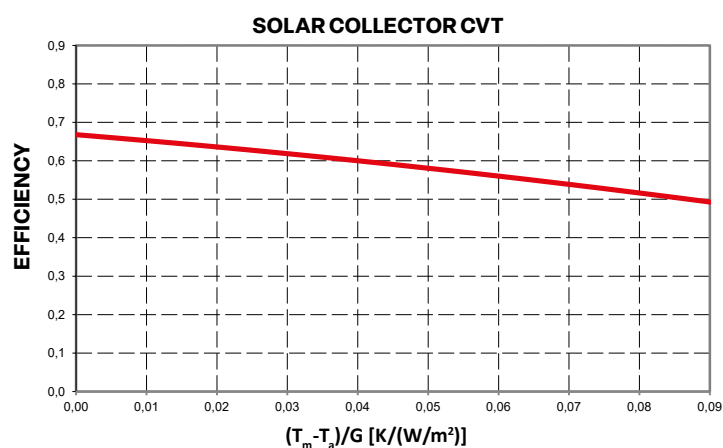


Art. Nr.	Version	Gross dimensions				Opening surface	Weight	Cap.	Connections	
		L	H	P	Surface				N°	[mm]
			[mm]		[m²]	[m²]	[kg]	[lt]		
3400306500201	10 TUBES	1130	1917	133	2,17*	1,78	28,5	0,94	2	ø 22
3400306500202	15 TUBES	1680	1917	133	3,22*	2,72	39	1,41	2	ø 22

* For the detailed calculation please always refer to the product certification and to test reports

Fixing kit for pitched roofs is included with vacuum tube collectors CVT

EFFICIENCY CURVES (Solar radiation values $G_{dir} = 850 \text{ W/m}^2$ $G_{dif} = 150 \text{ W/m}^2$)



VACUUM TUBE COLLECTORS EFFICIENCY CURVES

The immediate efficiency curve of a solar collector represents its performances "ID", that allows to quantify the collector capacity to turn solar energy into thermal energy.

Efficiency is defined as the relationship between the thermal power captured by the heat transfer fluid and the solar radiation that affects the collector. For the sake of convenience, the ratio is always applied to a square meter (1 m^2) of surface.

So on the vertical axis, the efficiency η (eta) is the relationship between the power absorbed by the heat transfer fluid circulating in one square

meter of the solar collector (W/m^2) and the solar radiation on the collector surface.

It is clear that the efficiency so defined is an instantaneous value depending on test conditions as well as on the collector type.

On the horizontal axis we find the relationship between the difference in temperature Δt and the power of the solar radiation affecting the collector.

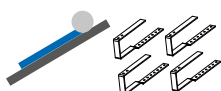
Δt is the difference between the average temperature of the heat transfer fluid inside the solar collector and the environment temperature.



FIXING KIT FOR **NATURAL CIRCULATION SYSTEMS**



PITCHED ROOF SUSPENSION KIT



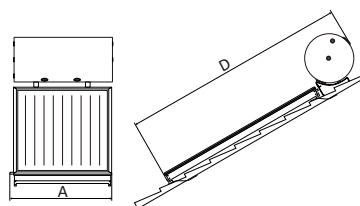
Art. Nr.	5770000480038	5770000480039	5770000480040
	kit for 1 collector of 2 or 2.5 m ²	kit for 2 collector of 2 or 2.5 m ²	kit for 3 collectors of 2 m ²
Description	With support saddles for SOLAR INTERKA calorifier		
	from 150 o 200 liters	from 200 liters	from 300 liters
Material	Galvanized mild steel		

Suspended fastening system for pitched roofs. Allows the weight of the system to be transferred to the roof structure instead of the roof covering.

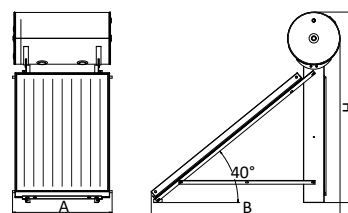
DIMENSIONS OF COLLECTORS' STRINGS

PANAREA SYSTEM

PITCHED ROOF



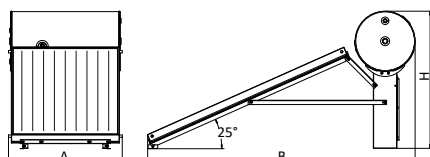
FLAT ROOF



Solar collectors surface [m ²]	1	2	3	1	2	3
Width A [mt] collectors 2 m ²	1,5	2,3	3,4	1,1	2,3	3,4
Width A [mt] collectors 2,5 m ²	1,5	2,6	-	1,3	2,6	-
Height H [mt]	-	-	-	2,03	2,03	2,03
Dimensions on the roof D [mt]	2,65	2,65	2,65	-	-	-
Length B [mt]	-	-	-	1,91	1,91	1,91

PANAREA LOW SYSTEM

FLAT ROOF

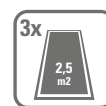
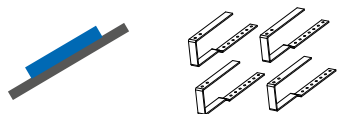


Solar collectors surface [m ²]	2	2
Width A [mt]	1,1	2,3
Width A [mt] collectors 2,5 m ²	1,3	2,6
Length B [mt]	2,56	2,56
Height H [mt]	1,27	1,27

FIXING KIT FOR **FORCED CIRCULATION SYSTEMS**



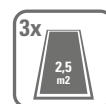
PITCHED ROOF SUSPENSION KIT



Art. Nr.	5770000480041	5770000480042	5770000480043
Description	kit for 1 collector of 2.5 m ²	kit for 2 collector of 2.5 m ²	kit for 3 collectors of 2.5 m ²
Material	Galvanized mild steel		

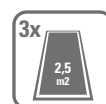
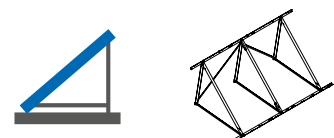
Suspended fastening system for pitched roofs. Allows the weight of the system to be transferred to the roof structure instead of the roof covering.

PITCHED ROOF FIXING KIT - VERTICAL COLLECTORS



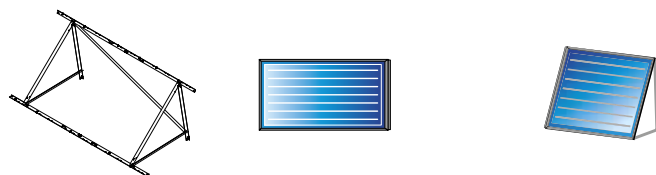
Art. Nr.	5770000480020	5770000480021	5770000480022
Description	kit for 1 collector of 2.5 m ²	kit for 2 collector of 2.5 m ²	kit for 3 collectors of 2.5 m ²
Material	Galvanized mild steel		

FLAT ROOF FIXING KIT - VERTICAL COLLECTORS



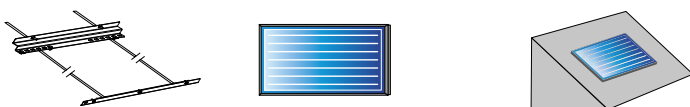
Art. Nr.	5770000480024	5770000480025	5770000480026
Description	kit for 1 collector of 2.5 m ²	kit for 2 collector of 2.5 m ²	kit for 3 collectors of 2.5 m ²
Material	Galvanized mild steel		

HORIZONTAL SYSTEMS FOR FLAT ROOFS



Art. Nr.	5770000480027
Description	1 collector of 2.5 m ² OR
Material	Galvanized steel

HORIZONTAL SYSTEMS FOR PITCHED ROOFS



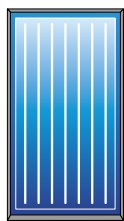
Art. Nr.	5770000480023
Description	1 collector of 2.5 m ² OR
Material	Galvanized steel



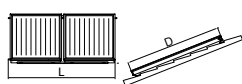


DIMENSIONS OF COLLECTORS' STRINGS

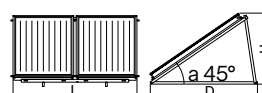
FORCED CIRCULATION



PITCHED ROOF SYSTEMS



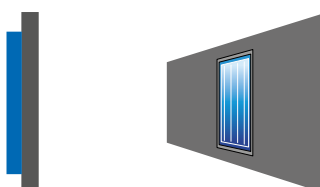
FLAT ROOF SYSTEMS



N° of collector per row	1	2	3	1	2	3
Width L [m]	1,26	2,62	3,98	1,26	2,62	3,98
Height H [m]	-	-	-	1,5	1,5	1,5
Dimension on the roof D [m]	2,06	2,06	2,06	1,5	1,5	1,5

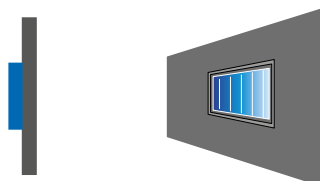
FIXING KIT ON VERTICAL WALLS

HORIZONTAL INSTALLATION



Art. Nr.	5770000480029
Description	1 collector of 2.5 m² VT
Material	Galvanized steel

VERTICAL INSTALLATION



Art. Nr.	5770000480028
Description	1 collector of 2.5 m² OR
Material	Galvanized steel

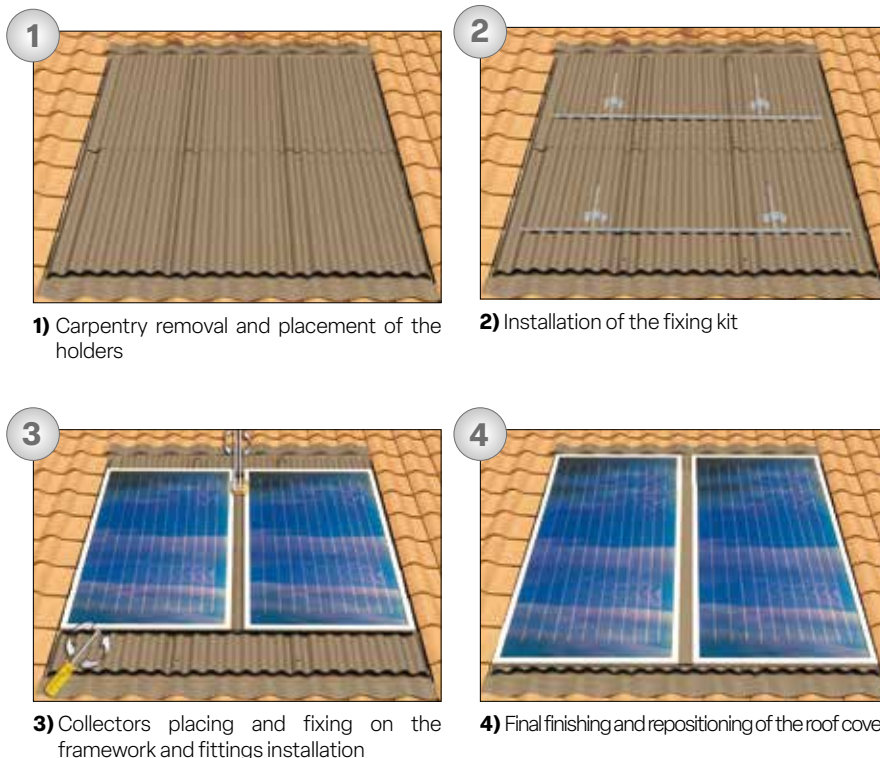


BUILT-IN PROCEDURE

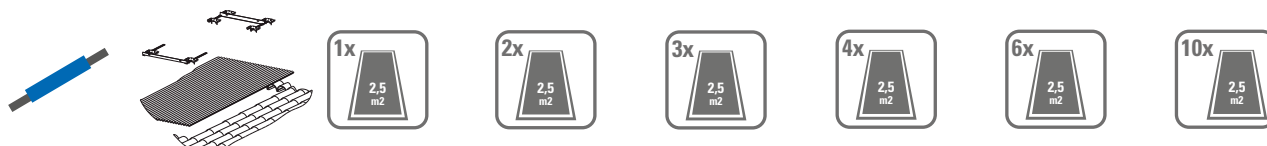
CORDIVARI PATENTED

- RELIABLE AND SAFE
- QUICK TO INSTALL
- IT CAN BE USED WITH STANDARD COLLECTORS

Cordivari patented built-in solar panels represents the best solution for built-in installations of flat plate solar collectors. It guarantees the maximum safety sealing against water infiltrations under the cover, it allows a quick and easy installation without specialized metal process interventions. It ensures maximum flexibility and represents a quick solution according to the installation type. In fact, this built-in system adapt to standard Cordivari collectors, does not need a special or customized collector. The aesthetic result is great and it fits with all the most common roof types.

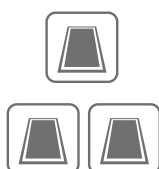
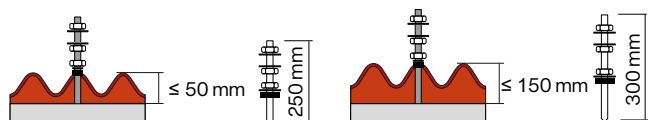


BUILT-IN SYSTEM



Art. Nr.	5770000480030	5770000480031	5770000480032	5770000480033	5770000480034	5770000480035
Description	kit for 1 collector of 2.5 m ²	kit for 2 collectors of 2.5 m ²	kit for 3 collectors of 2.5 m ²	kit for 4 collectors of 2.5 m ²	kit for 6 collectors of 2.5 m ²	kit for 10 collectors of 2.5 m ²
Material	Galvanized steel and bituminous corrugated panels					

FIXING KITS FOR INSULATED PITCHED ROOFS



= 2 INSULATED PITCHED ROOF FIXING KITS

= 3 INSULATED PITCHED ROOF FIXING KITS



Carpentry to be used in addition to standard fixing kit in case of pitched roofs with insulation between the slab and roofing tiles. The kit includes:

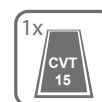
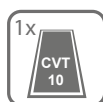
- 2 Galvanized steel brackets
- 2 steel screws, 250-300 mm length
- 2 rubber dowels
- Fittings

	With 250 mm screws	With 300 mm screws
Art. Nr.	5770001100602	5770001100604

Insulated roof fixing kits quantity to order = n° of panels + 1



FLAT ROOFS

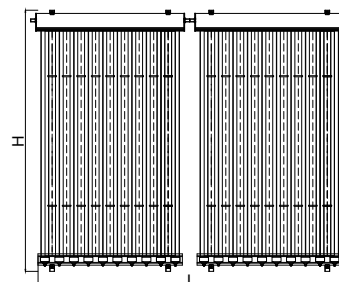
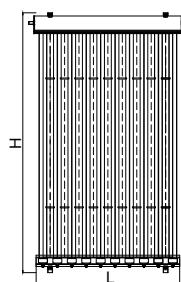
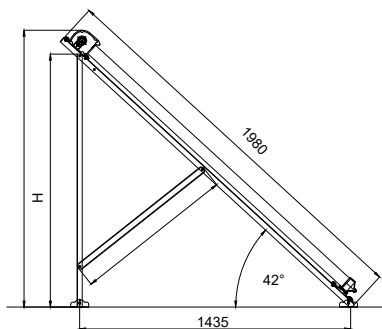


Art. Nr.	5770000480036	5770000480037
Description	FIXING KIT FOR CVT 10	FIXING KIT FOR CVT 15
Material	Anodized aluminium	

SIZE OF THE COLLECTORS' STRINGS CVT

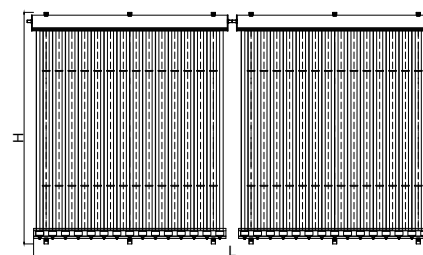
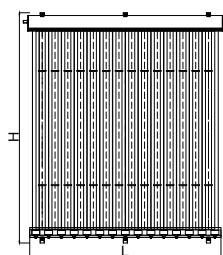
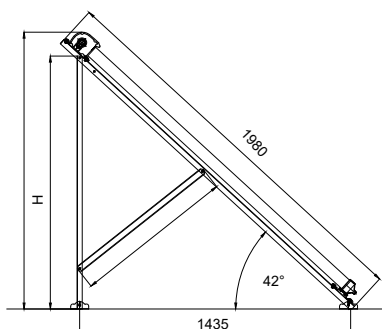
FLAT ROOFS

MODEL CVT10



N° of collectors per row	1	2
Width L [m]	1,13	2,3
Height H [m]	1,36	1,36

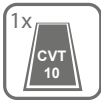
MODEL CVT15



N° of collectors per row	1	2
Width L [m]	1,68	3,4
Height H [m]	1,36	1,36



PITCHED ROOFS



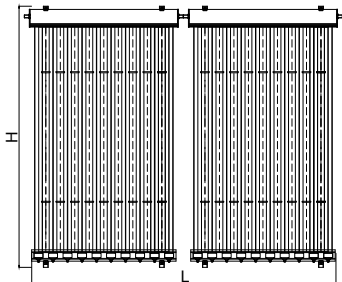
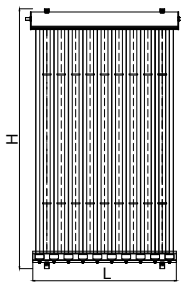
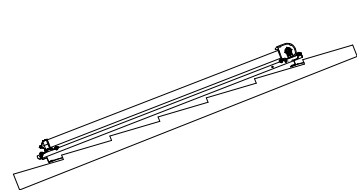
Art. Nr.	5770001105888	5770001105889
Description	BAND KIT x CVT 10 TF	BAND KIT x CVT 15 TF

Cordivari vacuum tubes collectors CVT fixing kits for pitched roofs are included with solar panel.

SIZE OF THE COLLECTORS' STRINGS CVT

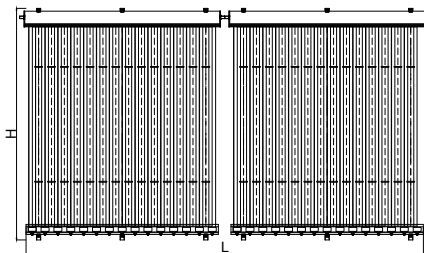
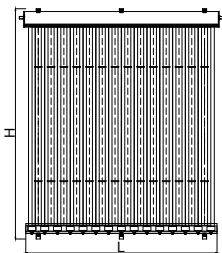
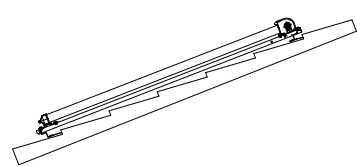
PITCHED ROOFS

MODEL CVT10



N° of collectors per row	1	2
Width L [m]	1,13	2,3
Height H [m]	1,36	1,36

MODEL CVT15



N° of collectors per row	1	2
Width L [m]	1,68	3,4
Height H [m]	1,36	1,36

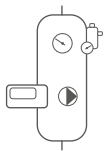
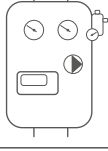
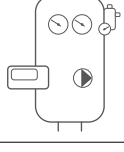
ACCESSORIES AND SPARE PARTS FOR **FORCED CIRCULATION SYSTEMS**

ACCORDING TO
EN 2009/125 CE
DIRECTIVE **ErP**
READY APPLIES TO EUROPEAN DIRECTIVE FOR ENERGY RELATED PRODUCTS

CIRCULATION GROUP WITH **BASIC** CONTROL UNIT

COMPONENTS:

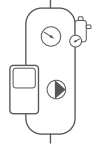
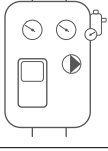
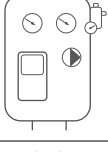
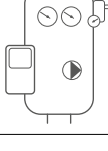
- CIRCULATOR
- BASIC (*) CONTROL UNIT
- FLOW REGULATOR
- SAFETY VALVE
- THERMOMETERS
- TEMPERATURE PROBES

	Art. Nr.	Description	Connections
	5760000000018	Circulation group with BASIC control unit Flow rate: 2-12 lt/min	3/4" GAS M
	5760000000020	Circulation group with BASIC control unit Flow rate: 8-28 lt/min	1" GAS M
	5760000000022	Circulation group with BASIC control unit Flow rate: 8-38 lt/min	1" GAS M
	5760000000024	Circulation group with BASIC control unit Flow rate: 20-70 lt/min	1" 1/2 GAS M

CIRCULATION GROUP WITH **PROFESSIONAL** CONTROL UNIT

COMPONENTS:

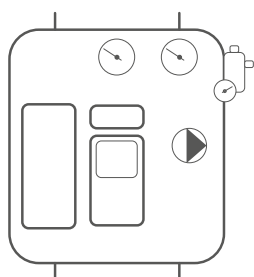
- CIRCULATOR
- PROFESSIONAL (*) CONTROL UNIT
- FLOW REGULATOR
- SAFETY VALVE
- THERMOMETERS
- TEMPERATURE PROBES

	Art. Nr.	Description	Connections
	5760000000019	Circulation group with PROFESSIONAL control unit Flow rate: 2-12 lt/min	1" GAS M
	5760000000021	Circulation group with PROFESSIONAL control unit Flow rate: 8-28 lt/min	1" GAS M
	5760000000023	Circulation group with PROFESSIONAL control unit Flow rate: 8-38 lt/min	1" GAS M
	5760000000025	Circulation group with PROFESSIONAL control unit Flow rate: 20-70 lt/min	1 1/2" GAS M

(*) For **control unit** features, see pages **80-81**

ACCESSORIES AND SPARE PARTS FOR **FORCED CIRCULATION SYSTEMS**

PRIMARY SOLAR EXCHANGE STATION WITH STRATIFICATION MODULE FOR BUFFER TANK



STRATIFICATION **Solar module for external exchange**

Art. Nr.

5760000000026

TECHNICAL DESCRIPTION:

SOLAR PRIMARY CIRCUIT:

- High efficiency solar circulator
- 3-way return ball valve with non-return valve
- 6 bar safety group
- Inlet ball valve with non-return valve 10 mbar equipped with thermometer holder clip
- Brass deaerator with automatic release valve and interception faucet
- AISI 316 stainless steel brazed plate exchanger

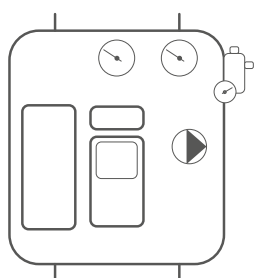
SECONDARY CIRCUIT:

- Switch valve
- Safety valve
- High efficiency circulator

FULL PACKAGE SOLAR STATION, INCLUDING PRIMARY SOLAR EXCHANGE MODULE TO BE CONNECTED TO PUFFER TANK AND STRATIFICATION SYSTEM SO TO ALLOW THE THERMAL STRATIFICATION OF THE TANK FROM THE TOP TO THE BOTTOM.

LOW-FLOW TILL 70 M² COLLECTOR LIGHT RECEIVING SURFACE.

PRIMARY SOLAR EXCHANGE STATION FOR BUFFER TANK



Solar module for external exchange

Art. Nr.

5760000000027

TECHNICAL DESCRIPTION:

SOLAR PRIMARY CIRCUIT:

- Solar circulator
- Flow rate regulator with system loading and drain valve
- 3-way return ball valve with non-return valve
- 6 bar safety group with pressure gauge
- Inlet ball valve with non-return valve 10 mbar equipped with thermometer holder clip
- Brass deaerator with automatic release valve and interception faucet
- AISI 316 stainless steel brazed plate exchanger

SECONDARY CIRCUIT:

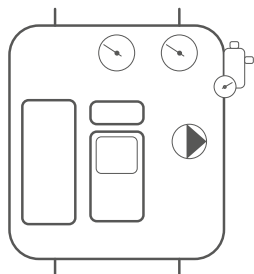
- Safety valve
- High efficiency circulator

FULL PACKAGE SOLAR STATION, INCLUDING PRIMARY SOLAR EXCHANGE MODULE TO BE CONNECTED TO PUFFER TANK.

THE MODULE DRAWS THE HEAT THROUGH THE PRIMARY CIRCUIT CONVEYING IT INTO THE EXCHANGER. THE THERMAL ENERGY IS TRANSFERRED TO THE SECONDARY CIRCUIT.

LOW-FLOW TILL 70 M² COLLECTOR LIGHT RECEIVING SURFACE.

SOLAR EXCHANGE STATION FOR DHW PRODUCTION



Solar module for external exchange DHW

Art. Nr.

5760000000028

TECHNICAL DESCRIPTION:

SOLAR PRIMARY CIRCUIT:

- High efficiency solar circulator
- Flow rate regulator with system loading and drain valve
- 3-way return ball valve with non-return valve
- 6 bar safety group with pressure gauge
- Inlet ball valve with non-return valve 10 mbar equipped with thermometer holder clip
- Brass deaerator with automatic release valve and interception faucet
- AISI 316 stainless steel brazed plate exchanger

DHW CIRCUIT WITH AISI 316 STAINLESS STEEL PIPES:

- 6 bar safety valve
- DHW circulator
- DHW flow rate till 37 Lt/min

FULL PACKAGE SOLAR STATION, INCLUDING PRIMARY SOLAR EXCHANGE MODULE TO BE CONNECTED TO DHW ACCUMULATION TANK.

THE MODULE DRAWS THE HEAT THROUGH THE PRIMARY CIRCUIT CONVEYING IT INTO THE EXCHANGER. THE THERMAL ENERGY IS TRANSFERRED TO THE SECONDARY CIRCUIT.

DHW LOW-FLOW TILL 70 M² COLLECTOR LIGHT RECEIVING SURFACE.



ACCESSORIES AND SPARE PARTS **FOR FORCED CIRCULATION SYSTEMS**

BASIC CONTROL UNIT

New BASIC control unit for solar thermal installations is equipped with 2 Outlets and 3 Inlets (probes). It can set and manage till 6 different solar installations. Selecting one of the 6 installation diagram, the control unit will automatically deal with outlets and inlets for the selected system. On the backlit LCD screen you can see the configuration of the hydraulic installation diagram, outlets status, probes status and many other useful data and information.



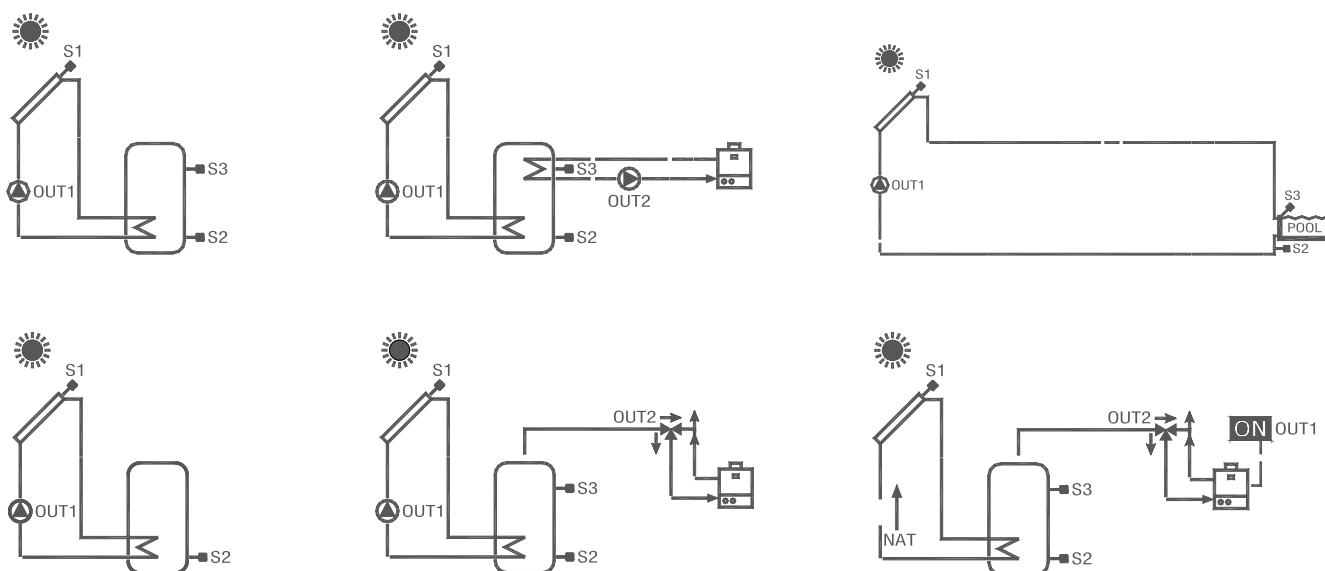
BASIC CONTROL UNIT

complete with 3 ntc temperature probes

Art. Nr.

5755280000020

MAIN EXAMPLES OF SETTINGS MANAGED BY **BASIC CONTROL UNIT**



ACCESSORIES AND SPARE PARTS **FOR FORCED CIRCULATION SYSTEMS**

PROFESSIONAL CONTROL UNIT

New PROFESSIONAL solar control unit combines a practical design and a clear graphical user interface. This control unit is particularly easy to use also thanks to its feature to assist the user step by step during the settings to easily and quickly start the unit. PROFESSIONAL V15 control unit can be used to run different complex installations till 42 system types. It is equipped with a backlit LCD display which easily allows to set all the functions, such as to see current values, system analysis and monitoring using statistics, customized settings for special features, extensible menus including instructions, safety lock.

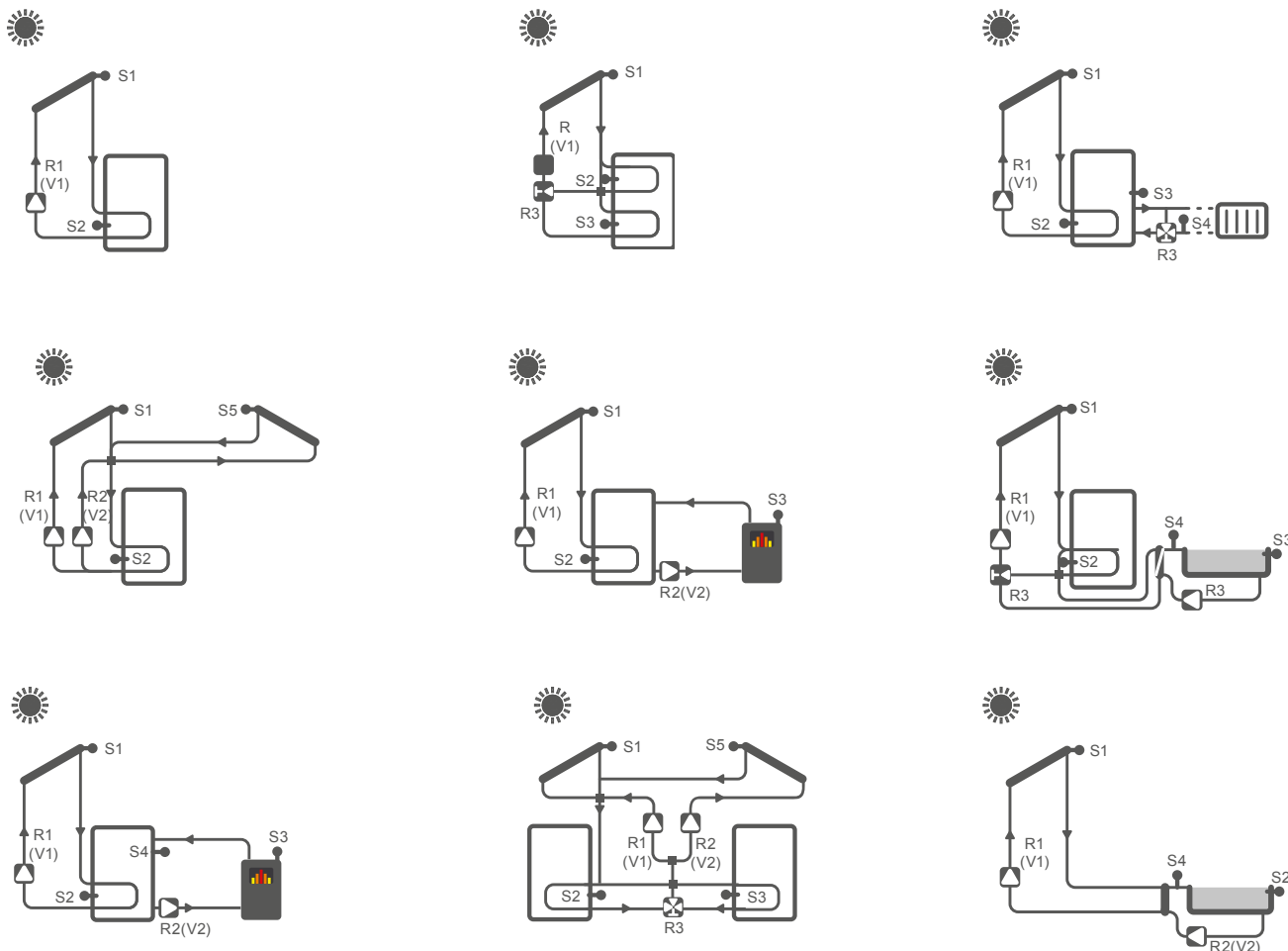


PROFESSIONAL CONTROL UNIT
complete with 4 temperature probes pt 1000

Art. Nr.

5755280000021

MAIN EXAMPLES OF SETTINGS MANAGED BY **PROFESSIONAL CONTROL UNIT**



SPARE PARTS AND ACCESSORIES FOR COMPACT SOLAR THERMAL

ACCESSORIES FOR **STRATOS® 4S**

COVERING SYSTEM FOR STRATOS® 4S HC / ROTOSHIELD® / HS



Cover for Stratos® 4S protection. Essential to protect the system in case it would be drained, during periods it is not working or after the installation before starting to work.

STRATOS® 4SHC/ ROTOSHIELD®

Model	Art. nr.
120	5775000000017
180	5775000000018
210	5775000000020

STRATOS® 4SHS

Model	Art. nr.
160	5775000000041
210	5775000000042
260	5775000000043
300	5775000000044

HEATING CABLE



The heating cable guarantees a great protection against freezing and avoids possible damages at the pipes or fittings caused by low temperatures in installations in those environments subject to risks of ice. This accessory is made of a heating cable with constant power of 10W/m (220 V), including the thermostat and cable with Schuko plug.

Lenght	Watt	Art. nr.
3 mt	30	5240000005003
6 mt	60	5240000005004

3/4" PRESSURE ADAPTOR



The pressure reduction is an essential device to reduce and stabilise the incoming pressure from the water supply network for a correct use of the domestic installation as well as of the related devices.

Art. nr.
5046000000042

3/4" SAFETY GROUP



The safety group has to be used for DHW storage protection. The product is made of several components which have the following functions:

- safety against overpressure
- anti-pollution, so to avoid the hot water to return back to the public network
- interception, allowing to seal the supply network for control and maintenance of other devices.

The installation of such device is mandatory as per the existing law. Cordivari safety group is certified according to the European law EN 1487 requirements.

Art. nr.
5760000001002

SOLAR STORAGE-TO-BOILER THERMOSTATIC CONNECTION KIT – 5-WAY VALVE



The solar storage-to-boiler connection kits automatically control and optimize the thermal energy contained in the solar water storage, ensuring that domestic hot water is distributed throughout the system at a controlled optimum temperature. They ensure that users always receive hot water at the set temperature and switch the boiler on if the temperature of the water coming from the solar storage falls below the set point.

These compact kits are designed for quick and easy installation in both new and existing systems.

Complete with:

- Thermostatic diverter valve
- Anti-scald thermostatic mixing valve

Art. nr.
5765000000514

HEAT MANAGER - SMART CONTROLLER WITH TEMPERATURE PROBE



The Smart Controller Wi-Fi HEAT MANAGER enables remote management through smartphone of devices such as electric heaters. Thanks to the app available for IOS and Android, it is possible to manage, to set and to monitor the electric heaters of the calorifiers or of compact systems, by setting the temperature and the operating time slots. The device HEAT MANAGER works with Wi-Fi networks at 2,4 GHz. Main Features: Relay max 230V 16 A Wi-Fi 2,4 GHz; protection grade IP20. The measuring temperature range is from -55°C to +125°, with temperature range adjustable -55°C +100°C.

CORDIVARI HEAT MANAGER WITH 3 METERS PROBE

Art. nr.
5755280000031

10 METERS PROBE FOR CORDIVARI HEAT MANAGER

Art. nr.
5221000000104

www.cordivariheatmanager.com

SPARE PARTS AND ACCESSORIES FOR COMPACT SOLAR THERMAL

ACCESSORIES FOR STRATOS® DR

ELECTRICAL IMMERSION KIT IP65

Monophase Electrical heating as 1500W integration, set-point at 50°C, protection class IP65, safety thermostat manual reset



Art. nr.	Tension	Output	Set-point temperature	Connection
	Volt	[W]	[°C]	Gas M
5240000000061	220 V MONO PHASE	1500	50	1"1/4

ANTI-FREEZE ELECTRICAL IMMERSION KIT IP65

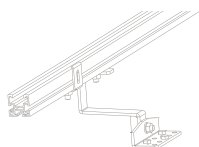
Anti-Freeze Electrical heating of 200W, set-point at 4°C, protection class IP65, it allows Stratos® DR system protection against freezing. It starts working when the Temperatures inside the storage falls below 4°C. If the environment temperature drops below -5°C, the system has to be drained and accurately protected following the user manual



Art. nr.	Tension	Output	Set-point temperature	Connection
	Volt	[W]	[°C]	Gas M
5240000000060	220 V MONO PHASE	200	4	1/2"

SUSPENDED FIXING KIT FOR PITCHED ROOFS

Suspended fixing kit for pitched roofs. It allows to direct the weight of the system to the roof framework instead to the roof



Art. nr.
5770001100885

STAINLESS STEEL PIT FOR TEMPERATURE PROBE WITH WATERTIGHT CABLE CLAMP

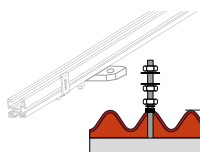
Stainless steel pit with 1/2" M thread, provided with watertight cable clamp for temperature probes to be mounted on solar collectors



Art. nr.
5775000000021
Kit of 3 pcs

INSULATED ROOF FIXING KIT

Fixing kit for insulated pitched roofs. It allows to mount the system on the roof, crossing the insulation without causing burden or damages



Art. nr.
5770001100886

30° SUPPORT KIT FOR STRATOS® DR

Support system for flat surfaces with 30° fixed inclination. Suitable to maximize the solar radiation as well as the output with low temperatures, especially during summer



Model	Art. nr.
110/150	5770001100906
180/220/260	5770001100902

PVC PROTECTION COVER

Cover for STRATOS® DR protection. Essential to protect the system in case it would be drained, during periods it is not working or after the installation before starting to work.



Model	Art. nr.
110	5775000000030
150	5775000000031
180	5775000000032
220	5775000000033
260	5775000000034



ACCESSORIES AND SPARE PARTS FOR NATURAL CIRCULATION SYSTEMS

ACCESSORIES AND SPARE PARTS **PANAREA**

PROTECTIVE COVER IN PVC



Cover and protection sheet for solar collectors. Indispensable to protect the system if it is emptied, in periods of inactivity, or in the post-installation phase, before commissioning

Model	Art. Nr.
SOLAR COLLECTOR 2 MQ	5775000000035
SOLAR COLLECTOR 2,5 MQ	5775000000036

MAGNESIUM ANODE 3/4"

Sacrificial magnesium anode with 3/4" connection suitable for cathodic protection of the solar Interka tank. Essential to protect the tank also from possible corruptions and stray currents.



For more information
see the Cordivari
CALORIFIERS catalogue.

ART. NR.	INTERKA PANAREA [litri]	[mm]
5200000041008	150	32x200
5200000041009	200-300	32x400

For INTERKA POLYWARM®. Kit of 2 pcs.

PRIMARY SAFETY VALVE

Safety valve for the primary circuit of the solar systems with thermosiphon circulation. Connections of 1/2"M and 1/2"F and calibration at 2,5 bar. This safety device is indispensable to avoid the overpressure of the primary circuit of the solar systems with thermosiphon circulation.



Art. Nr.
5775000000010

1/2"M x 1/2"F (calibrated at 2,5 bar)
Package of 5 pc.

SAFETY VALVE TP 1/2" M

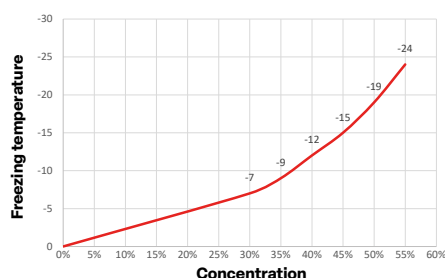
The safety valve TP combines the temperature and pressure control of the DHW storage tank. The safety device protects the solar systems with thermosiphon circulation from the excessive raising of one or the two factors in case of non-levy for long periods in situations of strong sun irradiation.



Art. Nr.
5302000000020

CONCENTRATED HEAT TRANSFER FLUID

Non-toxic biodegradable heat transfer fluid, propylene glycol-based. It is indicated for thermosiphon systems, it is safe thanks to its composition suitable for food applications, it also protects the primary circuit against corrosion as well as deposits and foams development. Concentrated fluid to be diluted



Art. Nr.	Package KG
5000500000004	10
5000500000006	5

ELECTRIC IMMERSION HEATERS

Monophase electric heater of 1500 watt with IP65 protection level, complete with protection cover against dirt, dust and UV rays. Useful as integration in systems with thermosiphon circulation. Connection of 1"1/4, manual reset, indicated for Interka solar tank.



Art. Nr.
5240000000073

IP65 1,5 kw 220v 1"1/4M with protection cover.

ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

PROTECTIVE COVER IN PVC



Cover and protection sheet for solar collectors. Indispensable to protect the system if it is emptied, in periods of inactivity, or in the post-installation phase, before commissioning. Suitable for both vertical and horizontal versions.

Model

Art. Nr.

SOLAR COLLECTOR 2,5 MQ 5775000000036

PROBES FOR BASIC CONTROL UNIT

Probes kit for BASIC control unit. The kit includes 2 temperature probes for the tank + 1 temperature probe for solar panel.



Art. Nr.

5755280000022

PROBES FOR PROFESSIONAL CONTROL UNIT

Kit of 4 replacement probes suitable for PROFESSIONAL control unit



Art. Nr.

5755280000023

SHIELDED CABLE

Electrical cable to extend the temperature probe length. This cable allows to extend the length of the different probes to the control unit, avoiding the signal loss. Cable 2x1mm.



Art. Nr.

5220000000021

Length 20 mt

JUNCTION BOX

In-wall junction box to easily and quickly connect the temperature probes cables thanks to the terminal block and the cables seal included



Art. Nr.

5775000000003

5 pcs box

OVERVOLTAGE PROTECTION

The junction box includes a power surge protection device. This accessory is essential to guarantee the solar control unit protection and safety against power surge or electrical discharges caused by lightning



Art. Nr.

5775000000004

2 pcs box



ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

ELECTRIC IMMERSION HEATERS

Electrical heating can be used as integration on calorifiers and tanks, stainless steel heaters, protection class min IP44, supplied with thermostat, safety thermostat with manual reset and 2 mt of electrical cable wired and without plug.



For more information
see the Cordivari
CALORIFIERS catalogue.

Art. Nr.	Tension	Power	Lenght L	Connection R
	Volt	[Kw]	[mm]	Gas M
52400000000051	220 V MONOPHASE	1,5	320	1"1/2
52400000000052		2	320	
52400000000053		3	320	

24L EXPANSION VESSEL KIT

Expansion vessel kit 1x24 Lt consisting of:
Expansion vessel - Flexible pipe, fixing bracket and fittings



Liters	Art. Nr.
24	5765000000101

EXPANSION VESSEL KIT SOLAR

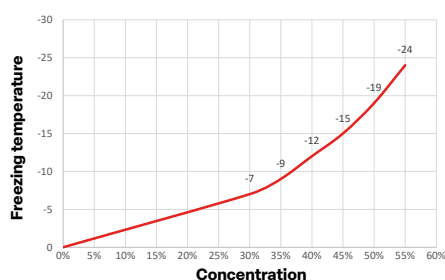
The kit includes:
- expansion vessel - flexible pipe and fittings



Liters	System Dimension	Art. Nr.
50	for systems with solar collector surface from 12.5 to 25 m ²	5765000000104
80	for systems with solar collector surface 30 m ²	5765000000105
100	for systems with solar collector surface from 37.5 to 45 m ²	5765000000106
200	for systems with solar collector surface from 45 to 50 m ²	5765000000107

CONCENTRATED HEAT TRANSFER FLUID

Non-toxic biodegradable heat transfer fluid, propylene glycol-based. It is indicated for thermosiphon systems, it is safe thanks to its composition suitable for food applications, it also protects the primary circuit against corrosion as well as deposits and foams development. Concentrated fluid to be diluted



Art. Nr.	Package KG
50005000000004	10
50005000000006	5

ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

CASE WITH MEASUREMENT AND PARAMETERS CHECK TOOLS FOR THERMAL SOLAR SYSTEM

Components: pressure gauge, test jar, refractometer, pH test strips, digital multimeter, monitoring and warning labels, compass, distilled water and tools



Art. Nr.

5765000000401

SOLAR COLLECTORS REFILLING SYSTEM

The kit is made of:

- cart with 30 L can
- self-priming pump (230V - Pmax 5,9 bar)
- Heat resistant pipe (from -40°C to +60°C)



Art. Nr.

5765000001001

FLOW REGULATOR

Flow regulator for circulation groups



Art. Nr.	Flow rate Lt/min
50460000000035	2 ÷ 12
50460000000036	20 ÷ 70
50460000000037	8 ÷ 28
50460000000038	8 ÷ 38

STRAIGHT TRANSITION FITTING

Copper tube / corrugated steel tube

Welded fitting, essential for connecting copper pipes to the corrugated stainless steel flexible tube in the primary circuit.

The fitting features a male thread with a flat stop.



Art. Nr.	Type
57750000000012	Ø 22 - 3/4"

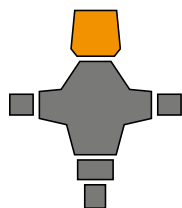
2 pcs box



ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

THERMOSTATIC MIXING VALVE

Thermostatic mixing valve for solar systems



Art. Nr.	Connections
5750000000001	3/4"
5750000000003	1"

THERMOSTATIC SWITCH VALVE

Auto-operated thermostatic switch valve, calibrated at 45°C. It can easily integrate solar thermal systems for DHW production with a boiler.



Art. Nr.	Connection size
5046000000007	3/4"
5046000000008	1"

BALANCING VALVE WITH FLOWMETER

The balancing valve for hydraulic primary circuit can settle the flow rate on single collectors rows in order to get the correct flow on every string of solar collectors with the purpose of an optimal thermal exchange. This accessory made in brass allows the flow regulation and direct control thanks to the graduated flow meter and the magnetic flow indicator.



Art. Nr.
5046000000023

MOTORIZED 3-WAY VALVE

Motorized 3-Way Valve - Pmax 10 bar, Tmax 110°C, IP40, 1" F connections, with insulation.



Art. Nr.	Connection size
5046000000050	1"

PRE-INSULATED PIPE EXTENSION KIT



Art. Nr.	Connection	Diameter Ø [mm]
5775000000005	3/4"	16
5775000000006	1"	20

ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

SOCKETS FOR TEMPERATURE PROBE ON SOLAR COLLECTORS

Nickel plated copper probe socket with male 1/2" thread to add temperature probes in solar collectors, sealing cable clamp included.



Art. Nr.

5775000000001

3 pcs box

COPPER SOCKET FOR PROBE

Copper probe socket with male 1/2" thread to add temperature probes in tanks.



Art. Nr.

5775000000011

5 pcs box

MANUAL AIR VENT

Manual air vent for solar systems (1/2" M connection)



Art. Nr.

5775000000002

5 pcs box

PRE-INSULATED PIPE

Flexible AISI 316L stainless steel corrugated pipe, with 13mm EPDM insulation at high efficiency, with protection against UV finishing. The pre-insulated pipe integrates the silicone sensor cable for temperature probe. This accessory is useful to easily and quickly create the connections of solar primary circuit.



Art. Nr.

Lenght
[mt]

Diameter Ø
[mm]

5768000010001

10

16

5768000010002

15

16

5768000010003

10

20

5768000010004

15

20



ACCESSORIES AND SPARE PARTS FOR FORCED CIRCULATION SYSTEMS

FITTINGS KIT

- 1 x 1/2" brass cross fitting F/F/F/F
- 2 x compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread
- 1 x 1/2 M manual air vent
- 1 x 1/2" well probe H 150 with cable clamp and silicone gasket



FITTINGS KIT SUITABLE FOR SYSTEM WITH:	Art. Nr.	Components
1x1 Collector	5765000000202	• 1 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85
1x2 Collectors	5765000000203	• 2 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85
1x3 Collectors	5765000000211	• 3 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85
2x2 Collectors	5765000000216	• 5 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85
1x5 Collectors		
1x4 Collectors	5765000000221	• 4 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 3 X bulb in sheath stop spring • 3 X socket probe 1/2" gas connection 10x11 l.85
2x3 Collectors	5765000000311	• 7 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85
2x4 Collectors	5765000000231	• 9 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 3 X bulb in sheath stop spring • 3 X socket probe 1/2" gas connection 10x11 l.85
2x5 Collectors	5765000000321	• 11 Compression fitting with metallic sleeve Ø 22 Dir.F/1/2" Male thread • 2 X bulb in sheath stop spring • 2 X socket probe 1/2" gas connection 10x11 l.85

TECHNICAL SUPPORT



SOLAR ENERGY

GENERAL INDICATION FOR DIMENSIONING A SOLAR THERMAL SYSTEM (*)

With a simple calculation it is possible to determine the number of solar collectors needed for a domestic hot water system. The surface of the Cordivari solar collectors is equal to the number of people living in the house.

SQM = P

For instance, a family composed of 4 persons will need 4 sqm of solar absorbing surface.

It is possible to calculate the volume needed for a domestic hot water system multiplying the surface of the collectors times 50:

V = 50 x SQM

Following the previous example we will need: $50 \times 4 = 200$ liters

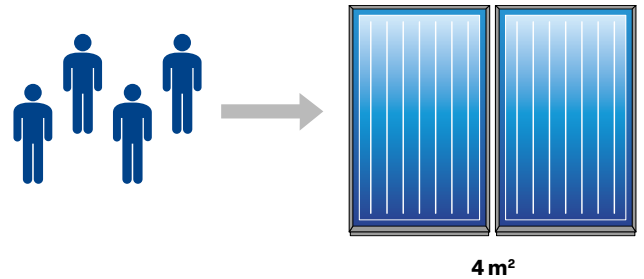
LEGEND

SQM = squared meters of the solar collectors

P = number of persons living in the house

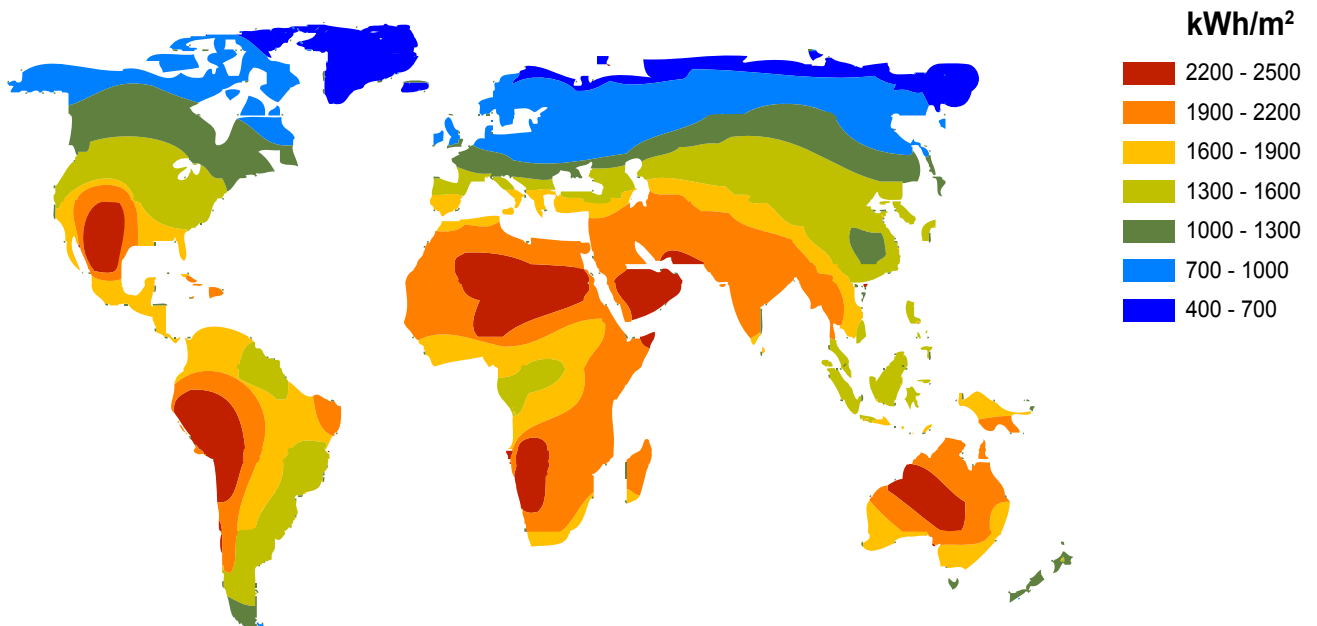
V = minimum accumulation volume for domestic hot water

(*) The calculation proposed is merely indicative and cannot take into consideration multiple variables (place, inclination, orientation, etc.). Always refer to a qualified designer for the detailed calculation of the most suitable system according to the specific parameters of the installation.



SOLAR ANNUAL RADIATION AND SOLAR THERMAL ENERGY

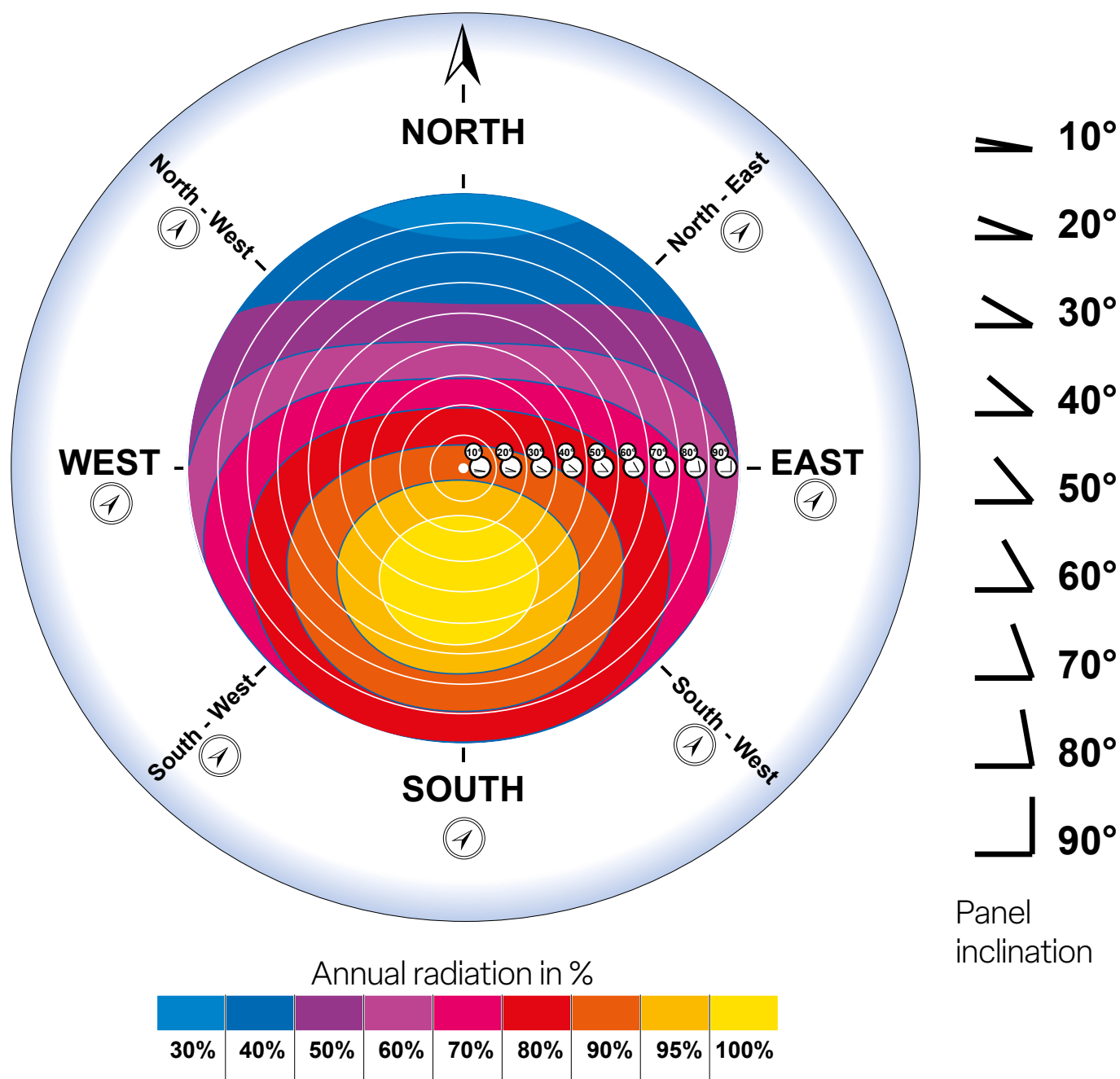
Global solar radiation kW/hm² – (source ENEA)



SOLAR ENERGY

SOLAR RADIATION SCHEME

To estimate the solar radiation loss on the solar collectors according to their orientation and inclination, it is necessary to obtain a diagram similar to the following, which must be realized for each specific place



The above graph refers to a place in central Italy (latitude 42°) and gives information about the percentage of annual solar radiation on the collectors at the best conditions.

According to this specific example, the optimum installation is with collectors oriented to south and inclined to the same angle of the latitude (in this case 42°). Under these conditions the annual solar radiation will

be at its maximum (100%).

A different orientation and inclination of the solar collectors will result into a different position on the diagram, having a different color; using the color scale it is possible to identify the correspondent annual solar radiation referred to the maximum conditions.

SOLAR ENERGY

ORIENTATION AND INCLINATION OF THE SOLAR COLLECTORS

The effective solar radiation available on a square meter of solar collector depends on:

- Inclination of the solar collector
- Orientation of the solar collector

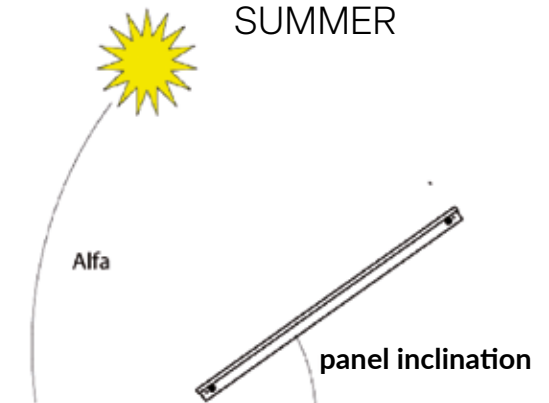
In general, the solar radiation that hits a squared meter of solar collector in any day of any month can be higher, lower or equal to the radiation calculated on the horizontal plane.

The norm UNI 8477 gives information on how it is possible to calculate the available solar radiation for any orientation and inclination. It can be easily understood that during Winter period (when the sun is lower on the horizon), an inclined surface will receive more radiations compared to a similar surface positioned horizontally (or with a lower inclination). On the contrary, during Summer period (when the sun is higher on the horizon), a less inclined surface will receive a higher quantity of energy compared to the same surface positioned vertically (or with a higher inclination).

WINTER

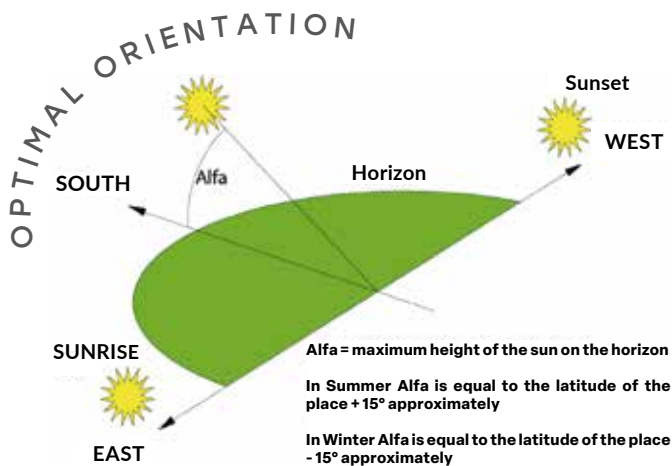


SUMMER



The Sun raises in the East, reaches its highest position in the South and sets in the West. Moreover, when the Sun is at its highest on the horizon the solar radiation has to cross a thinner atmosphere layer compared to when it is lower. For these reasons the optimal orientation for the solar collector is South. An important characteristic of the solar collectors is that they can exploit also the diffuse solar radiation (hence also the radiation the hits the collectors not directly from the Sun); this characteristic makes the solar collectors more flexible and less sensible to small deviations from the optimal orientation. It is proven that the same surface which is optimally oriented to the South loses 15% of its efficiency if it is oriented to the East or to the West. This loss can be easily compensated during the design phase.

The orientation of the collector is also affected by its inclinations: collectors with low inclination are almost uninfluenced by the orientation, while collectors with higher inclination suffer more if the orientation is not optimized.



INCLINATION OF SOLAR COLLECTORS

SUMMER PERIOD	$L - 15^\circ$
OVER THE YEAR	$L \pm 15^\circ$
WINTER PERIOD	$L + 15^\circ$

L= LATITUDE

INSTALLATION ON PITCHED ROOF

If the collector is installed on a PITCHED ROOF, the inclination will be influenced by the inclination of the roof (using the fixing kit Cordivari the collector is mounted in parallel to the roof). Knowing this, during the designing phase it will be possible to adapt the total surface of the collectors according to the specific installation needs.

INSTALLATION ON FLAT ROOF

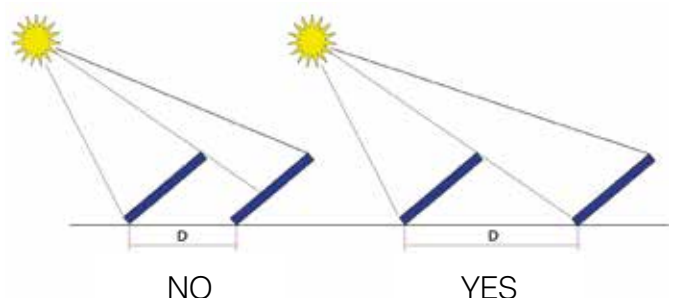
If the collector is installed on a FLAT ROOF (terrace, garden, or any other flat area), the fixing kit will be provided with a 40° angulation for the NATURAL systems, and with 45° angulation for the FORCED CIRCULATION systems.

POSITION OF THE SOLAR COLLECTORS ON FLAT SURFACE

The position of the solar collectors on a flat surface has to be carefully studied, in order to avoid that the shade of one may cover the other

The distance D will vary according to:

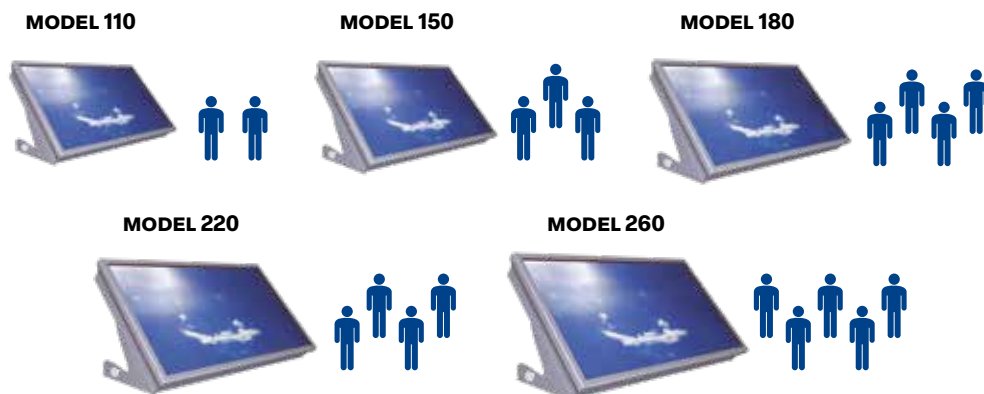
- PLACE (the height of the Sun varies according to the place, and as a consequence also the shade effect)
- PERIOD OF USE (Summer, annual or Winter, also in this case the height of the Sun varies)
- INCLINATION OF SOLAR COLLECTORS
- SIZE OF THE SOLAR COLLECTOR (the shade will vary according to the size of the collectors)



CHOICE OF THE SYSTEM – NATURAL CIRCULATION

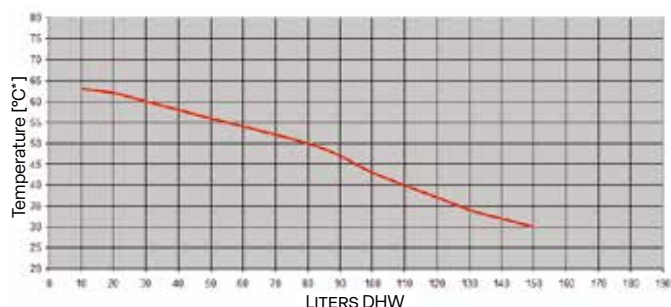
STRATOS® DR SYSTEM – NATURAL CIRCULATION – CHOICE OF THE SYSTEM

For a better overall system performance, we recommend installing Stratos® Dr in areas with high annual solar radiation (at least 1500 W/sqm per year). In such areas, the capacity to cover the needs of 3 persons for model 150 and 4 persons for model 220 is estimated.



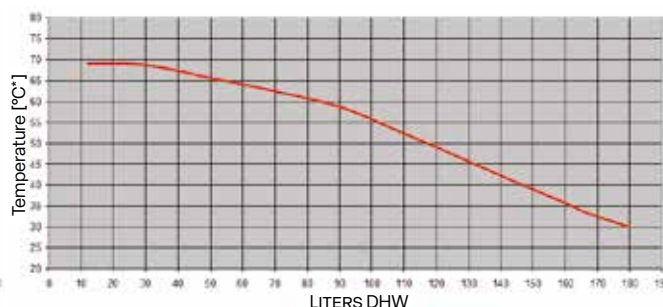
DHW CONSUMPTION TEST

TEST PERFORMED IN FEBRUARY



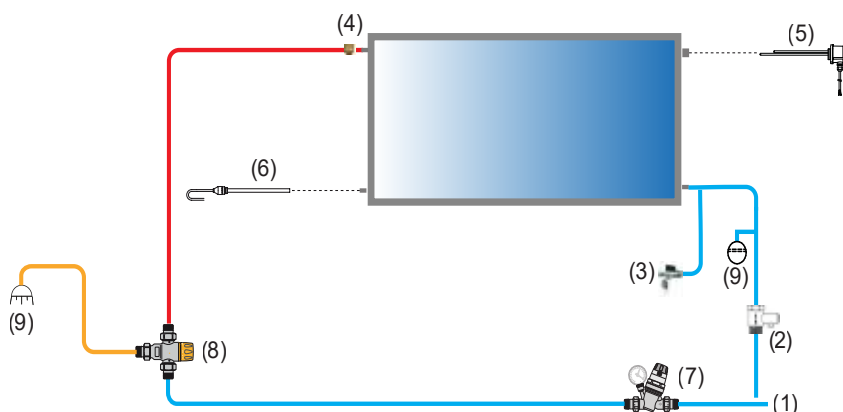
The graph shows the results of the domestic hot water consumption test performed on a Stratos DR 150 system installed in central Italy (latitude 42° North). Average of the results collected in a period of the month of February. On the horizontal axis there is the amount of consumed water expressed in liters in relation to the temperature measured on the outlet.

TEST PERFORMED IN MAY



The graph shows the results of the domestic hot water consumption test performed on a Stratos DR 150 system installed in central Italy (latitude 42° North). Average of the results collected in a period of the month of May. On the horizontal axis there is the amount of consumed water expressed in liters in relation to the temperature measured on the outlet.

TYPICAL INSTALLATION SCHEME



INSTALLATION SCHEME FOR MODELS 110/180/260

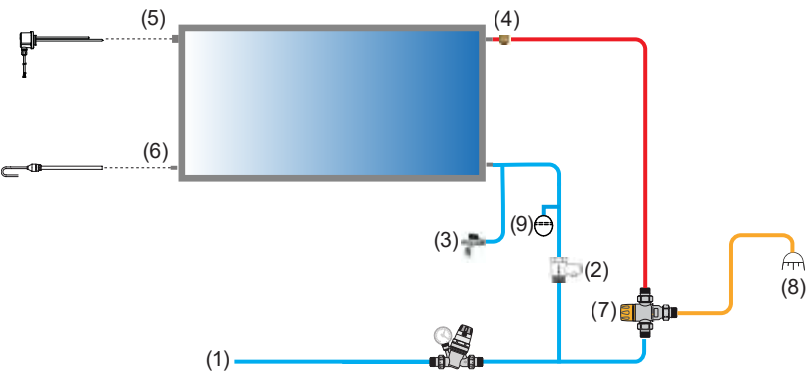
CONNECTION LEGEND

- 1** Domestic cold water inlet. If the pressure exceeds 4 bar, insert a pressure reducer. The water must be treated according to UNI 8065 standard and the adduction installation must be built according to UNI EN 806
- 2** 6 bar safety and non-return valve (included)
- 3** Drain tap for panel emptying (to be provided by the installer)
- 4** Vacuum break valve (included)
- 5** 1"1/4 gas F connection for integration of electrical immersion heater (to be ordered separately)
- 6** 1/2" gas F connection for anti-freeze Electrical heating (to be ordered separately)
- 7** Thermostatic mixing valve (to be ordered separately)
- 8** User
- 9** Expansion vessel

For other schemes with preheating functions, please refer to the section TECHNICAL SUPPORT

CHOICE OF THE SYSTEM – NATURAL CIRCULATION

TYPICAL INSTALLATION SCHEME



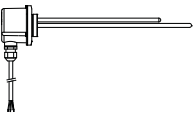
INSTALLATION SCHEME FOR MODELS 150/220

CONNECTION LEGEND

1	Domestic cold water inlet. If the pressure exceeds 4 bar, insert a pressure reducer. The water must be treated according to UNI 8065 standard and the adduction installation must be built according to UNI EN 806
2	6 bar safety and non-return valve (included)
3	Drain tap for panel emptying (to be provided by the installer)
4	Vacuum break valve (included)
5	1"1/4 gas F connection for integration of electrical immersion heater (to be ordered separately)
6	1/2" gas F connection for anti-freeze Electrical heating (to be ordered separately)
7	Thermostatic mixing valve (to be ordered separately)
8	User
9	Expansion vessel

For other schemes with preheating functions, please refer to the section TECHNICAL SUPPORT

ANTI-FREEZE PROTECTION AND USE OF HEATING ELEMENT



ELECTRIC IMMERSION HEATERS

HEATING ELEMENT

It is possible to integrate the STRATOS® DR with an electric heating element. The heater is equipped with a comfort temperature regulation thermostat as well as a manual safety reset thermostat. The use of the heating element guarantees DHW available at a comfortable temperature able to meet the minimum requirements of the user.



ANTI-FREEZE HEATING ELEMENT

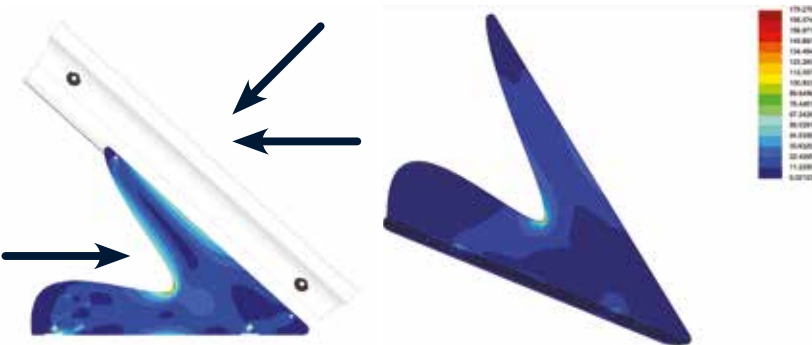
ANTI-FREEZE HEATING ELEMENT

The STRATOS® DR system must be installed in areas free from frost risk. If this does not happen and in any case when it is exposed to temperatures below 0 °C (and in any case not below than -5 °C) the installation and use of the anti-freeze safety heater element is necessary. If the temperature falls below -5°C the system must be emptied and suitably covered and protected. Always refer to the installation manual provided with the product.

ANCHORAGE AND INSTALLATION WITH WINDPROOF BALLAST

The STRATOS® fixing systems, thanks to their specific design are extremely efficient and safe in all circumstances. Design studies and simulations carried out with the aid of highly sophisticated computer simulations such as the FEM, do not show structural criticalities and provide excellent resistance results to wind and snow loads, even in the most unfavorable conditions. The STRATOS® system if installed on flat surfaces must be secured to the ground to prevent any risk

of overturning due to wind forces. Fixing kits for flat surfaces allow anchoring directly to the ground through bolting with screws and dowels. If it is not possible to drill the support surfaces it is necessary to anchor the system through the fixing on ballast in solid and compact material with adequate overall weight. Always refer to the installation manual provided with the product.



SIMULATION WITH REM ANALYSIS OF WIND AND SNOW LOAD



INSTALLATION WITH WINDPROOF BALLAST

CONNECTION OF SYSTEMS - NATURAL CIRCULATION

The fundamental components of a SOLAR THERMAL SYSTEM are essentially 2:

1. Solar collectors
2. Tank

If the installation foresees more than one collector or tank, it is necessary to evaluate how to connect the multiple collectors and tanks. The systems for preparation of domestic hot water are divided into NATURAL and FORCED circulation.

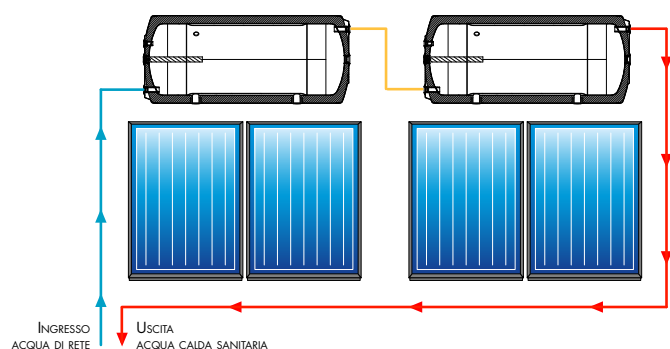
In Thermosiphon systems it is possible to connect multiple complete systems. It is important to underline that the collectors will be linked solely to their correspondent tank, while the tanks will be connected on the sanitary circuit. In these cases the multiple connections will involve only the inlet for cold water and the outlet for hot water of the double walled tanks.

Three options are available:

- Connection in series
- Connection in parallel
- Mixed connection (series and parallel)



CONNECTION IN SERIES



In the series connection the tap water enters the first tank, and the hot water outlet of this tank will be connected to the cold water inlet for the second, continuing until the last tank where the hot water will go directly to the final user.

In this type of connection it is possible to achieve high temperature of sanitary water, but the overall efficiency of the system is reduced because the downstream kits will have to work with higher temperatures, with relevant higher thermal loss of the tanks and solar collectors. The Best Practice in design suggests to not to link more than 2-3 systems in series.

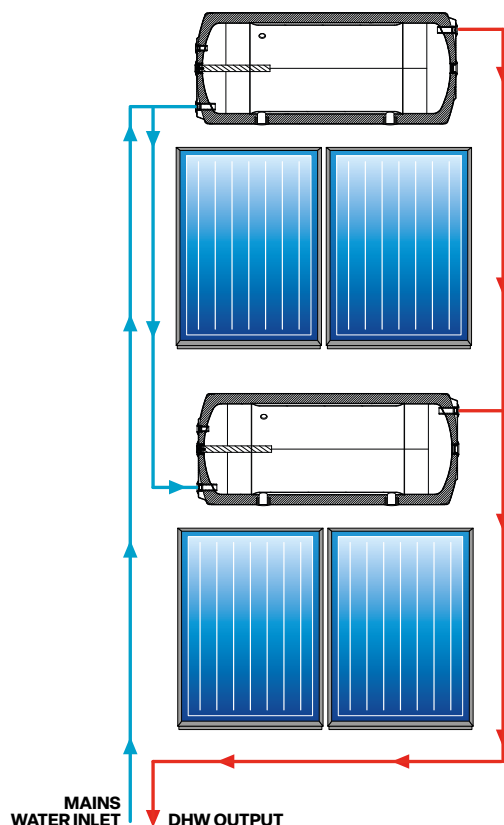
NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

PARALLEL CONNECTION

In parallel connection the tap water will enter into all the cold water inlet of the tanks, while all the hot water outlets will be directed to the final user.

In this kind of installation there is a larger quantity of domestic hot water available, and because of the larger flow rates it is necessary to foresee larger pipes to keep a sustainable circulation of the water.

In order not to favor one tank instead of another, it will be necessary to balance the system providing the inversed return circulation. The flow rate must be equal for each tank. The design will evaluate the maximum number of systems to be connected in parallel, also considering the economic viability of the project.



NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

CONNECTION OF SYSTEMS - FORCED CIRCULATION

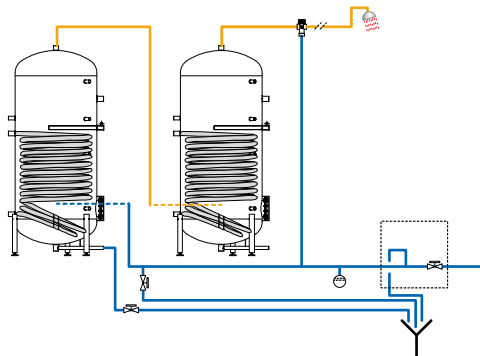
FORCED CIRCULATION SYSTEMS

In forced circulation systems it is possible to obtain larger installation by increasing the number of solar collectors or by using bigger tanks or more tanks connected. In this case, all the collectors are linked to the tank (or tanks). It is important to establish how to connect the collectors and the tanks among them. The subject is quite complex and cannot be completely explained in this catalog, but some indications can be given. The connection of the tanks follows similar rules that have been explained in the thermosiphon system section: it is possible to make series or parallel connections, and several other variants can be evaluated by the designer according to the specific installation needs.



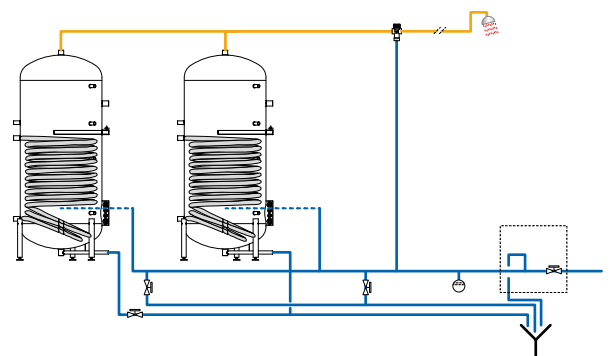
CONNECTION OF THE TANKS IN SERIES

In the series connection of the tanks the tap water will enter only in the first tank, while the domestic hot water outlet will be connected to the cold water inlet of the following tank, until the last tank is reached and will provide domestic hot water directly to the final user.



CONNECTION OF THE TANKS IN PARALLEL

In the parallel connection of the tanks the tap water will enter into all the tanks and all the hot water outlet will be directed to the user.

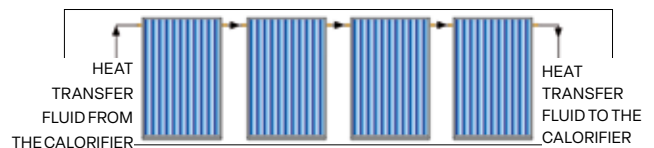
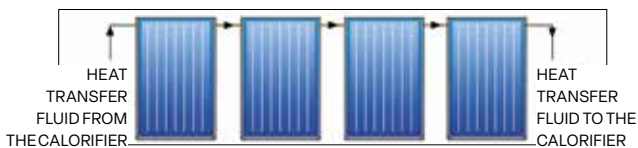


NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

CONNECTION IN SERIES OF FLAT AND VACUUM SOLAR COLLECTORS

The solar collector connection follows similar rules to those illustrated for thermosiphon systems. Also in this case it is possible to connect the collectors in series, in parallel or in mixed solutions. The below examples are for CORDIVARI collectors specific for FORCED CIRCULATION systems, variant V5. The series connection favors the raise of the temperature of the heat transfer fluid, optimizing the exchange with

domestic water, but reducing the efficiency of the downstream collectors that, because of their high temperatures, will have higher thermal loss with the external environment. In this case the best practice suggests to not to connect more than 5 collectors in series among them.

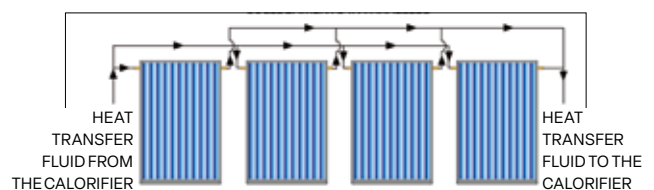
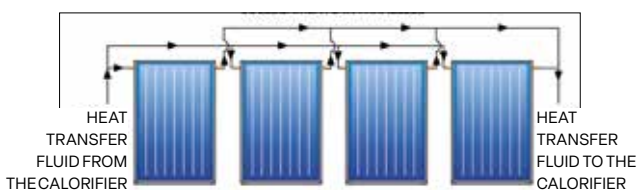


NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

PARALLEL CONNECTION OF FLAT AND VACUUM SOLAR COLLECTORS

The parallel connection allows to have higher flow rates of heat transfer fluid, hence higher amount of producible hot water. On the other hand, higher flow rates require larger diameter of the pipes and of the control

units, that result in the higher cost of the system. Also, in this case the designer will evaluate the maximum number of solar collectors to be linked in parallel.



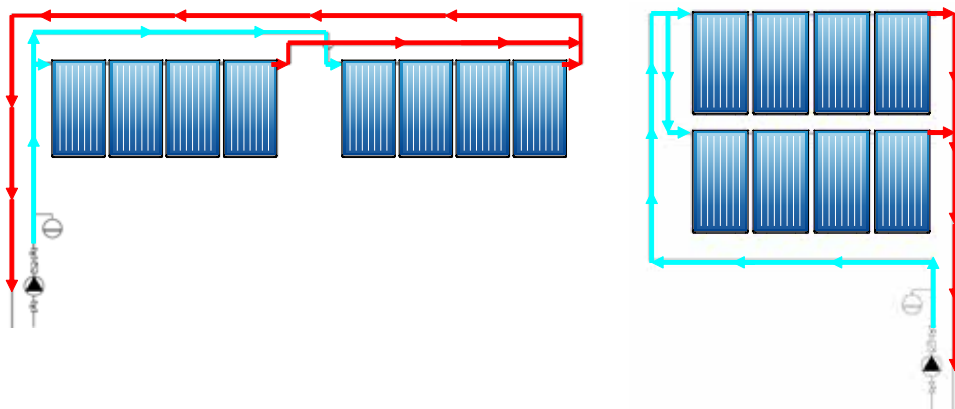
NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

CONNECTION OF FORCED CIRCULATION SYSTEMS

HYDRAULIC BALANCING

The mixed connection represents the optimal compromise, using string of collectors connected in series and then in parallel among them. In the mixed series-parallel connection it is fundamental to pay attention to the pipes system that will connect the collectors. The length of the pipes

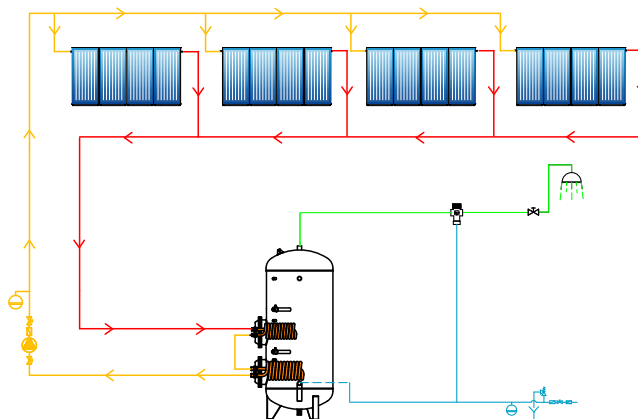
and the pressure loss balance will have to be particularly studied, so to avoid that the heat transfer fluid follows a preferred path unbalancing the system.



NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

The above pictures show two examples of balanced systems, the one on the left has two strings of 4 collectors put one beside the other, while the second shows two strings one above the other. In these circuits the total

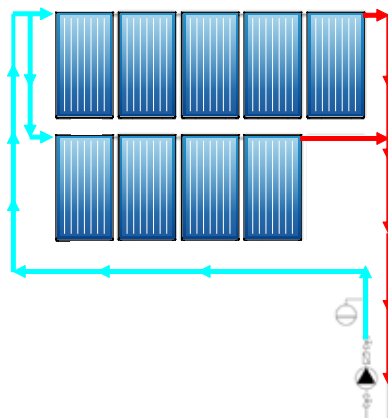
flow rate of the heat transfer fluid is equally distributed on each collector string.



NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

The last picture show a wrong installation, where it clear a thermodynamic disequilibrium: the circulation of the heat transfer fluid in the last strings, that have higher pressure losses (local or distributed), tends to go into overheating with thermal output close to zero. In this case it is possible to

correct the system by adding to the primary circuit balancing valves that allow to regulate precisely the flow rate for each string of collectors. In particular, the balancing valve is necessary to connect strings composed of a different number of solar collectors (see pictures below).



NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

CONNECTION OF FORCED CIRCULATION SYSTEMS

FLOW RATE OF THE HEAT TRANSFER FLUID ON FORCED CIRCULATION SYSTEMS

PIPES OF THE PRIMARY CIRCUIT

The connection pipes between solar collectors, circulator and exchanger with the accumulation tank, must be in material suitable for high temperatures that can be achieved in this type of installation. In this case do not use pipes in plastic or galvanized steel. Cordivari suggest pre-insulated piping in stainless steel to realize the connections between collectors and calorifiers.

The table refers to minimum suggested diameters for copper pipes to be welded.

TOTAL SURFACE AREA COLLECTORS	PIPES DIAMETER	CORRUGATED DIAMETER
	[mm]	[mm]
Up to 6 m ²	18	1/2"
Above 6 m ² e up to 25 m ²	22	3/4"
Above 25 m ² e up to 50 m ²	28	1"
Above 50 m ² e up to 75 m ²	35	1" 1/4
Above 75 m ²	42	1" 1/2

FLOW RATE IN FORCED CIRCULATION SYSTEMS

The flow rate of the primary circuit which connects the collectors to the calorifier in forced circulation solar thermal systems is a very important parameter. The right flow rate will ensure the most efficient exchange between the panel and the domestic hot water, keeping the temperature in the collector low enough to limit thermal losses, and keeping the heat transfer fluid temperature high enough to allow a good thermal exchange with the domestic hot water.

$$I * \eta = \frac{Q * Mv * C * \Delta T}{60}$$

Follows:

$$Q = \frac{60 * I * \eta}{Mv * C * \Delta T}$$

With:

I = radiation on the collector [Watts/m²]

η = solar collector efficiency

Q = flow rate circulating in a square meter of the collector [lt/min m²]

Mv = density of the heat transfer fluid = 1 kg/lt

C = specific heat of the heat transfer fluid = 4000 Joule/Kg °C

ΔT = thermal jump of the heat transfer fluid in the panel = 10°C

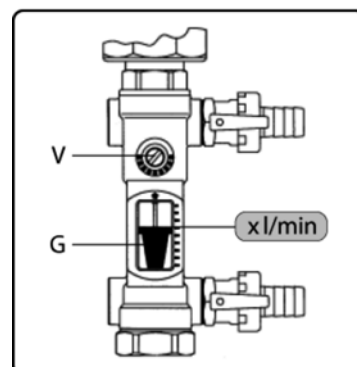
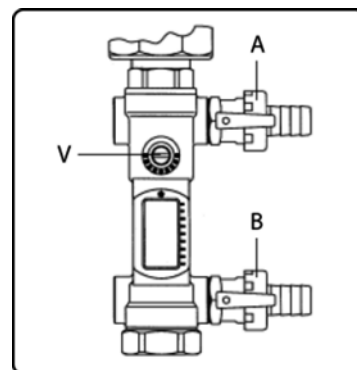
REGULATION OF THE FLOW RATE

The suggested flow rate on forced circulation systems is between 20 and 40 lt/h for each squared meter of solar collector. It is often necessary to regulate the flow rate on each system, increasing the flow rate in case of excessive difference between the temperature of the collectors and the temperature of the tanks (in the opposite case, it will be necessary to decrease the temperature).

For the regulation of the flow rate proceed as follow:

- activate the circulator at speed 1
- set the flow rate regulator at the maximum flow rate using a slotted screwdriver to regulate the device placed between the load and drain valves, if the required flow rate is lower than the one achieved regulate accordingly;
- if the first speed of the circulator is not sufficient, proceed with speed 2 and repeat the previous steps
- if speed 2 is not sufficient, proceed with speed 3 and repeat the previous steps

Note: at commissioning, also with an adequate solar radiation, the system will need some time to win the thermal inertia and run normally. Usually the hot water is available after one day from the installation.



Note:

at commissioning, also with an adequate solar radiation, the system will need some time to win the thermal inertia and run normally. Usually the hot water is available after one day from the installation

FLAT PLATE SOLAR COLLECTORS FOR DHW PRODUCTION

The calculation of the required solar collector surface area is usually carried out assuming 100% coverage in the month of highest insolation (July).

Calculate the amount of domestic hot water to be produced, depending on the user and using the tables in the bibliography:

USER	LITERS/DAY PER PERSON	KCAL/DAY PER PERSON	MJ/DAY PER PERSON	KWH/DAY PER PERSON	NOTE LITERS/DAY PER PERSON
House	50	1750	7,33	2,04	-
Hospital	60	2100	8,79	2,44	Per bed
Inn	40	1400	5,86	1,63	-
School	5	175	0,73	0,20	-
Army camp	30	1050	4,40	1,22	-
Industry	20	700	2,93	0,81	-
Office	5	175	0,73	0,20	-
Camping	30	1050	4,40	1,22	Per person
Hotel High cat.	160	5600	23,45	6,51	Per room
Hotel low cat.	100	3500	14,65	4,07	Per room
Gym	35	1225	5,13	1,42	Per user
Laundry	6	210	0,88	0,24	Per kg washed
Restaurant	10	350	1,47	0,41	Per meal
Bar	2	70	0,29	0,08	Per consumption

*Assumes an inlet water temperature of 10 °C and a supply water temperature of 45 °C.

The user's daily energy demand is calculated as follows, depending on the desired unit of measurement.

$$\text{ENERGY} = \text{LITERS} \times (\text{TH} - \text{TC}) \times \begin{cases} 1 \text{ [Kcal]} \\ 0,001163 \text{ [KWh]} \\ 0,004187 \text{ [MJ]} \\ 3,9683 \text{ [Btu]} \end{cases}$$

TH = Hot water temperature

TC = Cold water temperature



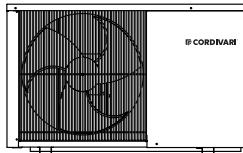
DIMENSIONING OF BUFFER TANKS

The calculation of a buffer tank's volume depends on the type and on the potential of the heat generators. The installation of a buffer tank has a double function, as it allows the generator to work regularly by limiting the number of interruptions, and it also constitute a thermal flywheel for the heating system, improving the overall comfort of the installation. Cordivari offers a wide range of buffer tanks, providing besides the mainstream version also combined solutions ideal for production of domestic hot

water. The wide spectrum of products available is characterized by advanced technology that allow a strong thermal stratification, to consistently reduce the energy consumption.

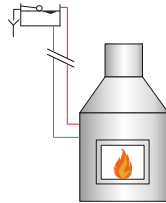
For calculation purposes we give an indication of the volumetric ratios according to the thermal potential of various sources with non-continuous operation. These suggestions are merely indicative and cannot substitute a closer evaluation made by a qualified technician.

HEAT PUMP



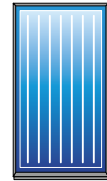
1 kw-10÷15 liters

FIREPLACE STOVE



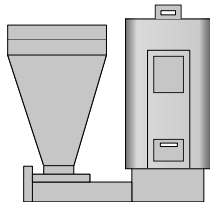
1 Kw-30÷50 liters

FLAT SOLAR COLLECTOR



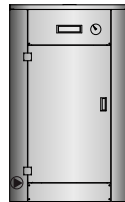
1 mq-50÷65 liters

POLYCOMBUSTIBLE BOILER



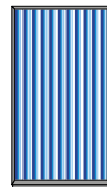
1 Kw-20 liters

PELLET STOVE



1 Kw-20 liters

VACUUM SOLAR COLLECTOR



1 mq-50÷75 liters

DIMENSIONING OF THE EXPANSION VESSEL FORCED CIRCULATION SYSTEMS

The expansion vessel has a key function for the primary circuit of a solar thermal system with forced circulation (generally speaking, expansion vessels are

important in any heating system). To calculate the nominal volume of the vessel refer to the following formula:

$$V_n = (V_u \cdot (P_f + 1)) / (P_f - P_i)$$

Where :

V_n = nominal volume of the Expansion vessel [lt]

V_u = useful volume of the Expansion vessel = $V_u = (\Delta V + V_c) \cdot 1,1$ [lt]

P_f = maximum working pressure of the solar thermal system: to be considered in the designing phase of the project according to the characteristics of the materials used and the safety devices installed = 5,5 [bar]

P_i = loading pressure of the solar thermal system: linked to the difference in level between solar collectors and expansion vessel

(approximately 1 bar each 10

meters) plus a safety coefficient; in domestic systems the cold water loading pressure is about 2,5 [bar]

With:

ΔV = variation of the volume of the fluid = $e \cdot V_f$ [lt]

V_c = fluid contained in the solar collectors [lt]

In which:

e = heat transfer fluid coefficient of cubic expansion = 0,07

V_f = heat transfer fluid contained in the system



fluid content in solar collectors
fluid content in pipes
fluid content in heat exchangers
fluid content in other components

$$\frac{V_C + V_T + V_S + V_A}{V_F}$$

The preload value of the expansion vessel will be 0,3-0,5 bar less than pressure P_i .

EXAMPLE

SOLAR THERMAL SYSTEM 500B2-10 TF

- 4 SOLAR COLLECTORS 2,5 MQ

- 1 CALORIFIER BOLLY® 2 500 LT

- 1 BASIC CIRCULATION GROUP

- 30 MT COPPER PIPE (SUPPLY + RETURN) D. 22 MM

To determine the necessary volume of the expansion vessel

$$V_F = (V_C + V_T + V_S + V_A) - 31 \text{ LT}$$

$$\Delta V = e \cdot V_F = (0,07 \cdot 31) = 2,17 \text{ LITERS}$$

$$V_U = (\Delta V + V_C) \cdot 1,1 = (2,17 + 3,8) \cdot 1,1 = 10,75 \text{ LITERS}$$

$$V_N = V_U \cdot (P_f + 1) / (P_f - P_i) = 6,56 \cdot (5,5 + 1) / (5,5 - 2,5) = 23,30 \text{ LITERS} \rightarrow 24 > \text{LITERS EXPANSION VESSEL}$$



FLAT SOLAR COLLECTORS FOR HEATING OF SWIMMING POOL

One of the most common applications of solar thermal systems is the heating of in-ground swimming pools.

The use of solar collectors is particularly convenient for outdoor swimming pool during Spring-Summer-Autumn, or indoor pools in general.

For domestic use swimming pools it is always recommended to provide a back-up boiler for:

- START-UP: the first heating period of the mass of water from the tap water temperature to the desired comfort;

- INTEGRATION: to ensure the comfort temperature also when the wheatear is cloudy

In maintaining mode, the solar collectors will be dimensioned considering the thermal loss of the swimming pool. Those can be of three types:

1. Thermal loss through the surface of the water (P1)
2. Thermal loss through lateral walls (P2)
3. Thermal loss through the bottom of the pool (P3)

It is possible to have an approximate calculation of the thermal loss as follow:

$$P_{tot} = P_1 + P_2 + P_3 \quad [Kcal/h]$$

$$P_1 = (109 + 8,9 * (T_{comfort} - T_{ambiente})) * S_{specchio} \quad [Kcal/h]$$

$$P_2 = (1,1 * (T_{comfort} - T_{terreno})) * S_{pareti} \quad [Kcal/h]$$

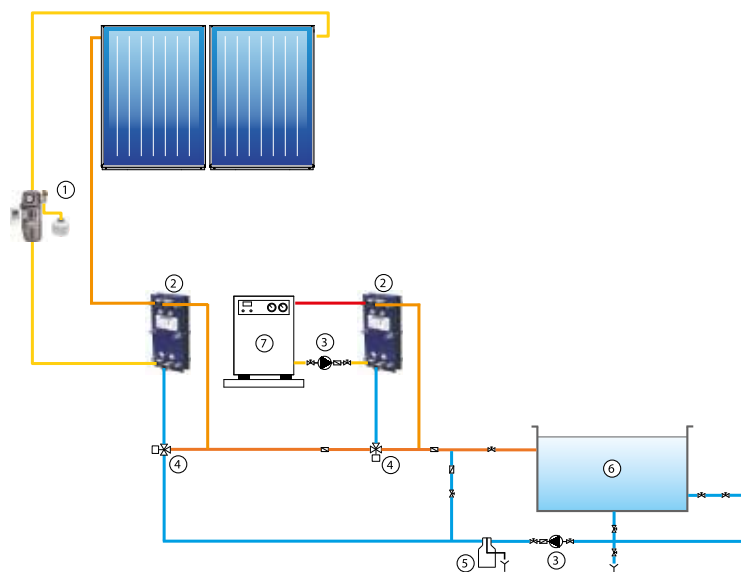
$$P_3 = (T_{comfort} - T_{terreno}) * S_{fondo} \quad [Kcal/h]$$

LEGEND

- | | |
|---|-------------------------------|
| 1 | Solar field circulation group |
| 2 | Plate exchanger |
| 3 | Pump |
| 4 | Motorised 3-way valve |
| 5 | Swimming poll filter |
| 6 | Swimming pool |
| 7 | Supplementary boiler |

THERMAL PROGRAM

	FLUID	IN	OUT
PRIMARY	GLIC. 40%	55	35
SECONDARY	H ₂ O	29	33



NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog

Tcomfort = desired temperature of the swimming pool water [°C]

Tenvironment = air temperature around the swimming pool [°C]

Tground = ground temperature [°C]

Ssurface = water surface of the swimming pool [mq]

Swalls = Surface of the lateral walls of the swimming pool [mq]

Sbottom = Surface of the bottom of the swimming pool (equal to Ssurface) [mq]

Being A, B, H the sides of the pool and its avarage height:

Ssurface = AxB

Swalls = (2xAxH) + (2xBxH)

Sbottom = Ssurface

One of the ways to calculate the surface of the solar collectors necessary to maintain the Temperature of the swimming pool is to divide the total thermal loss of the swimming pool by the thermal loss immediately available with one squared meter of solar collector.

$$Ssol = \frac{P_{tot}}{E1}$$

With:

Ssol = needed surface of solar collectors

E1 = average thermal Output available on 1 squared meter of solar collector

We can assume E1 equal to 400 Kcal/h mq (for high selective flat solar collectors).

CORDIVARI offers a wide range of products to be applied in solar thermal systems for the heating of swimming pools:

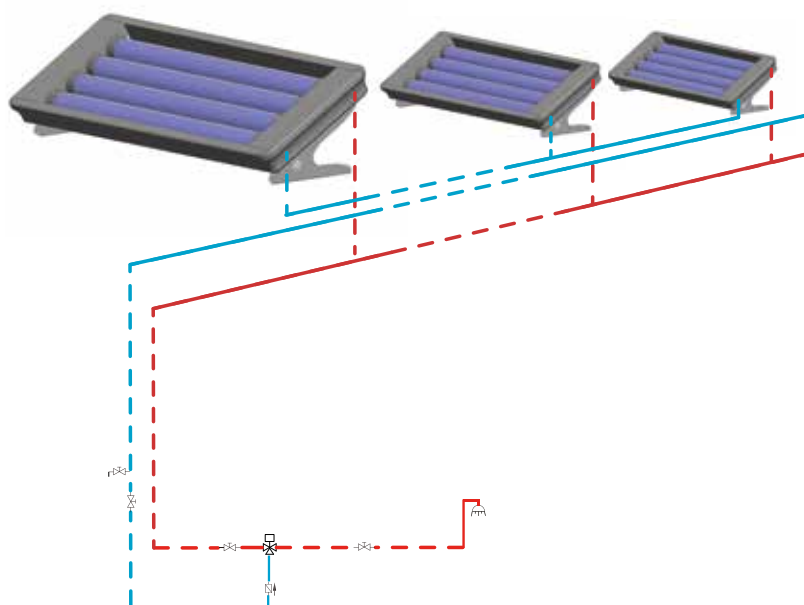
- Solar collectors
- Plate heat exchangers (PHC series)
- Circulation groups and electronic control units
- Accessories (diverting valves and thermostats)

EXAMPLE OF INSTALLATION

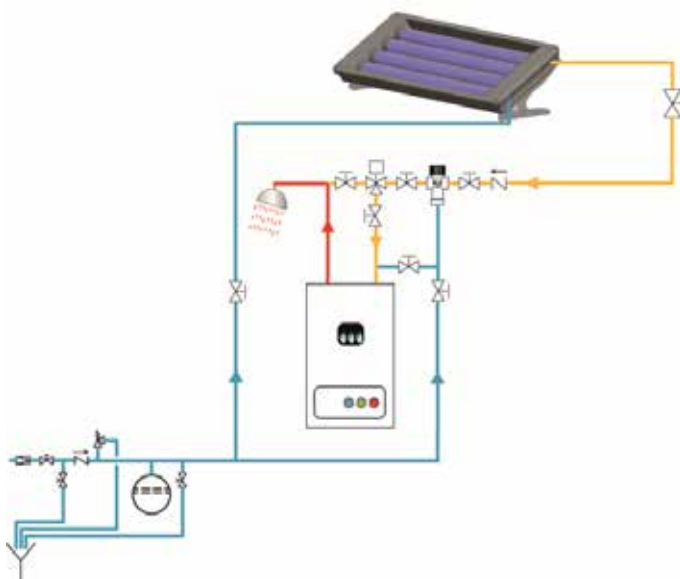
SINGLE INSTALLATION STAND-ALONE



INSTALLATION IN PARALLEL



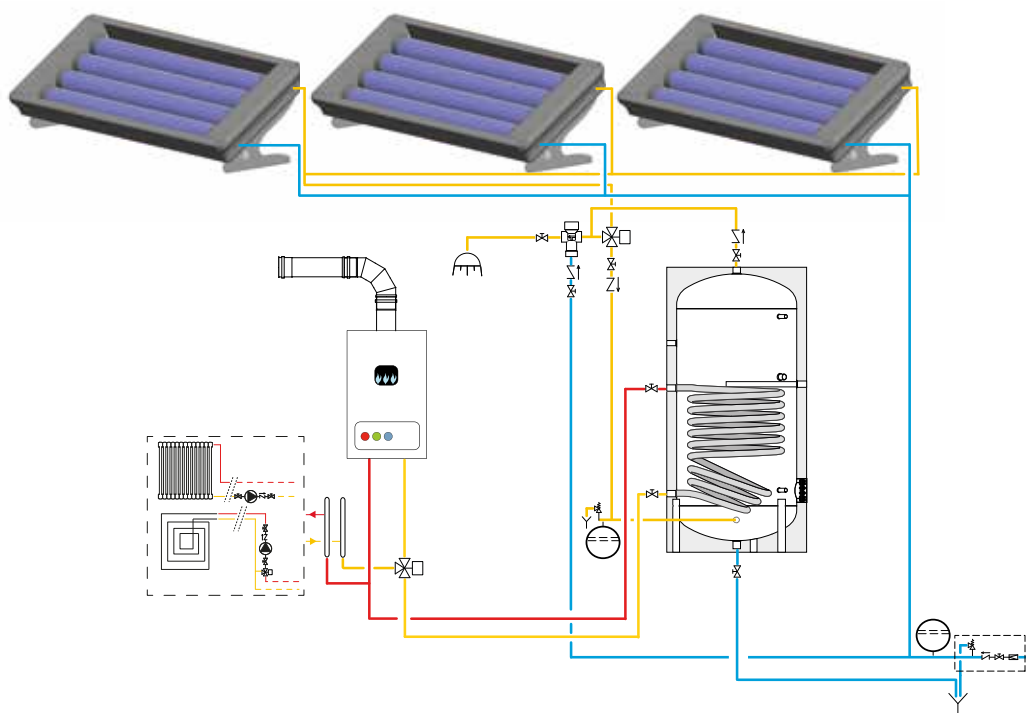
BOILER INTEGRATION



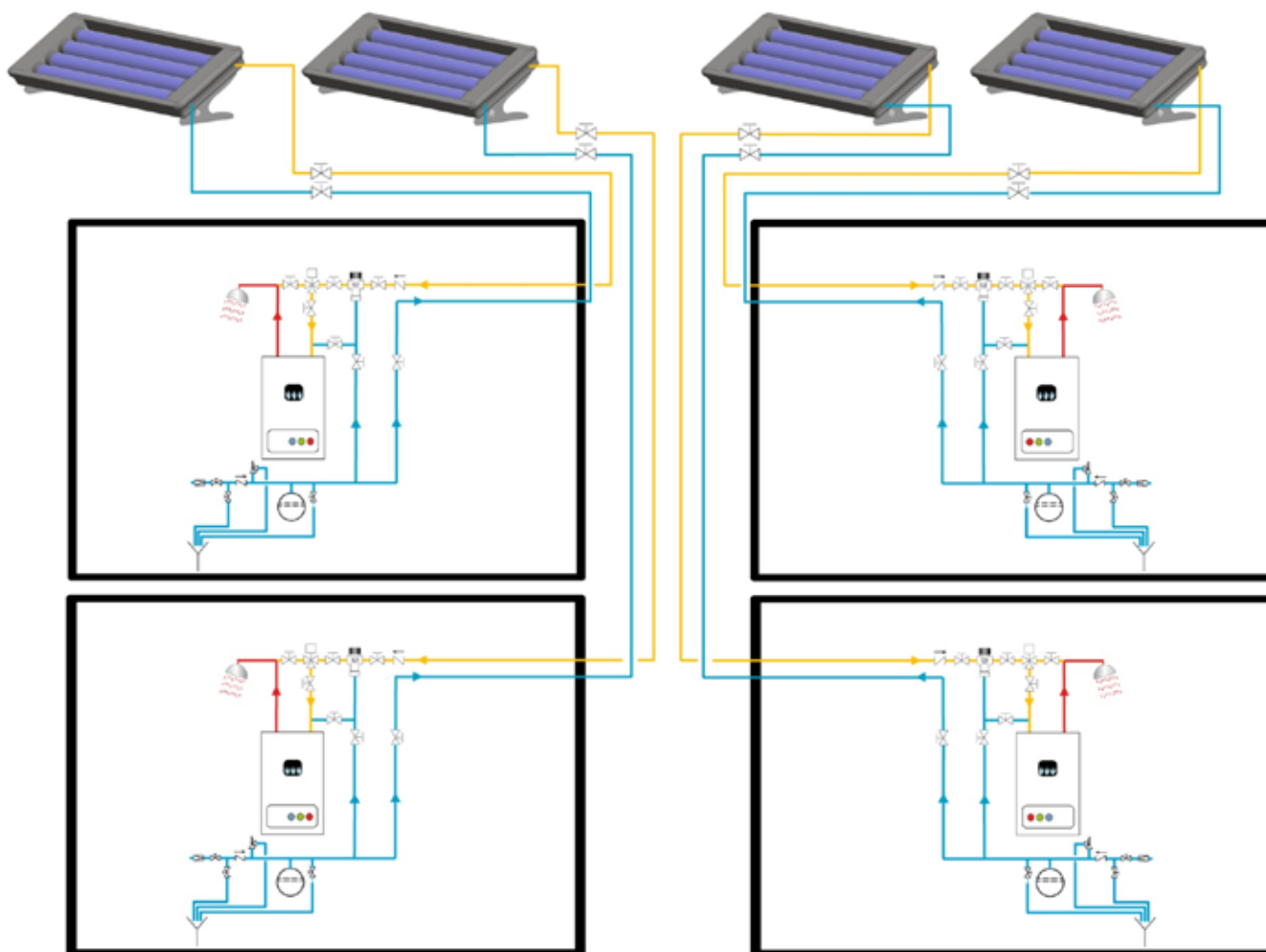
NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

EXAMPLE OF INSTALLATION

INSTALLATION IN PARALLEL WITH PRE-HEATING CYLINDER FUNCTION



CONDOMINIUM INSTALLATION DIAGRAM

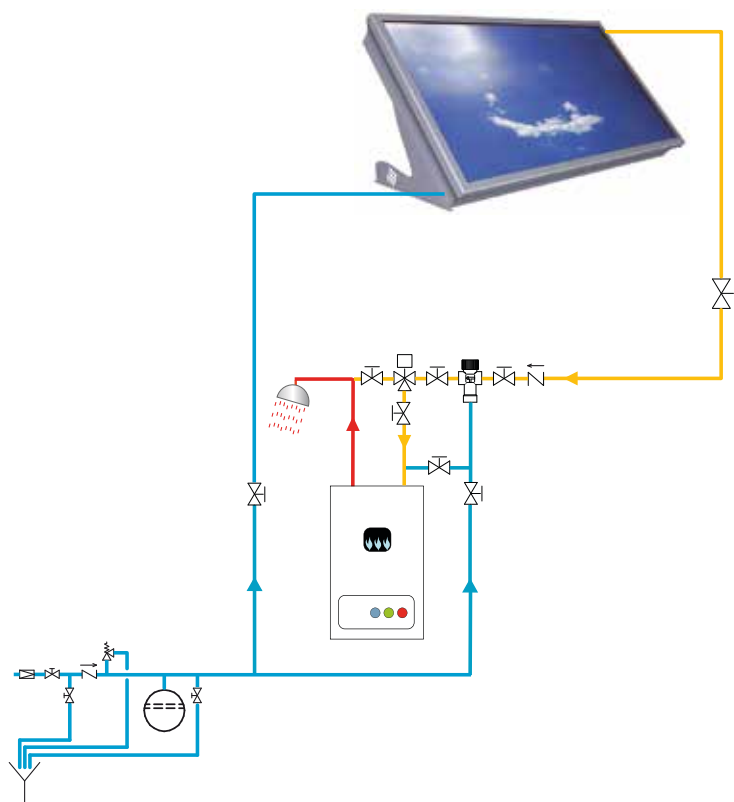


NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

EXAMPLE OF INSTALLATION

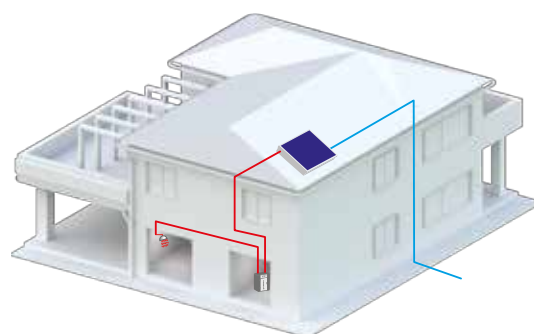
INSTALLATION SCHEME OF A SINGLE STRATOS® DR WITH BOILER INTEGRATION

Ideal system layout for models 110/180/260



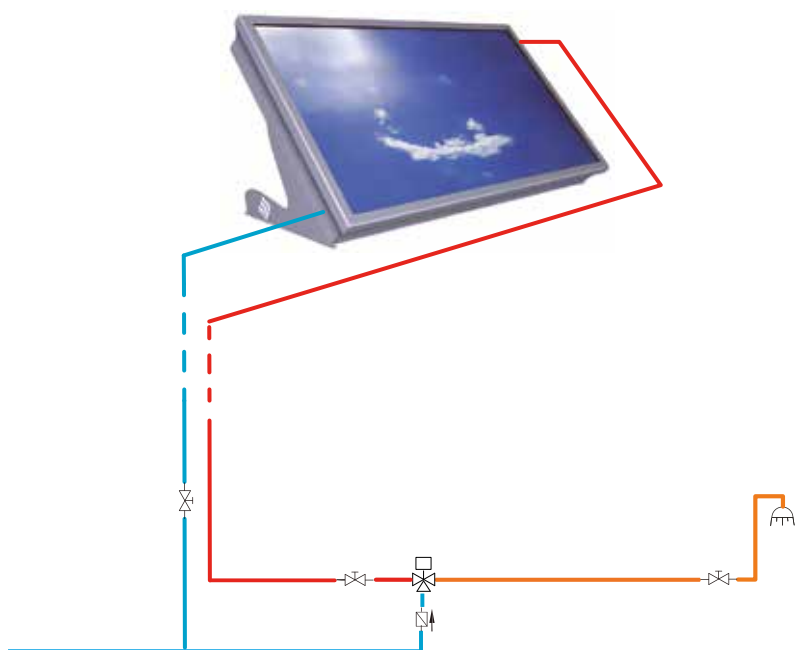
ADVICE

It is advisable to always foresee an emptying tap on the cold water supply connection to the Stratos system



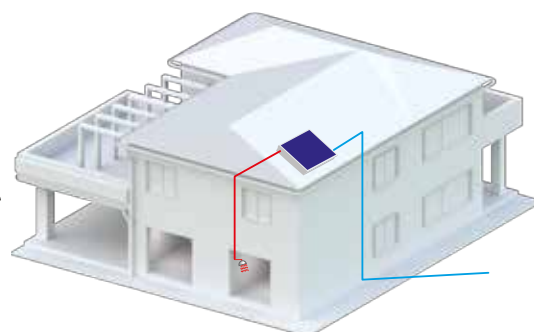
INSTALLATION SCHEME OF A SINGLE STRATOS® DR WITHOUT INTEGRATION OF OTHER DHW GENERATORS

Ideal system layout for models 110/180/260



ADVICE

It is advisable to always foresee an emptying tap on the cold water supply connection to the Stratos system

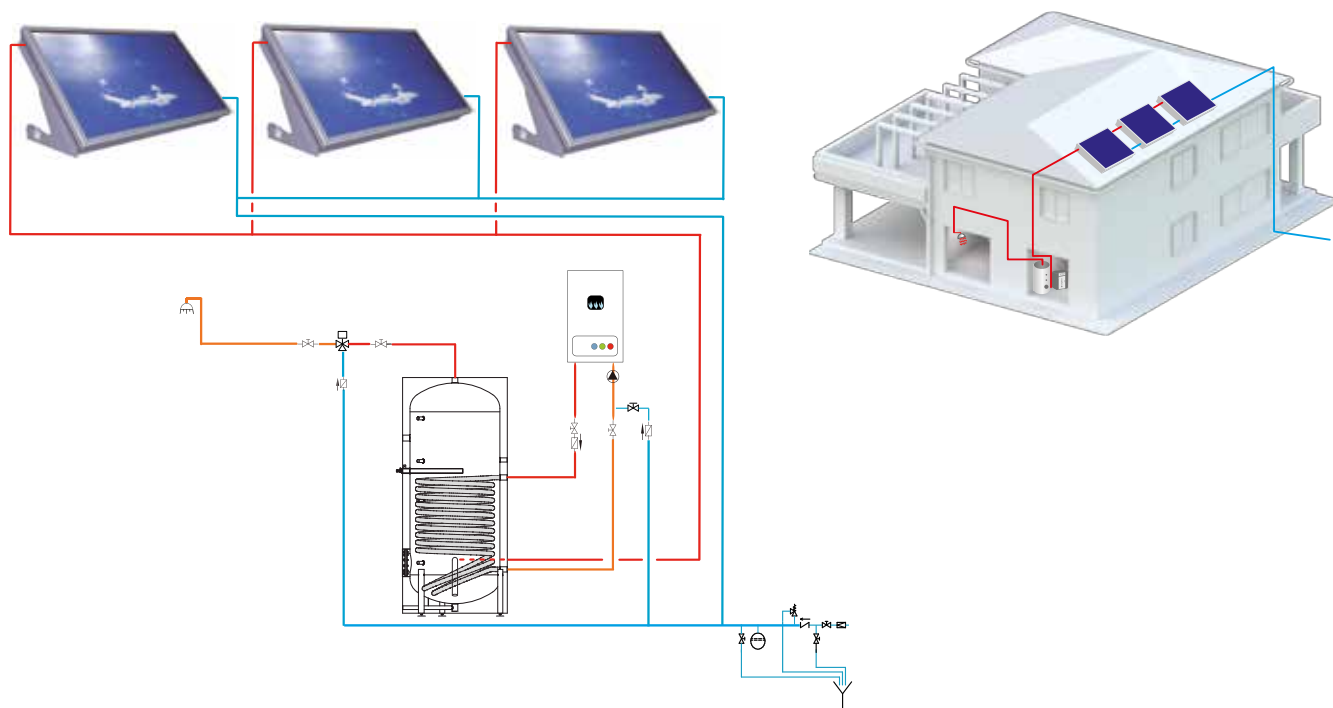


NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

EXAMPLE OF INSTALLATION

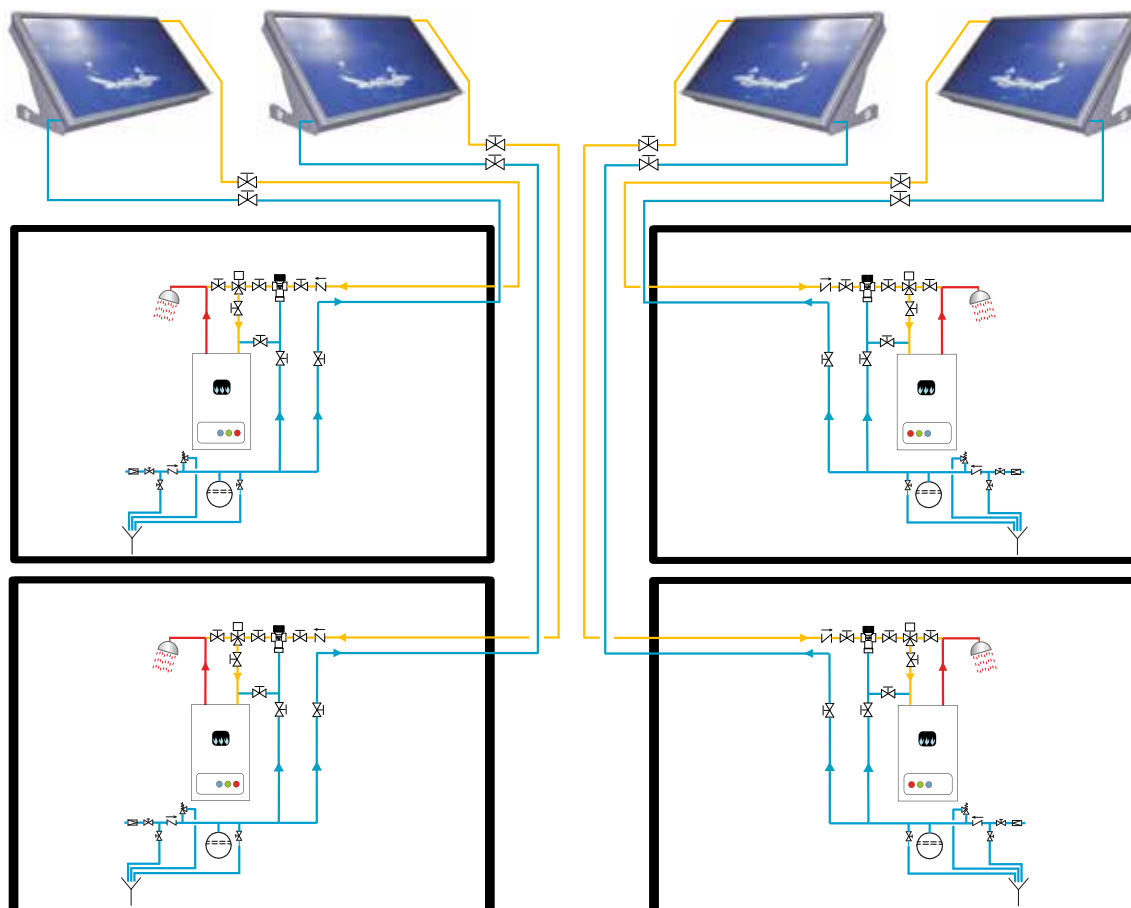
INSTALLATION DIAGRAM OF 3 STRATOS® DR IN PARALLEL WITH BOILER PRE-HEATING FUNCTION

Ideal system layout for models 110/180/260



INSTALLATION SCHEME OF STRATOS® DR ON CONDOMINIUM OF MULTI-FAMILY HOUSE WITH AUTONOMOUS THERMIC SYSTEM

Ideal system layout for models 110/180/260

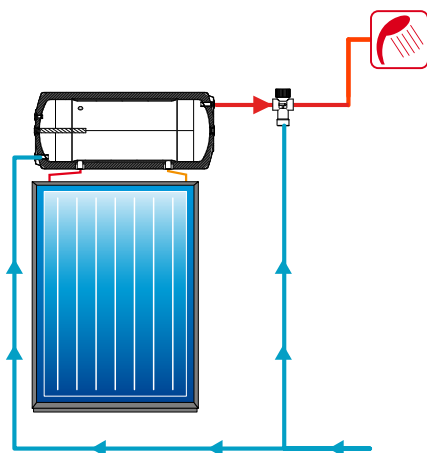


NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalog.

EXAMPLE OF INSTALLATION

SOLAR THERMAL SYSTEM **PANAREA**

A

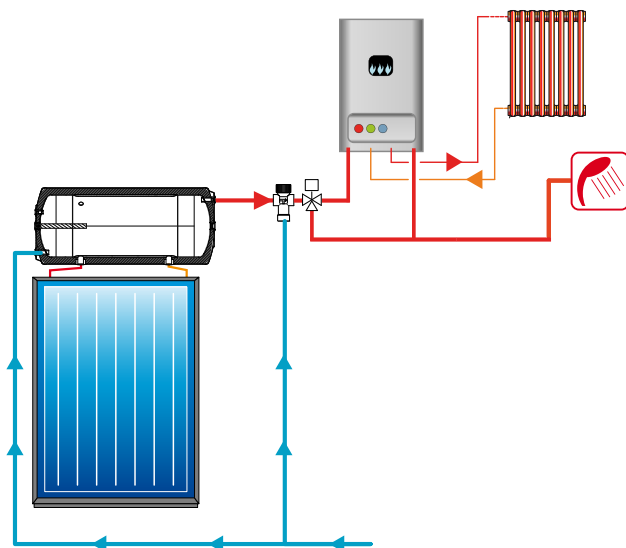


A • Direct connection of the system to the DHW Utilities

This is the simplest installation scheme, used to ensure the normal seasonal continuity of the service. It is recommended to install a solar thermostatic mixing valve to avoid water overheating. Cordivari solar thermal systems are supplied with anti-freeze fluid resistant down to -25°C ; anyway it is recommended to add an electric resistance to protect the system from freezing.

APPLICATIONS: utilities used in Summer when the need of domestic hot water coincides with the highest availability of solar radiation (ex. Beach resorts). Very simple installation, very high reliability.

B



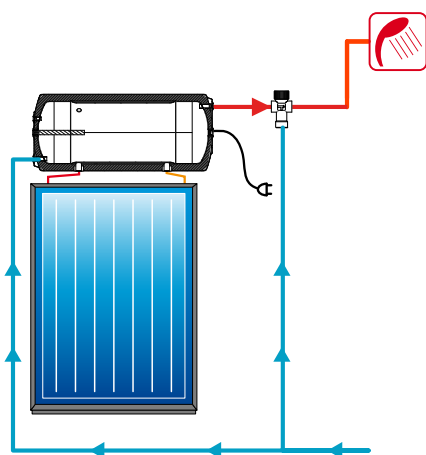
B • Direct connection of the system to the instantaneous boiler

This installation scheme foresees the addition of a 3 way valve controlled by a thermostat that detects the temperature of the water inside the tank. If this temperature is higher than the value set on the thermostat the water is directly sent to the utilities, otherwise the water is further heated by the boiler. This installation scheme allows to avoid conveying to the boiler water at high temperature, and at the same time using the solar as a pre-heating support.

In any case it is recommended to use a solar thermostatic mixing valve to avoid the overheating risk. Cordivari solar thermal systems are supplied with anti-freeze fluid resistant down to -25°C ; anyway it is recommended to add an electric resistance to protect the system from freezing.

APPLICATIONS: small domestic utilities with solar thermal system connected to an instantaneous boiler

C



C • Direct connection to the DHW utilities with electric integration

In this installation scheme the electric integration is applied directly on the double wall calorifier; this solution is considerably better than connecting in series electric water heaters. Cordivari solar thermal systems are supplied with anti-freeze fluid resistant down to -25°C ; anyway it is recommended to add an electric resistance to protect the system from freezing.

APPLICATIONS: Utilities used mostly during the Summer, where there is no back-up boiler.

NOTE: The sample installation schemes are merely illustrative. For the correct design and configuration of the systems always refer to a qualified technician. Cordivari declines any responsibility in relation to the EXAMPLE OF INSTALLATIONS described in this catalogue.

PLATE EXCHANGERS TOOL

Cordivari plate heat exchanger sizer online

Dimensioning of brazed and inspectable heat exchangers with one software

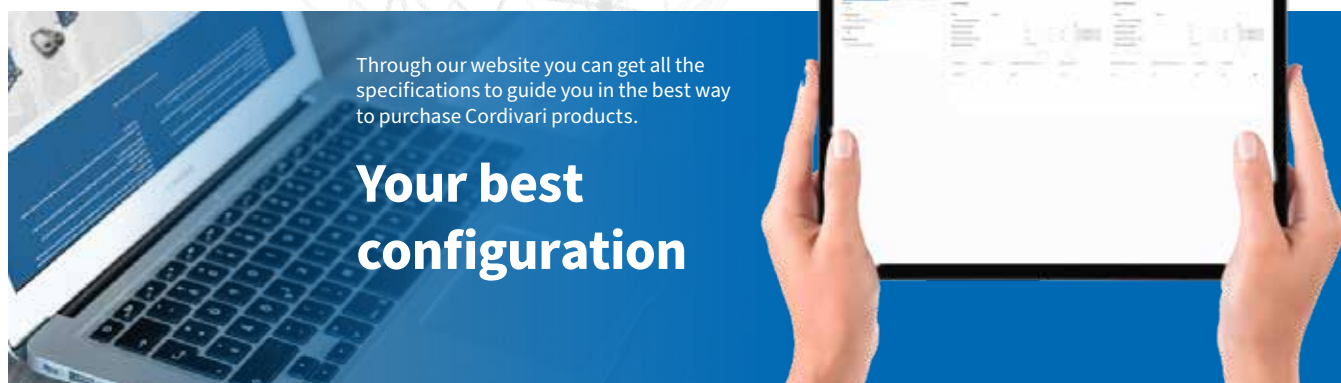
Home screen



Selection and check screen



Nella schermata di verifica l'utente può effettuare aggiustamenti (ad esempio, variare il numero di piastre) e verificare l'impatto sui risultati.





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Online tool on **www.cordivari.com**

COMPANY CERTIFICATES



Environmental managing System Certificate UNI EN ISO 9001



Environmental managing System Certificate UNI EN ISO 14001



Environmental managing System Certificate UNI EN ISO 45001

Cordivari has always placed as main objectives:

- The continuous improvement of the manufactured products
- The commitment to use low environmental impact materials that can be almost 100% recycled
- The achievement of the best quality

In this regard, Cordivari has worked to obtain the most significant certifications that demonstrate the company's commitment both internally and externally. The Cordivari Management System integrates "Quality," "Environment," and "Safety" and serves as a practical guide for the implementation and continuous improvement of eco-compatible management, ranging from energy and water savings to the rationalization of raw materials. The aim of the System is to create processes with minimal environmental impact and to provide the company with a tool for measuring and correcting the generated environmental impact.

Furthermore, the eco-compatibility of processes is a primary objective already in the design phase, offering benefits in terms of transparency and reliability towards external stakeholders.

COMPANY CERTIFICATES

LEGISLATION

DECREE-LAW NO. 185 OF NOVEMBER 29, 2008 and subsequent amendments and additions.

Measures to support families, employment, and businesses in response to the crisis.

LAW NO. 10 OF JANUARY 9, 1991. Provisions for the implementation of the national energy plan regarding the rational use of energy, energy savings, and the development of renewable energy sources

PRESIDENTIAL DECREE NO. 412 OF AUGUST 26, 1993. Regulations containing provisions for the design, installation, operation, and maintenance of thermal systems in buildings for the purpose of energy consumption reduction, in accordance with Article 4, paragraph 4 of Law No. 10 of January 9, 1991.

PRESIDENTIAL DECREE NO. 551 OF DECEMBER 21, 1999. Regulations amending D.P.R. No. 412 of August 26, 1993, regarding the design, installation, operation, and maintenance of thermal systems in buildings for energy consumption reduction.

DIRECTIVE 2002/91/EC of the European Parliament and Council of December 16, 2002 on the energy performance of buildings.

LEGISLATIVE DECREE NO. 192 OF AUGUST 19, 2005. Implementation of Directive 2002/91/EC concerning the energy performance of buildings.

LEGISLATIVE DECREE NO. 311 OF DECEMBER 29, 2006. Corrective and supplementary provisions to Legislative Decree No. 192 of August 19, 2005, implementing Directive 2002/91/EC concerning the energy performance of buildings.

DIRECTIVE 2006/32/EC of the European Parliament and Council of April 5, 2006 concerning the efficiency of energy end-use and energy services, and repealing Directive 93/76/EEC of the Council

MINISTERIAL DECREE OF THE ECONOMIC DEVELOPMENT OF DECEMBER 28, 2012. Incentives for the production of thermal energy from renewable sources and small-scale energy efficiency interventions.

DECREE-LAW NO. 63 OF JUNE 4, 2013. Urgent provisions for the transposition of Directive 2010/31/EU of the European Parliament and Council of May 19, 2010, on energy performance in buildings for the definition of infringement procedures initiated by the European Commission, as well as other provisions regarding social cohesion

LEGISLATIVE DECREE NO. 28 OF MARCH 3, 2011. Implementation of Directive 2009/28/EC on the promotion of the use of energy from renewable sources, amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

MAIN REGULATIONS GOVERNING THE CONSTRUCTION OF SOLAR COLLECTORS

- **UNI EN 9488:2022** - Solar energy – Vocabulary
- **UNI EN 12975:2022** Solar collectors – General Requirements
- **UNI EN ISO 9806:2018** Solar energy - Solar thermal collectors - Testing methods
- **UNI EN 12976-1:2022** Solar thermal systems and their components - Prefabricated plants - Part 1: General Requirements
- **UNI EN 12976-2:2019** Solar thermal systems and their components - Prefabricated plants - Part 2: Testing methods
- **ISO 9459-2:1995** Solar heating - Domestic water heating systems - Part 2: Outdoor test methods for system performance characterization and yearly performance prediction of solar-only systems
- **ISO 9459-5:2007** Solar heating - Domestic water heating systems - Part 5: System performance characterization by means of whole-system tests and computer simulation
- **UNI EN 1717:2002** Protection against drinking water pollution in plumbing systems and general requirements for devices to prevent backflow pollution

COMPANY CERTIFICATES

ACCREDIA

ICIM

Certificazione di Prodotto
Product Certification

Certificato N°
Certificate No. ICIM-CLS-000160-01

INCARICATA / TO THE FIRM
Cordivari S.r.l.
Zona Industriale Pagliare
64020 Morro d'oro (TE) - IT

UNITÀ OPERATIVA / OPERATING UNIT
Zona Industriale Pagliare
64020 Morro d'oro (TE) - IT

PER I SEGUENTI PRODOTTI / FOR THE FOLLOWING PRODUCTS
Sistema solare termico prefabbricato
Factory made solar thermal system

CONFERMAZIONE COMMERCIALE / WITH TRADE MARKS
Cordivari
SISTEMA TERM SOLARE STRATOS DR 150
SISTEMA TERM SOLARE STRATOS DR 150
SISTEMA TERM SOLARE STRATOS DR 150
SISTEMA TERM SOLARE STRATOS DR 220
SISTEMA TERM SOLARE STRATOS DR 220

Certificazione del prodotto / Characteristic and data
CONFERMAZIONE COMMERCIALE / WITH TRADE MARKS
UNI EN 12976-2:2017 - UNI EN 12976-2:2017
Specific CEN Keymark Scheme Rules for Solar Thermal Products, ICIM 0662CS
SISTEMA TERM SOLARE STRATOS DR 150
SISTEMA TERM SOLARE STRATOS DR 220
61050E1, 61040E1, 61050E1

La presente Certificazione di Prodotto è valida per i prodotti e i servizi descritti. This Certificate is valid only for the products and services described.

Prova di accettazione / Proof of acceptance
20/08/2019

Emissione / Issuance
20/08/2019

Validità / Validity
27/08/2025

ICIM S.p.A. - Piazza Don Enrico Mattei, 75 - 20090 Sesto San Giovanni (MI) - Italy
Sede legale / Legal office: Piazza Don Enrico Mattei, 75 - 20090 Sesto San Giovanni (MI) - Italy

SOLAR KEYMARK CERTIFICATE - STRATOS® DR Mod. 150

eurofins

Product Testing

TEST REPORT

EN 12976-2:2017 Thermal solar systems and components - Factory made systems - Part 2: Test methods
EN 12976-2:2017 Thermal solar systems and components - Factory made systems - Part 2: Test methods

Report Reference No. / Numero rapporto: EPT.15.NRG.0364/53179

Date of issue / Data di emissione: 2015-07-18

Total number of pages / n° di pagine: 30

Testing Laboratory / Laboratorio di prova: Eurofins Product Testing Italy S.r.l.

Address / Indirizzo: Via Cavour, 21 - 10136 Torino (TO) - Italy

Applicant's name / Nome del richiedente: ICIM S.p.A.

Address / Indirizzo: Piazza Don Enrico Mattei, 75 - 20090 Sesto San Giovanni (MI) - Italy

Test specification / Specifiche di prova: EN 12976-2:2017 (ICS Solar Thermal System requirements)
EN ISO 9806:2013 (Solar Collector requirements)
ISO

Non-standard test method / Metodo di prova non standard: No

Scope of the test / Campo della prova: To assess the general requirements of durability, stability and safety for a Factory made thermal water heating system within the scope of EN 12976-2:2017 Thermal solar systems and components - Factory made systems - Part 2: Test methods. Thermal performance characteristics of systems of solar thermal collectors.

Test item description: Factory made solar heating system: Integrated Storage Collector (ISC) system for domestic hot water preparation.

Trade Mark: CORDIVARI

Manufacturer / Costruttore: Cordivari S.r.l.

Address / Indirizzo: Zona Industriale Pagliare - 64020 Morro d'oro (TE) - Italy

Model/Type reference / Modello: STRATOS DR 150

System classification: System type / Tipo di sistema: ISC
Floor principle / Principio di base: Thermodynamic / Termidynamico
Heat transfer principle / Principio di calore: Direct / Diretto
Pressure principle / Principio di pressione: Closed / Chiuso
Drain principle / Principio di scarico: Filled / Riempito
Storage principle / Principio di accumulo: Output / Uscita
Integrated back-up / Accumulo integrato: None / Nessuno

Date of receipt of the test item / Data di ricevimento dell'oggetto di prova: 2015/04/10

Testing period / Periodo di prova: 2015/04/17 - 2015/07/18

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Assessor: 2015-07-18

Tested by: Eurofins Product Testing Italy S.r.l.

Approved by: Eurofins Product Testing Italy S.r.l.

TEST REPORT EXTRACT

RI SE

Annex to Solar Keymark Certificate

Page 1/2

Annex to Solar Keymark Certificate - Summary of EN 12975-2
Test Results

Licence Number: SC0140-18
Date issued: 2018-03-16
Issued by: RI SE

Licence holder: Cordivari S. R. L.
Brand (optional): CVT
Street, Number: Zona Industriale Pagliare - 64020 morro d'oro
Postcode, City: Teramo

Country: Italy
Web: http://www.cordivari.it/
E-mail: info@cordivari.it
Tel: +39 085 80401

Collector Type: Evacuated tubular collector

Power output per collector
G₀ = 850 W/m², G_d = 150 W/m²
G₀ - G_d

Collector name: CVT10
CVT15

Power output per m² gross area: 541, 529, 501, 471, 437, 442

Performance parameters test method: Steady state - outdoor
Performance parameters (related to AG): n_{0,rem}, a₁, a₂
Units: - W/(m²K) W/(m²K)
Test results: 0.541, 1.212, 0.004

Incidence angle modifier test method: Quick dynamic - outdoor
Bi-directional incidence angle modifiers: Yes
Incidence angle modifier: Angle 10°, 20°, 30°, 40°, 50°, 60°, 70°, 80°, 90°
Transversal: K_{eff,ref} 1.03, 1.05, 1.18, 0.00
Longitudinal: K_{eff,ref} 0.95, 1.18, 0.00

Heat transfer medium for testing: Water
Flow rate for testing (per gross area, A_g): dm³/dt 0.020, 0.020, 0.020, 0.020, 0.020, 0.020
Maximum temperature difference for thermal performance calculations: (T_{in} - T_{out})_{max} 64 K
Standard stagnation temperature (G = 1000 W/m², θ = 30°): T_{st} 280 °C
Effective thermal capacity, incl. fluid (per gross area, A_g): C_{m,eff} 3.17 kJ/(m²K)
Maximum operating temperature: T_{max,op} 120 °C
Maximum operating pressure: P_{max,op} 1000 kPa

Testing laboratory: TestLab A
Test report(s): 131016040G2U-001
Dated: 2014-01-07

Comments of testing laboratory: Negative mechanical load test of collector was not performed

Certification Body: RI SE Research Institutes of Sweden | Certification
Box 857, SE-501 15 Borås, Sweden, Phone: +46 33 516 50 00, certifying@ri.se | www.ri.se

SOLAR KEYMARK CERTIFICATE

RI SE

Annex to Solar Keymark Certificate

Page 2/2

Annex to Solar Keymark Certificate
Supplementary Information

Licence Number: SC0140-18
Date issued: 2018-03-16

Annual collector output in kWh/collector at mean fluid temperature θ_m, based on EN 12975-2 test results

Collector name: CVT10
CVT15

Standard Locations: Athens, Davos, Stockholm, Würzburg

Collector name: CVT10
CVT15

Annual output per m² gross area: 921, 791, 661, 775, 654, 540, 558, 457, 367, 601, 493, 393

Fixed or tracking collector: Fixed (slope = latitude - 15°, rounded to nearest 5°)

Annual radiation on collector plane: 1765 kWh/m², 1714 kWh/m², 1166 kWh/m², 1244 kWh/m²

Mean annual ambient air temperature: 18.5°C, 3.2°C, 7.5°C, 9.0°C

Collector orientation or tracking mode: South, 25°, South, 30°, South, 45°, South, 35°

The collector is operated at constant temperature θ_m (mean of in- and outlet temperatures). The calculation of the annual collector performance is performed with the official Solar Keymark spreadsheet tool Sencalc Ver. 5.01 (March 2016). A detailed description of the calculations is available at www.solarkeymark.org/sencalc.

Additional Information

Collector heat transfer medium: Water-Glycol
Hybrid Thermal and Photo Voltaic collector: No
The collector is deemed to be suitable for roof integration: No
The collector was tested successfully according to EN ISO 9806:2013 under the following conditions:
Climate class (A, B or C): C
Maximum tested positive load: 2860 Pa
Maximum tested negative load: 0.8 m
Roof resistance using steel ball (maximum drop height): 0.8 m

Energy Labeling Information

Reference Area, A_{ref} [m²]: Data required for CDR (EU) No 811/2013 - Reference Area A_{ref}

CVT10: 2.17
CVT15: 3.22

Collector efficiency (η_{col}): 49 %

Remark: Collector efficiency (η_{col}) is defined in CDR (EU) No 811/2013 as collector efficiency of the solar collector at a temperature difference between the solar collector and the surrounding air of 40 K and a global solar irradiance of 1000 W/m², expressed in % and rounded to the nearest integer.

Deriving from the regulation η_{col} is based on reference area (A_{ref}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013.

Data required for CDR (EU) No 812/2013 - Reference Area A_{ref}

Zero-loss efficiency (η₀): 0.541
First-order coefficient (a₁): 1.21 W/(m²K)
Second-order coefficient (a₂): 0.004 W/(m²K)
Incidence angle modifier IAM (50°): 0.00

Remark: The data given in this section are related to collector reference area (A_{ref}) which is aperture area for values according to EN 12975-2 or gross area for ISO 9806:2013. Consistent data sets for either aperture or gross area can be used in calculations like in the regulation 811 and 812 and simulation programs.

Certification Body: RI SE Research Institutes of Sweden | Certification
Box 857, SE-501 15 Borås, Sweden, Phone: +46 33 516 50 00, certifying@ri.se | www.ri.se

SOLAR KEYMARK CERTIFICATE



CERTIFICATO

**Proprietario del
certificato**

**Cordivari s.r.l.
Zona Industriale Pagliare
64020 Morro d'Oro TE
ITALIA**

Sito produttivo

033

Prodotto

Collettore solare

Tipo, modello

ASA MQ 2.5 VT 4 CONN

Norme di riferimento

DIN EN 12975-1:2011-01
DIN EN ISO 9806:2018-04
Solar KEYMARK Regole del programma (2022-06)

Marchio di conformità



Numero di registrazione

011-752185 F

Valido fino al

2026-11-30

Diritto di utilizzo

Il presente certificato autorizza ad utilizzare il marchio di conformità di cui sopra
in relazione al numero di matricola indicato.

Vedi allegato per ulteriori indicazioni.



2023-09-14 *K. Vohring*
Dipl.-Biol. Katharina Vohring, M. Eng.
Ente di certificazione





CARSO - LABORATOIRE SANTÉ ENVIRONNEMENT HYGIÈNE DE LYON

Laboratoire Agréé pour les analyses d'eaux par le Ministère de la Santé

ATTESTATION DE CONFORMITE SANITAIRE (ACS)

Certificate of sanitary conformity

Conformément à l'arrêté du 29 mai 1997 modifié et aux circulaires du Ministère de la santé
DGS/VS4 n° 99/217 du 12 avril 1999 et DGS/VS4 n° 2000/232 du 27 avril 2000

Coordonnées du demandeur / Contact details of the ACS owner : CORDIVARI s.r.l. Zona Industriale Pagliare 64020 MORRO D'ORO (TE) Italie	Nom(s) commercial(aux) du produit / Commercial name(s) of the finished product : POLYWARM
---	---

Type de produit fini / Type of finished product :

☐ tube / pipe	☐ Réservoirs / Storage systems	☐ joint / seal, gasket, o-ring...
☐ revêtement pour tubes / coating for pipes	☐ Produits pour réservoirs / Products for storage systems	☐ composant d'accessoires / accessories component
☐ produit de jointoyage / sealing product	☐ raccord et manchon / fittings	☐ autre / other :

Nature du matériau / Type of material :

☐ polychlorure de vinyle PVC	☐ polybutylène PB	☐ éthylène-propylène EPDM
☐ PVC surchloré PVC-C	☐ polyamide PA	☐ butadiène-acrylonitrile NBR
☐ polyéthylène PE	☐ polytétrafluoroéthylène PTFE	☐ autre / other :
☐ polyéthylène réticulé PEX	☐ acrylonitrile-butadiène-styrène ABS	
☐ polypropylène PP	☐ à base de résine époxydique / epoxy resin	

Température(s) d'utilisation / Temperature(s) for the use :

☐ Eau froide / Cold water	☐ Eau chaude / Warm water	☐ Eau très chaude / Hot water
--	--	--

Commentaires / Comments :

Conteneur du matériau / Material colour : gris-vert / green-grey

N° de dossier attribué par le laboratoire habilité / File reference :

20 MAT LY 120

Formulation chimique / Chemical formulation :

Vérifiée par le laboratoire et conforme aux listes positives
 Checked by the laboratory and conform to the positive lists

Essais de migration réalisés selon les normes NF EN 1420, NF EN 13052-1 & NF EN 12873-1 ou -2 :
Migration tests performed according to the standards NF EN 1420, NF EN 13052-1 & NF EN 12873-1 ou -2 :
 Rapport SVI testé / SVI tested ratio : 1,5 d/m³ (NF EN 1420, NF EN 13052-1) & 5 d/m³ (NF EN 12873-1)
 Facteur de conversion associé / Associated conversion factor : 4 day/dm³
 Date des essais / Tests date : du 07 AOÛT au 04 NOVEMBRE 2020 / from August 07 to November 04, 2020
 Commentaires : Les essais diérent ne font pas apparaître aucune anomalie. Les résultats sont conformes aux critères d'acceptabilité
 fixés en annexe 1.
 Comments : The migration tests do not bring out any anomaly. The results are in accordance with the acceptance criteria set out in
 annex 1.

Attestation délivrée par / Certificate issued by :

Christelle AUTUGELLE
 Responsable Laboratoire MCDE
 CARSO-LESLH

Signature :

A la date du / Date of issue : 05 Novembre 2020

Date d'expiration de l'ACS / Expiry date : 05 Novembre 2025

Commentaires / Comments : Renouvellement / Renewal 15 MAT LY 142

F_MC104_1 Reaction : CAU / Validation : SPR / Approbation : CBR - 03/02/2020

Scalé par système intégré au capital de 7 287 422,50 €. RCS Lyon N° 8 416 542 313 - SIRET 849 545 313 00001 - APE 702 B - N° TVA : FR 92 849 545 313
 Siège Social : Laboratoire - 4, avenue Jean-Baptiste - CS 36623 - 69693 VERNY-CEDEX - Tél : 03 52 72 16 16 - Fax : 03 52 72 16 03

Site web : www.groupecarso.com - e-mail : info@groupecarso.com

TEST REPORT N° ITAH18011510/E2 - Amendment of 12/09/2018		 Intertek Total Quality Assured.
START DATE 06/06/2018	END DATE 12/09/2018	

CONTRATTORE SRL Zona Industriale Faglione 54020 MORRO D'ORO - TORRANO TE		APPLICAZIONE
---	--	---------------------

SAMPLE DESCRIPTION	Sample Received 06/06/2018 Your order no. 127058 del 21/05/2018 Colore: semiprecato / green brown Spessore: semipasto con semiprecato / semi-foam Dopo compressione: acciaio di carbonio ricostituito con l'ossigeno in polveri polimeriche / carbon steel treated with polymeric powder Brand: Corbucci srl Buyer's Name: CORBUCCI SRL
-------------------------------------	---

Sample ID	Sample	Result	Interpretation
1	Colorimetric test	5	
2	SWL 100% (0.50% - 1.00% - 1.50% - 2.00%)	2	
3	SWL 50% (0.50% - 1.00% - 1.50% - 2.00%)	2	
4	SWL 25% (0.50% - 1.00% - 1.50% - 2.00%)	2	
5	SWL 10% (0.50% - 1.00% - 1.50% - 2.00%)	2	

L200 del 21/12/15 and Amendment (Reg. 10/2018/09)
 0 = Non in Conformità / 1 = Accettabile / 2 = Non in Conformità / 3 = Non in Conformità / 4 = Non in Conformità / 5 = Non in Conformità

Valore in brackets rappresenta dei limiti.

LAB. N° 02715
 Intertek Italia S.p.A.
 Laboratorio Office Via. S. Maria Maddalena 100 - 00187 Roma (RM)
 Laboratorio Office Via. S. Maria Maddalena 100 - 00187 Roma (RM)
 Via. S. Maria Maddalena 100 - 00187 Roma (RM)

02/07 1 di 2

Approval Number 2307508
Test Report: MA8028/R

5th July 2023

Cordivari Srl,
Zi Pagliare,
I-64020,
Teramo,
Italy

WATER REGULATIONS APPROVAL SCHEME LTD. (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS6920-1:2000 and/or 2014 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

COATINGS, PAINTS & LININGS- FACTORY APPLIED PIPE & FITTINGS COATINGS.

5030

"Polymarm".
Factory applied, brown coloured enamel powder coating. Apply as per manufacturer's instructions '1024'. Cure for 20 minutes@240°C.
For use with water up to 85°C.

APPROVAL NUMBER: 2307508
APPROVAL HOLDER: CORDIVARI SRL.

The Scheme reserves the right to review approval.
Approval 2307508 is valid between July 2023 and July 2028

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wrasapprovals.co.uk/approvals-directory/

Yours Faithfully

Ian Hughes
WRAS Approvals Manager

Water Regulations Approval Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

POLYWARM® certificate of conformity according to WRAS

ACCREDIA

001 01/2018

e
Solar Keymark
Certification Body
0107-102

ICIM

Certificazione di Prodotto

Product Certification

Certificato N.
Certificate No

ICIM-CLS-000159

ALLIAMENTO TO THE FIRM

Cordivari S.r.l.

Zona Industriale Piagnare
64020 Morro d'oro (TE) - IT

ZONA INDUSTRIALE PIAGNARE
Zona Industriale Piagnare
64020 Morro d'oro (TE) - IT

PER SEGUENTI PRODOTTI / FOR THE FOLLOWING PRODUCTS

Sistemi solari prefabbricati
Factory made solar systems

CON DENOMINAZIONE COMMERCIALE / WITH TRADE NAME

STRATOS 4S HEAT CONTROL 120
STRATOS 4S HEAT CONTROL 180
STRATOS 4S HEAT CONTROL 210

CONFORMITÀ ALLA NORMA ED AL DOCUMENTO IDENTIFICATI ICIM
IN COMPLIANCE WITH THE STANDARD AND WITH CONFORMATIVE DOCUMENT

UNE EN 12976-1-2017 - UNE EN 12976-2-2017

Specific CER Keymark Scheme Rules for Solar Thermal Products, ICIM 0052CS

NAIPORTO DI PROVA ACCREDITATO ISO/IEC 17025 - PERFORMANCE TESTING/TESTING ACCREDITED ISO/IEC 17025

61000DEL, 6101DEL, 6101FI

L'entità Certificata dichiara di essere all'oscuro di qualsiasi circostanza che potrebbe compromettere la validità del presente certificato o che potrebbe compromettere la validità del presente certificato o che potrebbe compromettere la validità del presente certificato.
The certificate holder declares to be unaware of any circumstance that could compromise the validity of this certificate or that could compromise the validity of this certificate or that could compromise the validity of this certificate.
To avoid additional information under validity of this certificate, please read the license agreement at

[Signature]

Ugo Cossiga
Rappresentante Direzionale / Management Representative
ICIM S.p.A.

PRIMA EMISSIONE
FIRST ISSUE

28/02/2019

EMISORE COPIANTE
CURRENT ISSUE

22/06/2023

DATA DI SCADENZA
EXPIRY DATE

27/02/2025

0107-102





Certificate number:	T3515 Rev D	Revision:	-
Issued:	28/03/2024	Third edition:	13/02/2008
Report number:	PKC02-2401	Copy date:	31/05/2022
Page:	1 of 1	Control number:	PKC0021067

Product Certificate Solar Thermal Products

License holder:	Combiwell S.r.l. Zone Industriale Pagnan, 44020 - Mirra D'Este (FE), Italy
Production site(s):	Combiwell S.r.l. Zone Industriale Vianova, 44020 - Mirra D'Este (FE), Italy
Product:	Solar thermal system
Model(s):	STRATOSIP 4.5 Heat Storage 180 STRATOSIP 4.5 Heat Storage 210 STRATOSIP 4.5 Heat Storage 260 STRATOSIP 4.5 Heat Storage 300

Kiwa Conform Italia hereby declares that the product can be considered conforming to the testing requirements and is entitled to use the Solar Keymark Label based upon the following aspects:

Laboratory testing of the solar thermal products, which are performed by an accredited laboratory in accordance to EN ISO/IEC 17025:2005 (see annex), using the following standards:

- EN 12878-1-2021
 Thermal solar collectors and components - Factory made systems - Part 1: General requirements
- EN 12878-2-2019
 Thermal solar collectors and components - Factory made systems - Part 2: Test Methods

Specific CEK Marking Scheme Rules for Solar Thermal Products (SRM_S022248E)

Periodic inspection of the Factory label performed by Kiwa Conform Italia.
 A reinspection of the test results is given in the annex to this certificate.

This certificate is issued in accordance with the Kiwa Conform data regulations.
 Publication of the certificate is allowed.
 The validity of this certificate is subject to the periodic renewal of specific conforming status.
 The validity of this certificate can be requested in respect of the following email address: certificati@kiwa.nl
 Any note or partial derogation of this document is any form, without Kiwa Conform express authorization, is prohibited.

Kiwa Conform Italia S.p.A.
 Research and testing center, responsible
 off activities of certification in
 accordance with CEK Marking Scheme
Marketing Unit
 Via Luffers, 21
 40051 Serravalle (BO) Italy
 Tel. +39 051 466 2151
 Fax +39 051 466 2002
 E-mail: certificati@kiwa.nl
www.kiwa.nl


Industry Division Manager
 Giuseppe Longari



Logo in printing
 requires prior approval Kiwa Conform Italia S.p.A.
 01/01/2019 01/01/2024 01/01/2024 01/01/2024








CORDIVARI S.r.l.

Zona Industriale Pagliare - 64020 MORRO D'ORCO (TE) Italia
 Tel. +39 085 80.40.1 r.a. - Fax UNF. COMM. +39 085 80.41.438 - Fax CENTR. +39 085 8041280
 C.F. - P. IVA - REG. IMPRESE TE N. IT 00735570673 - R.E.A. TE N. 92310 - CAP. SOC. C.4.000.000,00 I.V.
www.cordivari.it - info@cordivari.it

RAPPORTO DI PROVA

VERIFICA DISPERSIONE TERMICA AI FINI DELL'ETICHETTATURA ENERGETICA PREVISTA DAL REGOLAMENTO (UE) N. 814/2013 DELLA COMMISSIONE DEL 2 AGOSTO 2013 RECANTE MODALITÀ DI APPLICAZIONE DELLA DIRETTIVA 2009/125/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO IN MERITO ALLE SPECIFICHE PER LA PROGETTAZIONE ECOCOMPATIBILE DEGLI SCALDACQUA E DEI SERBATOI PER L'ACQUA CALDA.

Rapporto di prova n°	BO-CLEN 11.21
Data di emissione	07/12/2021
N° di pagine totale	5
Laboratorio di prova	Cordivari LAB
Nome del richiedente	Cordivari srl
Specifiche di prova	EN 15332:2019
Scopo della prova	Determinare la dispersione termica nelle condizioni previste dalla norma al fine di caratterizzare il prodotto oggetto della prova nell'ambito delle classi energetiche previste dal Regolamento UE 814/2013
Descrizione dell'oggetto in prova	BOLLY 1 ST WB 300. Materiale del corpo: acciaio al carbonio. Esecuzione cilindrica verticale, trattamento anticorrosivo polywarm e coibentazione in schiuma poliuretana.
Marchio	CORDIVARI
Costruttore	--
Indirizzo costruttore	--
Modello	BOLLY 1 ST WB 300 litri matricola M000002130481245
Data del ricevimento oggetto in prova	26/11/2021
Periodo di prova	Dal 30 NOVEMBRE 2021 al 04 DICEMBRE OTTOBRE 2021

Questo rapporto non può essere riprodotto, se non integralmente, senza l'autorizzazione del laboratorio di prova che lo rilascia. I risultati esposti in questo rapporto di prova si riferiscono esclusivamente all'oggetto testato. Cordivari LAB non assume nessuna responsabilità per danni derivanti dall'interpretazione dei dati del presente documento riprodotto al di fuori del suo contesto.

0 Revisione	 P.I. Giovanni D'Egidio Esecuzione Test
----------------	--

CERTIFICATE

Kiwa Cermet Italia S.p.A.
Sede e stabilimento unico integrato
all'interno di un'area a
certificazione ISO 9001 e ISO 14001
Heating Unit
Via Gattorna, 10
40037 Sassuolo (Modena) Italy
Tel. +39 0536 486 3111
Fax +39 0536 486 380
E-mail: info@cermetitalia.it
www.cermetitalia.it

Certificate number:	17514 Rev.0	Product:	-
Serial:	ZIGG0004	First edition:	ZIGG0004
Request number:	PIC0012156	Expiry date:	ZIGG0004T
Page:	1 of 1	Contact number:	PIC0012160

Product Certificate Solar Thermal Products

License holder:	Cermet S.r.l. Zona Industriale Pagnara, 64023 - Mont'e Ope (TS), Italy
Production site(s):	Cermet S.r.l. Zona Industriale Pagnara, 64023 - Mont'e Ope (TS), Italy
Product:	Solar thermal system
Model(s):	Sistema termico solare Pagnara 150/12 Sistema termico solare Pagnara 200/15 Sistema termico solare Pagnara 300/20

Kiwa Cermet Italia hereby declares that the product can be considered complying with the testing requirements as outlined to test the Solar Systems List based upon the following aspects:

Laboratory testing of the solar thermal products, which are performed by an accredited laboratory in accordance to EN ISO/IEC 17025:2005 plus annex, using the following standards:

- EN 12974-1:2001
- Thermal solar systems and components – Factory made systems – Part 1: General requirements
- EN 12974-2:2010
- Thermal solar systems and components – Factory made systems – Part 2: Test Methods

Specific DIN Layback Scheme Rules for Solar Thermal Products DIN 68463/3

Periodic inspection of the factory stated performed by Kiwa Cermet Italia.
A description of the test results is given in the annex to this certificate.

Product may be used in accordance with the Kiwa Cermet Italia approval.

Publication of this certificate is without.

The validity of this certificate is subject to the duration of periodic surveillance visits.

The validity of this certificate shall neither be nullified nor reduced at the following website address: www.kiwacert.com

Any sale or partial reproduction of this document in any form without the Kiwa Cermet Italia signed authorisation, is prohibited.

Industry Division Manager
Mauro Lorenzini

ISO 9001 / ISO 14001

Member since March of Public Administration Law, set n. 488

Regulation of D.L. 98 and D.L. 98-Integration Agreement

034



**TECHNICAL
SUPPORT**

GENERAL CONDITIONS OF SALE AND WARRANTY

SOLAR THERMAL SYSTEMS

Sales of Cordivari Srl products are made in accordance with the below listed General Conditions of Sale and Guarantee. Any exception to these conditions is subject to written acceptance by Cordivari Srl.

1. SHIPMENT

The goods travel at the risk of the Customer, even if they are delivered at destination. The goods must be checked in the presence of the carrier at the time of delivery, verifying the integrity of the packaging, missing or wrongly shipped items. Any dispute must be immediately reported to the carrier / courier signing the transport document with reserve and confirming this reserve by registered letter within three days from reception of the goods. (Failure to observe this clause will release transport company and Cordivari srl from any liability).

2. DELIVERY TERMS

The delivery terms are approximate and if the proposed delivery time cannot be respected for any reason, the Customer will not be entitled to demand any compensation, penalty payments, cancellation or modification to the order given. In the event of extraordinary events such as natural disasters, strikes, lack of raw materials and force majeure, Cordivari srl reserves the right to choose the measures to be taken. If the ordered goods are not collected within the agreed terms, they will be invoiced and stored with costs, risks and risks for the customer.

3. WEIGHTS, MEASURES, SURFACES

Weights, measures, surfaces, shapes, illustrations, images and other data in this catalog or on the products are for illustrative purposes only and are not binding. Cordivari Srl reserves the right to make modifications or variations to its products without prior notice. Always refer to the technical documentation attached to the product and official certificates.

4. ORDER CANCELLATION OR MODIFICATION

Without the written consent of Cordivari Srl, the orders cannot be canceled or modified neither partially nor totally. No changes or modifications are agreed when the production has already begun. Any costs resulting from the cancellation or modification of the order will be invoiced to the customer.

5. WARRANTY

A) Complete SYSTEMS

The warranty period for manufacturing defects on complete systems is:

- 5 years for solar collectors and calorifiers.
- 2 years for all other accessories, technical, electrical and electronic components.
- In the case of systems sized by the purchaser, Cordivari guarantees only the quality of the components provided. The products and systems presented in our catalog are designed and manufactured in compliance with European legislation EC-EN-UNI and PED. The declarations of guarantee and conformity are therefore

valid only in countries where these regulations are valid and in force. In non-European countries or in countries that do not comply with these standards, Cordivari assumes no responsibility for warranty and compliance.

The warranty is void if the limit values indicated in Annex I Part C of Legislative Decree No. 31 of 02/02/2001 and subsequent modifications, implementation of the European directive 98/83 / EC, relating to the quality of the water intended for human consumption:

- pH (> 7 and <9)
- Chloride <250 mg / l
- Iron <200 µg / l
- Sulphate <200 mg / l
- Residual disinfectant <0.2 mg / l

With regard to water hardness, reference is made to the UNI CTI 8065 standard which regulates the values in domestic hot water systems:

- Total hardness 15-25 ° f

Any warranty is void in the event of non-compliance with the instructions indicated on the user manual supplied with the product, and if the rules described below are not respected.

B) SOLAR COLLECTORS

The warranty period for manufacturing defects on solar collectors is 5 years.

The use of non-original fixing structure or its improper assembly will void the warranty on the collector.

Changes in coloring, as well as the formation of stains, do not affect the performance of the solar collector, therefore they are not considered manufacturing defects.

C) CALORIFIERS

For all calorifiers with internal anti-corrosion treatment in Polywarm® or in 316L stainless steel, the warranty is 5 years.

For all other pressure tanks the warranty is 2 years.

The warranty covers manufacturing defects and is void if the provisions of this article are not observed. The warranty exists under the condition that the product is permanently and efficiently equipped with the cathodic protection provided, and that the installation of the products is compliant with the criteria of protection against overpressure, corrosion, legionella, as well as what is prescribed in the instructions for use and in all the possible standards regarding system engineering (see. Catalog CALORIFIERS AND THERMAL STORAGE in force). In the domestic hot water production systems, as well as in the heating ones, comply with the provisions of the UNI CTI 8065 standard which provides for various types of water treatments depending on its characteristics. The warranty does not cover damage resulting from failure to comply with the requirements of the UNI CTI 8065 standard.

The commitment to provide the warranty in points A, B, C of this article, exists provided that:

- The product has been stored in good condition and protected from adverse weather conditions before installation;
- The product has not been damaged during transport, handling or installation;

GENERAL CONDITIONS OF SALE AND WARRANTY

SOLAR THERMAL SYSTEMS

- No tampering or repairs have been carried out by unauthorized persons;
- The installation has been carried out by authorized personnel and in compliance with the instructions and the standards indicated in the technical documentation supplied, and compliance with any provisions of specific laws or technical standards;
- The accessories used are those regularly supplied by Cordivari Srl.;
- The buyer pays in the pre-established terms;
- No additions of aggressive chemicals to the water have been made;
- The operating pressure and temperature indicated in the catalog correspond to the pressure and the limit temperature of use.
- Any repairs or replacement of parts or products under warranty can take place at the sole discretion of Cordivari Srl. If carried out during the warranty period, they do not change the starting date and duration of the warranty itself.
- The warranty does not cover costs due to demolition work for the passage of products, both inbound and outbound, and labor cost for any product replacements. During the warranty period, Cordivari srl undertakes to replace the returned product, if recognized as defective due to proven manufacturing defects, and the customer will not be able to claim any other compensation for direct or indirect damage costs of any kind to persons and / or things resulting from these defects.
- The warranty starts from the date of the Cordivari sales invoice and is not renewed in any case in the event of a product replacement.
- Cordivari srl is not liable for any direct or indirect damage caused to things or persons due to product damage, as well as to incorrect or improper use of the same.
- The personnel in charge of Cordivari always and only acts as assistance for the product. The installer remains the person in charge of the installation to all intents and purposes, who must respect the technical prescriptions reported in this document as well as the ANCC, UNI-CIG regulations, VVFF and CEI.

The Cordivari Srl reserves the right to make at any time and at its sole discretion, any changes it deems useful and necessary to the data and technical characteristics of its products without interfering in the general conditions described above. For the accessories and for all the residual articles of this catalog not contemplated in the general conditions of sale, the warranty is 2 years.

6. PAYMENTS

The payments of the invoices must be made within the established deadlines. The delay in the payment of the invoices, even if partial, gives rise to interest on arrears to the extent of the current rate, in addition to the immediate suspension of the shipments in progress.

7. RETENTION OF TITLE

Until the customer has paid the final price of the delivered goods, the products remain property of Cordivari srl.

In the event of the buyer's non-fulfillment, even partial, Cordivari Srl may request the immediate return of the goods, withholding in any case the installments paid as compensation, without prejudice to greater damages.

8. PRICES

Prices are not binding and can be changed without notice. Prices can be reviewed based on the variations that may occur up to the time of delivery.

Prices are intended for delivery FCA Morro D'Oro (TE), unless otherwise agreed.

Prices are always shown in the price list, excluding VAT.

For bulky models Cordivari Srl reserves the right to request a participation in the packaging costs.

9. ORDERS/DELIVERY

The minimum order value is 2.000€. The confirmed orders definitively commit the Customer who must declare to know and accept all the conditions of sale. If the Customer draws up the order by name and on behalf and in the name of others, with the signing of the order he undertakes the fulfillment of what he has agreed. Delivery is intended exclusively at the Customer's headquarters/warehouse. Special requests of the Customer such as: express deliveries, delivery other than the office / warehouse, etc. will have additional costs that will be communicated from time to time to our sales office.

10. COURT AUTHORITY

For the present Catalogue and conditions only the provisions of Italian law will be used. For controversy, the Court of Teramo (Italy) shall have exclusive competence. Essential and trial law shall be exclusively Italian.

11. ORIGINAL VERSION

Translation of Cordivari General Sales Conditions and Warranty Terms, reported in this page, derives from the Italian version. In case of possible controversy, the official Cordivari General Sales Conditions and Warranty Terms are the one reported in the Italian language, stated at the back of the Italian catalogues.

CONDIZIONI GENERALI DI VENDITA E GARANZIA

SISTEMI TERMICI SOLARI

Le vendite dei prodotti della Cordivari Srl sono effettuate conformemente alle sotto elencate Condizioni Generali di Vendita e Garanzia.

Ogni deroga a queste condizioni è subordinata all'accettazione scritta da parte della Cordivari Srl.

1. SPEDIZIONE

La merce viaggia a rischio e pericolo del Cliente, anche se viene spedita franco destino. La merce deve essere verificata all'atto della consegna, controllando l'integrità dell'imballo, articoli mancanti o sostituzioni in presenza del trasportatore. Ogni contestazione dovrà essere segnalata immediatamente al trasportatore/corriere firmando con riserva il DDT e confermando tale riserva a mezzo lettera raccomandata entro tre giorni dal ricevimento merce. (In caso di mancata osservanza di questa clausola l'impresa di trasporto e la Cordivari srl sono svincolate da ogni responsabilità).

2. TERMINI DI CONSEGNA

I termini di consegna si intendono approssimativi e comunque se il termine di consegna proposto non potesse essere rispettato per qualsiasi motivo, il Cliente non avrà diritto a esigere alcun indennizzo, pagamenti di penali, annullamento o modifica all'ordine conferito. In caso di eventi straordinari quali calamità naturali, scioperi, mancanza di materie prime e cause di forza maggiore, la Cordivari srl si riserva la scelta delle misure da adottare. Se la merce ordinata non viene ritirata entro i termini concordati, questa verrà fatturata e immagazzinata con costi, rischio e pericolo a carico del committente.

3. PESI, MISURE, SUPERFICI

Pesi, misure, superfici, forme e dimensioni, illustrazioni o immagini e altri dati presenti in questo catalogo o sui prodotti hanno puro scopo illustrativo e non impegnativi e possono subire delle modifiche o variazioni che la Cordivari Srl si riserva di apportare ai suoi prodotti senza preavviso. Fare sempre riferimento alla documentazione tecnica allegata al prodotto e ai certificati ufficiali.

4. ANNULLAMENTO O MODIFICA ORDINE

Senza il consenso scritto della Cordivari Srl, le ordinazioni conferite non possono essere né parzialmente né totalmente annullate o modificate.

Non si accordano variazioni o modifiche quando è già stata intrapresa la lavorazione. Eventuali spese derivanti dall'annullamento o modifica dell'ordine saranno fatturate al cliente.

5. GARANZIA:

A) SISTEMI COMPLETI

La durata della garanzia per vizi originari sui Sistemi completi è:

- 5 anni per i Collettori Solari e per i Bollitori.
- 2 anni per tutti i restanti accessori, componenti tecnici, elettrici ed elettronici.
- In caso di sistemi dimensionati dall'acquirente, la Cordivari garantisce esclusivamente la qualità dei componenti ordinati. I prodotti e sistemi presentanti nel nostro catalogo

sono concepiti e realizzati in conformità con la legislazione europea EC-EN-UNI e PED. Le dichiarazioni di garanzia e di conformità sono quindi valide solo nei paesi in cui tali normative sono valide e in vigore. In paesi extra-europei o comunque in paesi che non recepiscono tali norme, la Cordivari non si assume alcuna responsabilità in merito a garanzia e conformità.

La garanzia decade qualora non vengano rispettati i valori limite indicati nell'allegato I Parte C del D.Lgs. n°31 del 02/02/2001 e successive modifiche, attuazione della direttiva europea 98/83/CE, relativa alla qualità dell'acqua destinata al consumo umano:

- pH (>7 e <9)
- Cloruro < 250 mg/l
- Ferro < 200 µg/l
- Solfato < 200 mg/l
- Disinfettante residuo < 0,2 mg/l

Per quanto riguarda la durezza dell'acqua si fa riferimento alla Norma UNI CTI 8065 che ne disciplina i valori negli impianti ad acqua calda sanitaria:

- Durezza totale 15-25 °f

Ogni garanzia decade in caso di non rispetto delle prescrizioni indicate sulle istruzioni d'uso e di montaggio fornite a corredo del prodotto e se non sono rispettate le norme descritte a seguire.

B) COLLETTORI SOLARI

La durata della garanzia per vizi originari sui collettori solari è di 5 anni.

L'utilizzo di strutture di fissaggio non originali, o il montaggio improprio delle stesse fanno decadere la garanzia sul collettore.

Modifiche della colorazione, come anche la formazione di macchie, non influiscono sulle performance del collettore solare, pertanto non sono difetti di produzione.

C) BOLLITORI

Per tutti i bollitori con trattamento anticorrosivo interno in Polywarm®, o acciaio inox 316L la garanzia è di 5 anni.

Per tutti gli altri recipienti in pressione la garanzia è di 2 anni.

La garanzia copre i difetti di fabbricazione e decade se non viene rispettato quanto indicato nel presente articolo. La garanzia sussiste a condizioni che il prodotto sia sempre dotato in maniera permanente ed efficiente della protezione catodica prevista a corredo, che l'installazione dei prodotti abbia rispettato i criteri della protezione dalla sovrappressione, corrosione, legionella e norme e prescrizioni di installazione e utilizzo, oltre che quanto prescritto nelle istruzioni d'uso e in tutte le eventuali norme in materia impiantistica (vedi. Catalogo listino BOLLITORI in vigore).

Negli impianti di produzione di acqua calda sanitaria, così come in quelli di riscaldamento, attenersi, ai fini della garanzia, a quanto disposto dalla norma UNI CTI 8065 che prevede vari tipi di trattamenti dell'acqua in funzione delle sue caratteristiche. La garanzia non copre danni derivanti da inadempienze alle prescrizioni della norma UNI CTI 8065.

L'impegno di prestare la garanzia nei punti A, B, C, D, del presente articolo, sussiste a condizione che:

- Il prodotto sia stato immagazzinato in buone condizioni e al riparo dalle intemperie prima dell'installazione;
- Il prodotto non abbia subito danneggiamenti durante il trasporto, le movimentazioni o l'installazione;

CONDIZIONI GENERALI DI VENDITA E GARANZIA

SISTEMI TERMICI SOLARI

- Non siano state effettuate manomissioni o riparazioni da persone non autorizzate;
- L'installazione sia stata realizzata da personale autorizzato e in conformità alle istruzioni e alle norme indicate sulla documentazione tecnica fornita e rispettate eventuali disposizioni di leggi o norme tecniche specifiche;
- Gli accessori utilizzati siano quelli regolarmente forniti dalla Cordivari Srl;
- Il compratore abbia effettuato il saldo dei pagamenti nei termini prestabiliti;
- Non siano state effettuate aggiunte di sostanze chimiche aggressive all'acqua;
- La pressione e la temperatura di esercizio indicate sul catalogo corrispondano alla pressione e alla temperatura limite di utilizzo;
- Eventuali riparazioni o sostituzioni in garanzia di parti o prodotti possono avvenire solo ed esclusivamente a giudizio insindacabile della Cordivari Srl e se effettuati durante il periodo di garanzia, non spostano la decorrenza e la durata della garanzia stessa;
- La garanzia non copre costi dovuti a demolizioni lavori per il passaggio dei prodotti sia in ingresso che in uscita e la manodopera per eventuali sostituzioni di prodotto. Cordivari srl si impegna durante il periodo di garanzia alla sostituzione del prodotto reso, riconosciuto difettoso per accertati difetti di produzione, oltre a ciò il committente non potrà vantare alcun altro risarcimento per spese di danno, diretti o indiretti di qualsiasi natura a persone e/o cose derivanti da detti difetti.
- La garanzia decorre dalla data della fattura di vendita della Cordivari e non si rinnova in alcun caso nell'eventualità di una sostituzione di prodotto;
- La Cordivari srl non risponde di eventuali danni diretti o indiretti causati a cose o persone per avarie del prodotto, così come per errato o improprio uso dello stesso;
- Il personale incaricato della Cordivari interviene sempre e solo a titolo di assistenza per il prodotto in quanto il responsabile dell'installazione rimane a tutti gli effetti l'installatore che dovrà rispettare le prescrizioni tecniche riportate nel presente certificato nonché le normative UNI-CIG, VVFF e CEI;

La Cordivari Srl si riserva il diritto di apportare in qualsiasi momento ed a suo insindacabile giudizio, tutte le modifiche che riterrà utili e necessarie a dati e caratteristiche tecniche dei propri prodotti senza che ciò interferisca nelle condizioni generali sopra descritte.

Per gli accessori e per tutti gli articoli residuali del presente catalogo non contemplati nelle condizioni generali di vendita, la garanzia è di 2 anni.

6. PAGAMENTI

I pagamenti delle fatture relative alle forniture dovranno essere effettuati entro i termini di scadenza stabiliti. Il ritardo nel pagamento delle fatture, anche se parziale, dà luogo alla decorrenza degli interessi di mora nella misura del tasso corrente, oltre alla sospensione immediata delle spedizioni in corso.

7. RISERVA DI PROPRIETÀ

Fino a quando il cliente non ha pagato l'ultima rata di prezzo di merce consegnata, i prodotti restano di proprietà della Cordivari srl. In caso di inadempimento anche parziale del compratore la Cordivari Srl potrà chiedere l'immediata restituzione della merce trattenendo comunque le rate pagate a titolo di indennità salvo il maggior danno.

8. PREZZI

I prezzi non sono impegnativi e possono essere modificati senza preavviso. I prezzi sono revisionabili in funzione delle variazioni che dovessero intervenire fino al momento della consegna.

I prezzi si intendono resa franco stabilimento di Morro D'Oro (TE), salvo diversi accordi.

I prezzi sono sempre riportati nel listino al netto di IVA.

Per modelli ingombranti la Cordivari Srl si riserva di chiedere una partecipazione alle spese di imballaggio.

9. ORDINI/CONSEGNA

Per gli ordini con consegna unica con valore imponibile di minimo Euro 1000, la spedizione è esente da contributi di trasporto; per ordini di valore inferiori alla somma di Euro 1.000, e/o richiesta di spedizione parziale il cui valore è inferiore alla somma di Euro 1000, il contributo è del 6% con addebito minimo di Euro 25,00 per ogni singola spedizione. Gli ordini impartiti impegnano definitivamente il Committente che deve dichiarare di conoscere e accettare tutte le condizioni di vendita.

Nel caso in cui il Committente rediga l'ordine per nome e per conto e in nome di altri, con la firma dell'ordine si impegna in solido all'adempimento di quanto da egli convenuto. La consegna si intende esclusivamente presso la sede/magazzino del Committente.

Richieste particolari del Committente come: consegne espresso, consegna diversa dalla sede/magazzino, etc. avranno costi aggiuntivi che verranno comunicati di volta in volta al nostro ufficio commerciale.

10. FORO COMPETENTE

Per qualsiasi controversia derivante dal presente contratto o collegata allo stesso è competente il Foro di Teramo.



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CORDIVARI SRL

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