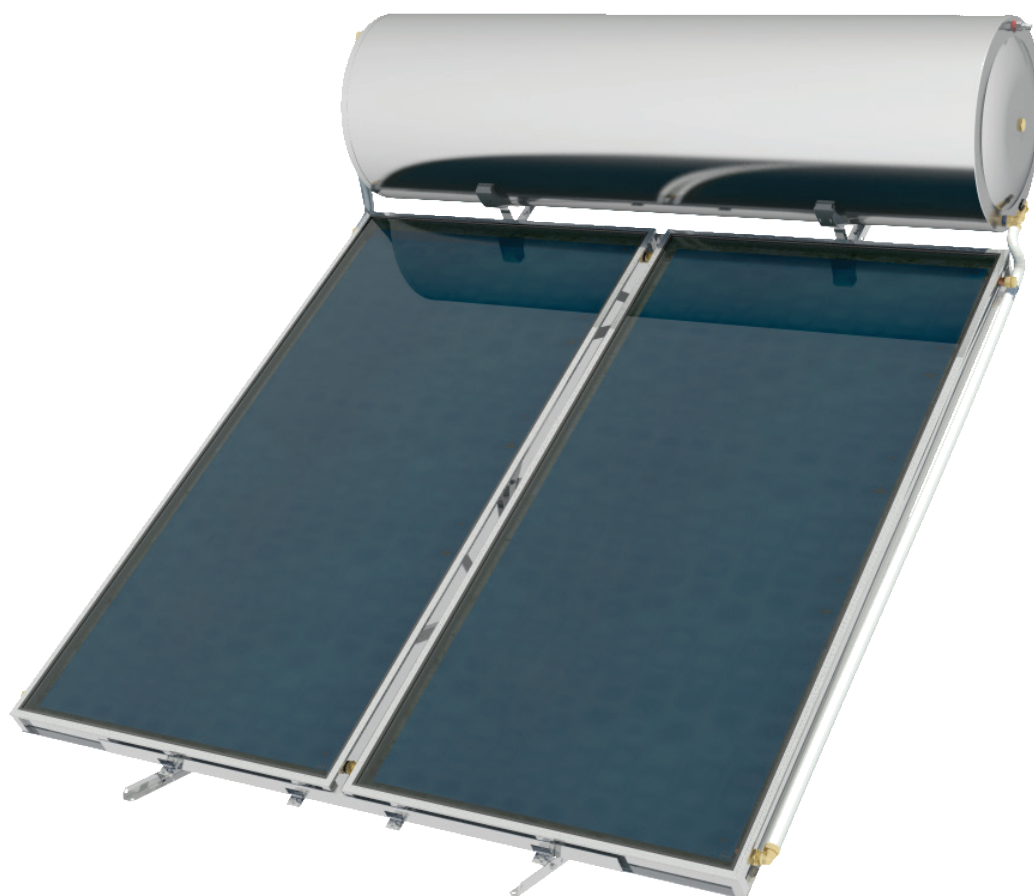




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SIME NATURAL 160S - 200S - 300/5.2S - 320S

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This manual provides all the necessary instructions for installing, operating and servicing the natural circulation system SIME NATURAL 160S - 200S - 300/5.2S - 320S.

Nowadays we know that we need to produce and save energy without polluting the environment. Our planet's conventional energy resources have decreased to an alarming level while people's energy requirements increase, generating polluting agents that affect the climatic balance.

The renewable energy sources solve the energy and pollution problems. The international legislation is gradually modifying and encouraging, even imposing, the use of alternative energy products with the aim of meeting the energy requirement without placing the environment at risk.

D.H.W. REQUIREMENT

It was statistically calculated that the average daily consumption of a family varies from 35-50 litres per person. Should we add the consumption of the washing machine and dishwasher in case they were connected to the solar system, around 20 litres are required daily for each appliance (for one wash).

A family made up of four people with an average D.H.W. consumption of 40 litres per person, requires a 160 litre solar water heater. The requirement increases by at least 40 litres per day if we add the domestic appliances connected to the solar system. To obtain the maximum benefit from the solar water heater, use the highest amount of hot water possible during the day so that the plant can continuously produce during the sunny period, maintaining yield to a maximum.

SOLAR SYSTEM FUNCTIONING - WATER HEATING

The collector surface heats the liquid (water or anti-freeze solution) circulating in the solar collector, through the solar energy it absorbs. The heated liquid becomes less heavy and moves towards the boiler heating the water contained therein. The collectors' liquid circulates naturally (thermosyphon flow).

There are many factors affecting the temperature of the water supplied by a solar panel and their oscillation values vary depending on the season, time of day and place.

As the solar panel is a system exposed to atmospheric conditions, the essential parameters affecting its yield are the supply water temperature, the solar energy available and the environment temperature.

The temperature of the mains water is not constant during the year as it is much colder in the winter than the summer. Considering 45°C as satisfying D.H.W. temperature (to meet the requirements of a home), it is given from the static data that the temperature of the mains water must increase by 35°C during the winter and 20°C in the summer.

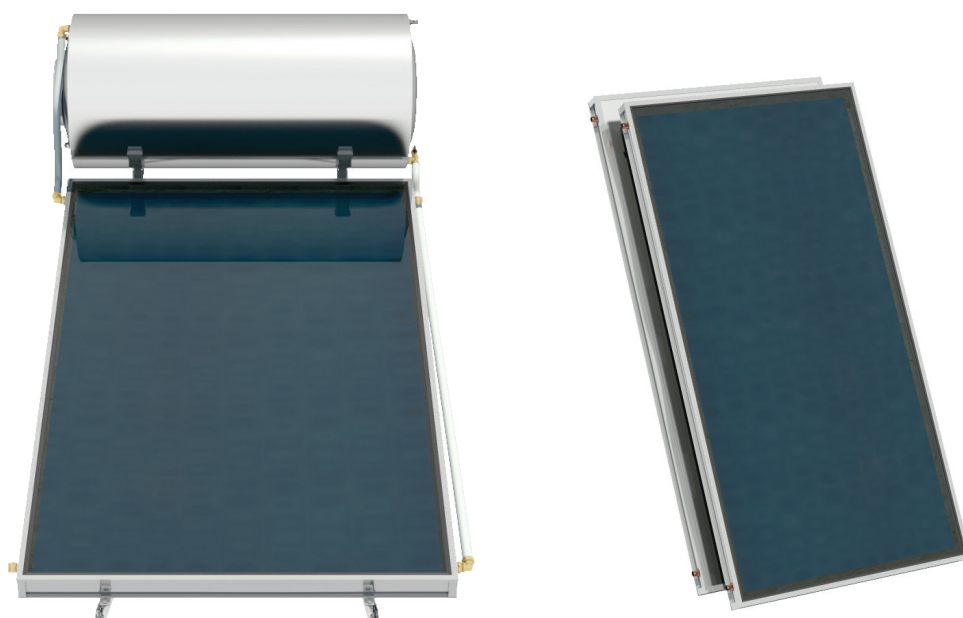
Furthermore, the available solar energy is not constant during the year as it assumes lower values during the winter months with respect to the summer period. The solar panel assures pre-heating and is assisted by using the electric heater or the central heating boiler (triple energy systems), in cases of reduced sun and low environment temperature. The heat losses during the night are minimised by the system's efficient thermal isolation. The leaks depend on the environment temperature that varies depending on the place and climatic conditions.

NATURAL CIRCULATION SOLAR SYSTEMS

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RELIABILITY - EFFICIENCY - AESTHETICS



Certification
Solar Keymark

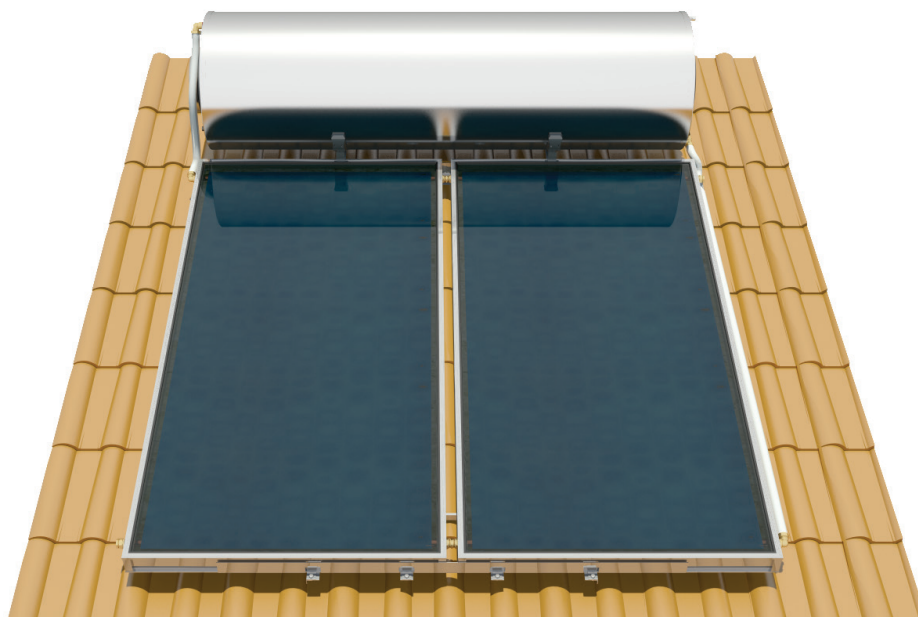


5 YEARS OF
WARRANTY

The natural circulation solar systems **Sime Natural S** constitute an ecological proposal and efficient energy solution that combines high results, autonomy, aesthetics, easy installation and money savings. They are made with materials that meet the international specifications. Their quality is proven by all the relative certifications and tests.

These are cutting-edge aesthetic systems that can be easily and quickly installed, they adapt to the more traditional or modern architectural style of buildings and allow using D.H.W. almost all-year-round. Even in the regions with scarce sunlight, the solar systems reach water pre-heat thus contributing to the significant reduction of conventional energy consumption.

An energy saving varying between 70 and 100% is obtained by using natural circulation solar systems. At the same time, the boiler or electric heater operating time is reduced with a simultaneous reduction of the carbon dioxide emissions, based on the sunlight of the different regions and the system dimensions.



SUPPLY

RANGE OF PRODUCTS

The natural circulation solar systems **Sime Natural S** are available with aluminium and copper solar collector and with black painted absorber.
Each is available in the following models:

Code	Model	Description
8500240	SIME NATURAL 160S	160 L boiler, 2 m ² solar collector (1)
8500250	SIME NATURAL 200S	200 L boiler, 2.6 m ² solar collector (1)
8500264	SIME NATURAL 300/5.2S	300 L boiler, 2.6 m ² solar collector (2)
8500260	SIME NATURAL 320S	320 L boiler, 2 m ² solar collectors (2)

The packaging of each model contains all the necessary equipment:

1. The boiler;
2. The collector(s);
3. The support frame, the supplies and accessories.
















The boiler is located between two protective coverings, fastened to the boiler with a strap.

The solar collector is packed in a cardboard box.

All fixing frame pieces, including the connection accessories, the anti-freeze liquid and the other accessories, are packed in a cardboard box.



The supplies and accessories of each solar system are stated in the following table:

SUPPLIES AND ACCESSORIES FOR THE SOLAR SYSTEMS					
SIME NATURAL 160S - 200S (1 COLLECTOR)			SIME NATURAL 300/5.2S - 320S (2 COLLECTORS)		
	Quantity	Description		Quantity	Description
	2 PC.	COPPER ELBOW Ø 22 x DN16 STAINLESS STEEL		2 PC.	CONNECTOR Ø 22 COPPER x Ø 22 COPPER
	2 PC.	COPPER END CAP Ø 22		2 PC.	COPPER ELBOW Ø 22 x DN16 STAINLESS STEEL
	1 PC.	SAFETY VALVE ONE-WAY 10 bar		2 PC.	END CAP Ø 22 COPPER
	1 PC.	SAFETY VALVE 3 bar		1 PC.	SAFETY VALVE ONE-WAY 10 bar
	2.65 m	STAINLESS STEEL PIPE DN16 0.65 m and 2.0 m		1 PC.	SAFETY VALVE 3 bar
	3.0 m	ISOLATION Ø 22 x 9		2.78 m	STAINLESS STEEL PIPE DN16 0.78 m and 2.0 m
				3.0 m	ISOLATION Ø 22 x 9
	2 PC.	ANTI-FREEZE LIQUID 1L		4 PC.	ANTI-FREEZE LIQUID 1L

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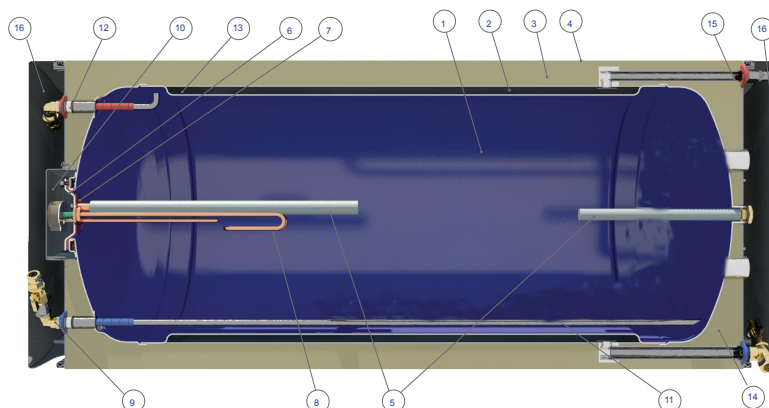


Fonderie Sime SpA reserves the right to amend all of the product and relative accessories specifications without prior warning.

TECHNICAL FEATURES OF THE SOLAR BOILER

GLAZED STEEL SOLAR BOILER

1. **Tank:** cold-rolled 2.5 mm thick steel with glazed double internal layer, fired at 860°C according to DIN 4753.
2. **External boiler casing:** with internal expansion tank: in cold-rolled steel for closed circuit operation, required in the regions with lower temperature or with higher concentration of salt in the water mains.
3. **Thermal insulation:** the ecological, high density expanded polyurethane guarantees minimal heat loss while maintaining the DHW temperature.
4. **External casing:** naval aluminium alloy / pre-painted galvanised steel.
5. **Cathodic protection:** 2 magnesium anodes Ø22x300 mm/ 200 g and Ø26x500 mm/ 500 g for an efficient protection against corrosion and limescale deposits caused by the electrolytic reactions.
6. **Large circular flange:** innovative and elegant design to easily clean from limescale, quickly replace the anode and immediately access the electric components.
7. **Flexible gasket:** non-toxic silicone single piece preventing contact of water with flange. purposely made to resist to high temperatures.
8. **Electric heater:** classified according to the local regulations of the destination country (Optional for the use of electricity as auxiliary energy source). Conform with Standards EN 60335-1 and EN60335-2-21, all electrical components are EC marked.
9. **Adjustable automatic thermostat:** with bipolar protection with auxiliary safety. All electrical parts are EC marked according to Standards EN 60335-1 and EN 60335-21.
10. **Protective covering:** designed to guarantee electric components' ventilation and protection against atmospheric agents.
11. **Cold water inlet:** male threaded brass fitting 1/2" BSP and 8 bar safety valve.
12. **DHW outlet:** male threaded fitting 1/2" BSP.
13. **Casing inlet:** male threaded fitting 3/4" BSP.
14. **Casing outlet:** closed circuit filling point: male threaded fitting 3/4" BSP.
15. **Safety valve connection location 1.5 bar or 2.5 bar:** male threaded fitting 1/2" BSP.
16. **Heat exchanger:** with female threaded fittings 3/4" BSP, with stainless steel sleeve, large exchange surface to use the heat produced by the central heating systems during the winter (optional).

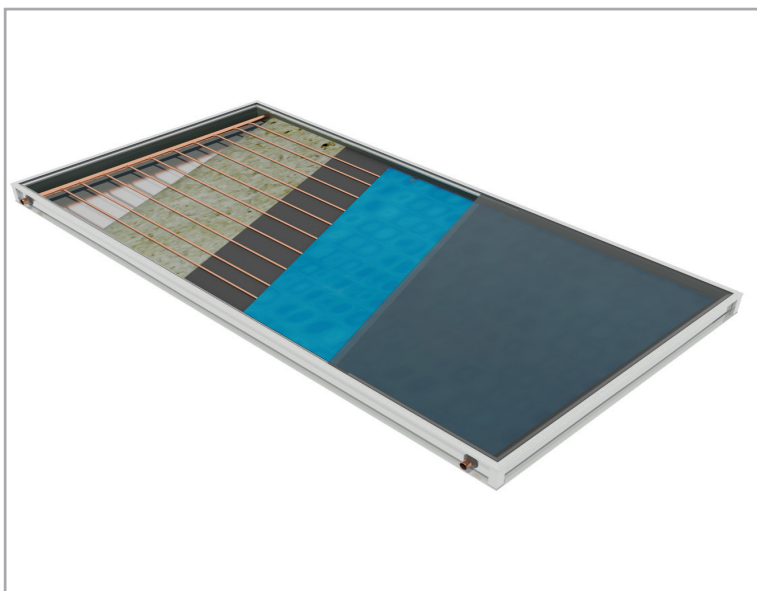
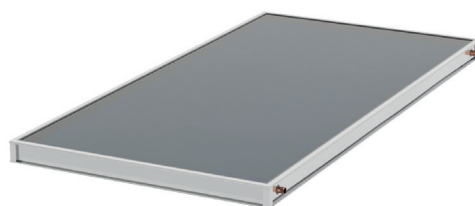
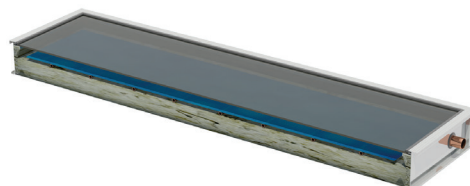
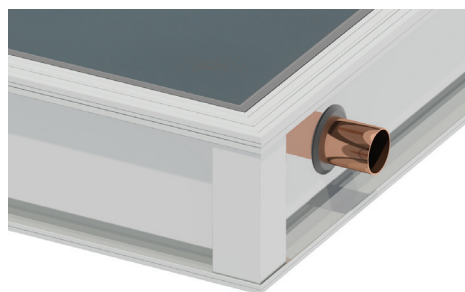
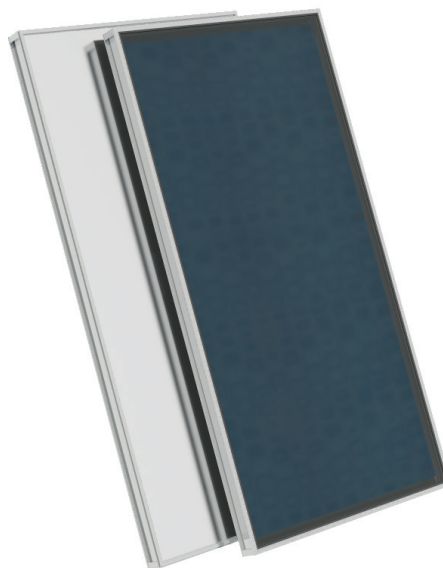


TECHNICAL FEATURES OF THE SOLAR COLLECTOR SIME PLANO

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1. **Frame of aluminium profile collector** (Al Mg Si 05).
2. **Rear covering** in 0.5 mm galvanised steel with flexible EPDM gasket.
3. **Tubular coil in copper tubes:** perfect intersection and thickness. The heads are drilled with upward discharge for the perfect adaptation of the collectors and to avoid pressure drops. Distance between pipes = 107 mm (EN 1652).
4. **Absorber with single surface** made of 0.3 mm thick selective aluminium that covers the entire surface of the window and the supply and return pipes, increasing the collector's captivating power, Laser welded to the coil.
5. **High density thermal insulation**, obtained with a 50 mm (rear) and 20 mm (sides) thickness layer in glass wool for maximum reduction of heat losses.
Insulation thermal conductivity in glass wool: $\lambda = 0,035 \text{ W/m grad}$ (DIN 56612, measurement at 0 °C).
6. **Tempered Mistlite solar glass**, with a constant expansion coefficient and a high luminous transmittance, can support adverse atmospheric conditions (e.g. hail, extreme change of temperatures, etc.). ANSI Z 97-1 (U.S.A.) BS 6206 (GREAT BRITAIN) DIN 52337 (GERMANY).

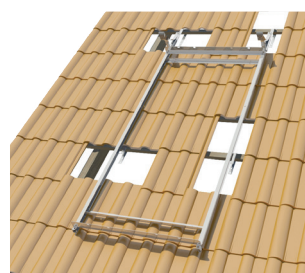


Basic support system in galvanised steel for installation on flat or inclined surfaces.

FLAT SURFACE




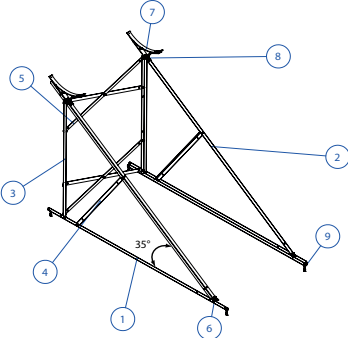
INCLINED SURFACE



CONFIGURATION SIME NATURAL 160S (2 m²)

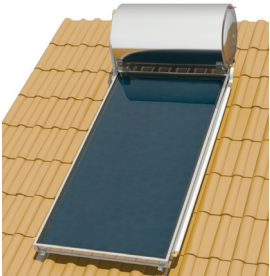
SIME NATURAL 160S
FLAT SURFACE

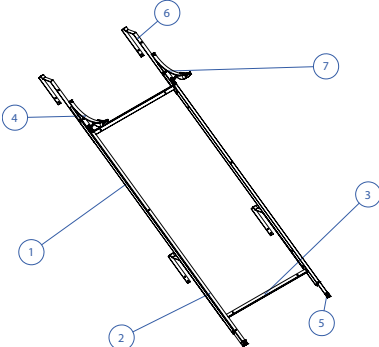




Pos.	Description	N°
1	Base support	2
2	Collector support	2
3	Vertical support	2
4	Cross support	2
5	Support X BA AE	4
6	Collector Holder	8
7	Tank support	2
8	Bolt M8x16, Nut M8	28
9	Bolt, Washer, Upad D10	4

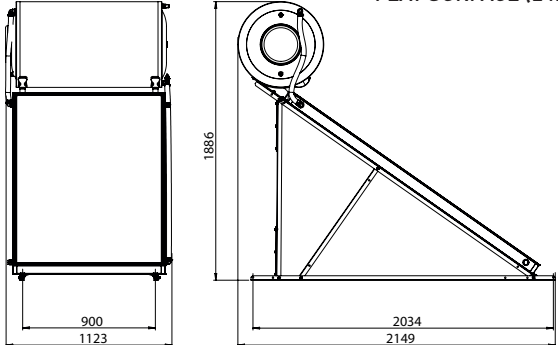
SIME NATURAL 160S
INCLINED SURFACE



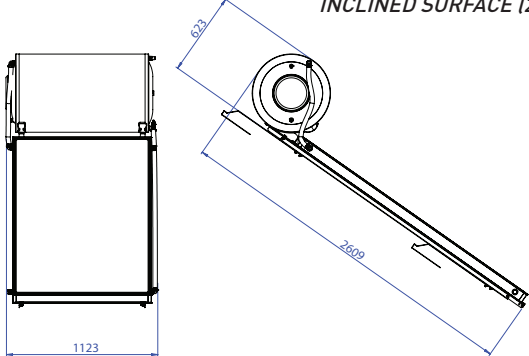


Pos.	Description	N°
1	Base support	2
2	Collector support	2
3	Cross support	2
4	Tank support	2
5	Collector Holder	4
6	Support X BA AE	4
7	Bolt M8x16	20

FLAT SURFACE (2 m²)



INCLINED SURFACE (2 m²)



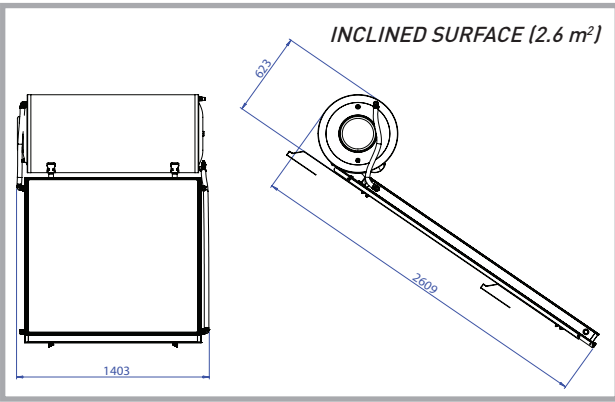
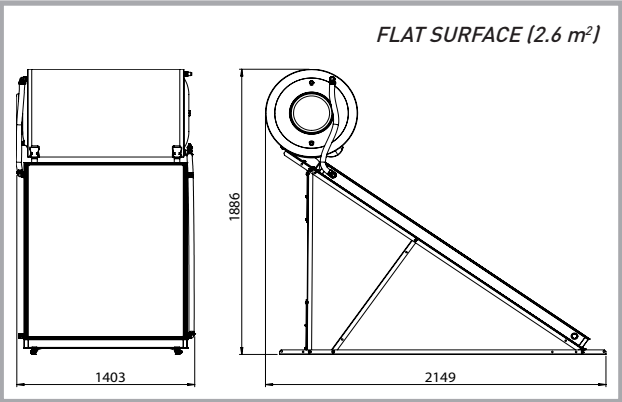
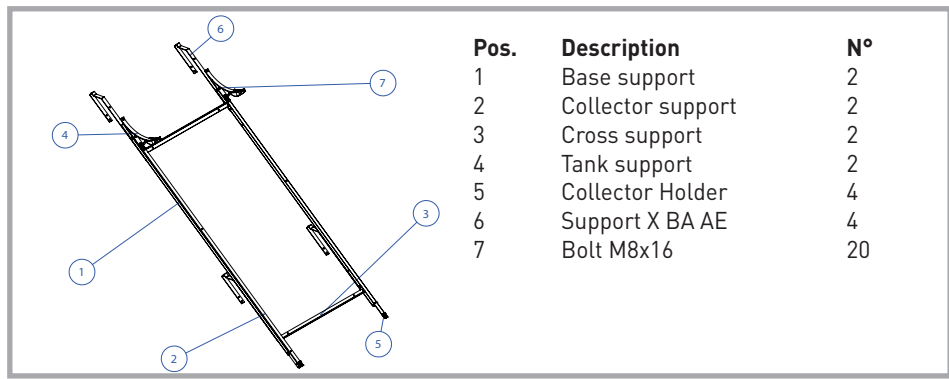
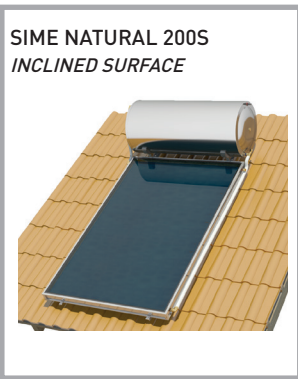
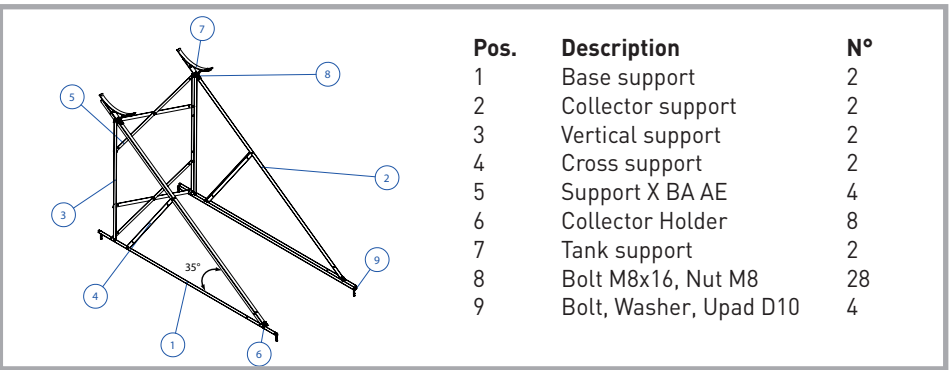
TANK FOR WATER STORAGE	160 L
DIMENSIONS (mm)	580 x 1116
VACUUM WEIGHT (kg)	75.6
DOUBLE WALL CAPACITY (L)	12.9
DOUBLE WALL SURFACE (m²)	0.91
MAX TEST PRESSURE (bar)	15
MAX WORKING PRESSURE (bar)	10

TOTAL SYSTEM	SIME NATURAL 160S (2 m²)
NUMBER OF COLLECTORS	1
WEIGHT OF THE VACUUM/FULL SYSTEM (kg)	140 / 293
MAX WORKING PRESSURE OF THE WATER TANK (bar)	10
MAX WORKING PRESSURE OF THE CLOSED CIRCUIT (bar)	2.5
MAX OPERATING TEMPERATURE	95°C

SOLAR COLLECTOR	SIME PLANO 182
TOTAL AREA (m²)	2.09
NUMBER OF COLLECTORS	8 (ø 8)
HEAT TRANSFER MEAN	PROPYLENE GLYCOL SOLUTION
CAPACITY (kg)	1.28
ABSORBER SURFACE (m²)	1.80
TOTAL DIMENSIONS (mm)	2030 x 1030 x 80
TOTAL VACUUM COLLECTOR WEIGHT (kg)	36
ABSORBER	SELECTIVE ALUMINIUM
ABSORBING / RADIATION COEFFICIENT	95% +/-2% / 5% +/-2%

Note: All dimensions are measured in mm

CONFIGURATION SIME NATURAL 200S (2.6 m²)



TANK FOR WATER STORAGE	200 L
DIMENSIONS (mm)	580 x 1356
VACUUM WEIGHT (kg)	93
DOUBLE WALL CAPACITY (L)	18.3
DOUBLE WALL SURFACE (m²)	1.28
MAX TEST PRESSURE (bar)	15
MAX WORKING PRESSURE (bar)	10

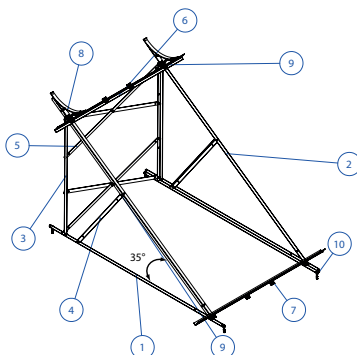
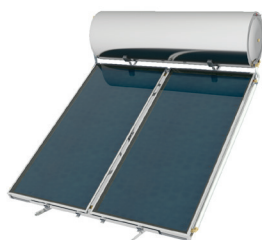
TOTAL SYSTEM	SIME NATURAL 200S (2.6 m²)
NUMBER OF COLLECTORS	1
WEIGHT OF THE VACUUM/FULL SYSTEM (kg)	167 / 365
MAX WORKING PRESSURE OF THE WATER TANK (bar)	10
MAX WORKING PRESSURE OF THE CLOSED CIRCUIT (bar)	2.5
MAX OPERATING TEMPERATURE	95°C

SOLAR COLLECTOR	SIME PLANO 230
TOTAL AREA (m²)	2.6
NUMBER OF COLLECTORS	11 (ø 8)
HEAT TRANSFER MEAN	PROPYLENE GLYCOL SOLUTION
CAPACITY (kg)	1.64
ABSORBER SURFACE (m²)	2.30
TOTAL DIMENSIONS (mm)	2030 x 1280 x 80
TOTAL VACUUM COLLECTOR WEIGHT (kg)	45
ABSORBER	SELECTIVE ALUMINIUM
ABSORBING / RADIATION COEFFICIENT	95% +/-2% / 5% +/-2%

Note: All dimensions are measured in mm

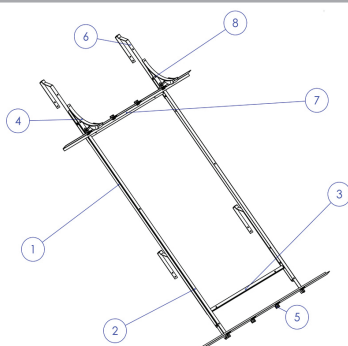
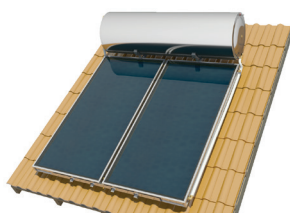
CONFIGURATION SIME NATURAL 300/5.2S (5 m²) - 320S (4 m²)

**SIME NATURAL
300/5.2S - 320S
FLAT SURFACE**



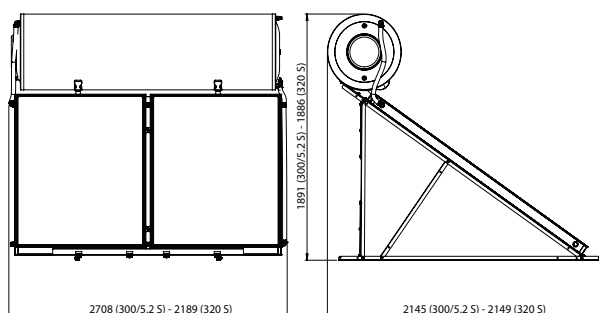
Pos.	Description	N°
1	Base support	2
2	Collector support	2
3	Vertical support	2
4	Cross support	2
5	Support X BA AE	4
6	Crossbar AE 2 CO	2
7	Collector Holder	8
8	Tank support	2
9	Bolt M8x16, Nut M8	32
10	Bolt, Washer, Upad D10	4

**SIME NATURAL
300/5.2S - 320S
INCLINED SURFACE**

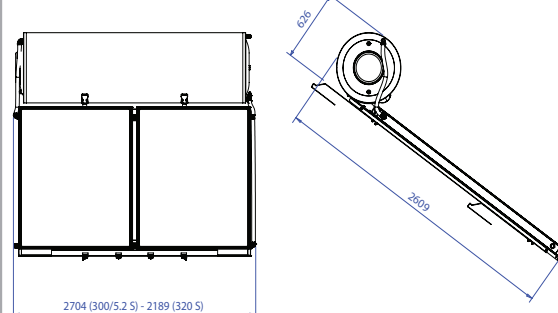


Pos.	Description	N°
1	Base support	2
2	Collector support	2
3	Cross support	2
4	Tank support	2
5	Collector Holder	8
6	Support X BA AE	4
7	Crossbar AE 2 CO	2
8	Bolt M8x16	24

FLAT SURFACE (5/4 m²)



INCLINED SURFACE (5/4 m²)



TANK FOR WATER STORAGE	300 L	320 L
DIMENSIONS (mm)	580 x 2000	580 x 2076
VACUUM WEIGHT (kg)	116.8	136.4
DOUBLE WALL CAPACITY (L)	25.8	25.8
DOUBLE WALL SURFACE (m²)	1.79	1.79
MAX TEST PRESSURE (bar)	15	15
MAX WORKING PRESSURE (bar)	10	10
SIME NATURAL	300/5.2S	320S

TOTAL SYSTEM	SIME NATURAL 300/5.2S (5 m²)
NUMBER OF COLLECTORS "SIME PLANO 230"	2
WEIGHT OF THE VACUUM/FULL SYSTEM (kg)	263 / 588
MAX WORKING PRESSURE OF THE WATER TANK (bar)	10
MAX WORKING PRESSURE OF THE CLOSED CIRCUIT (bar)	1.5
MAX OPERATING TEMPERATURE	95°C

TOTAL SYSTEM	SIME NATURAL 320S (4 m²)
NUMBER OF COLLECTORS "SIME PLANO 182"	2
WEIGHT OF THE VACUUM/FULL SYSTEM (kg)	245 / 569
MAX WORKING PRESSURE OF THE WATER TANK (bar)	10
MAX WORKING PRESSURE OF THE CLOSED CIRCUIT (bar)	1.5
MAX OPERATING TEMPERATURE	95°C

SOLAR COLLECTOR	SIME PLANO 230 (SIME NATURAL 300/5.2S)	SIME PLANO 182 (SIME NATURAL 320S)
TOTAL AREA (m²)	2.6	2.09
NUMBER OF COLLECTORS	11 (ø 8)	8 (ø 8)
HEAT TRANSFER MEAN	PROPYLENE GLYCOL SOLUTION	PROPYLENE GLYCOL SOLUTION
CAPACITY (kg)	1.64	1.28
ABSORBER SURFACE (m²)	2.30	1.80
TOTAL DIMENSIONS (mm)	2030 x 1280 x 80	2030 x 1030 x 80
TOTAL VACUUM COLLECTOR WEIGHT (kg)	45	36
ABSORBER	SELECTIVE ALUMINIUM	SELECTIVE ALUMINIUM
ABSORBING / RADIATION COEFFICIENT	95% +/-2% / 5% +/-2%	95% +/-2% / 5% +/-2%

Note: All dimensions are measured in mm

GENERAL INSTALLATION RULES

ATTENTION:

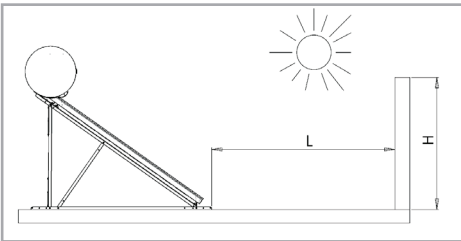
Installation must be conform to the local standards in force for hydraulic and electric plants.

Remove the water heater packaging in the place of installation to protect the equipment against impacts during transport, avoiding resting the collectors' weight on the pipes connection fittings. The collectors' crystals must remain covered until installation is completed, until the boiler is filled with domestic water to avoid the filling liquid from boiling or the crystals from breaking. Remove the plastic protective caps from the boiler and collectors' connection fittings.

Installation point: the installer must accurately choose the place of installation before proceeding, (in agreement with the customer). It is also necessary to check (considering the static resistance) that the surface is able to support the system's weight.

On inclined roofs, the system must never be placed between two beams but above a single beam.

LATITUDE	DISTANCE BETWEEN OBSTACLE AND COLLECTOR (L)
0° - 25°	1.0 x H
26° - 35°	1.5 x H
36° - 45°	2.0 x H
46° - 50°	2.5 x H
> 50°	3.0 x H



Direction - Perfect inclination - Shading: It is essential, in order to obtain maximum solar system yield, to properly choose the inclination and direction with regard to the installation place and the maximum production period requested. The solar panels must be directed so that their surface faces the geographic South in the northern hemisphere (geographic North in the southern hemisphere), meaning they always face the equator.

A change of direction means a decrease in the plant's yield. Correct the system yield if the change of the correct direction is inevitable, by increasing the collectors' surface based on an assessment of the specific conditions.

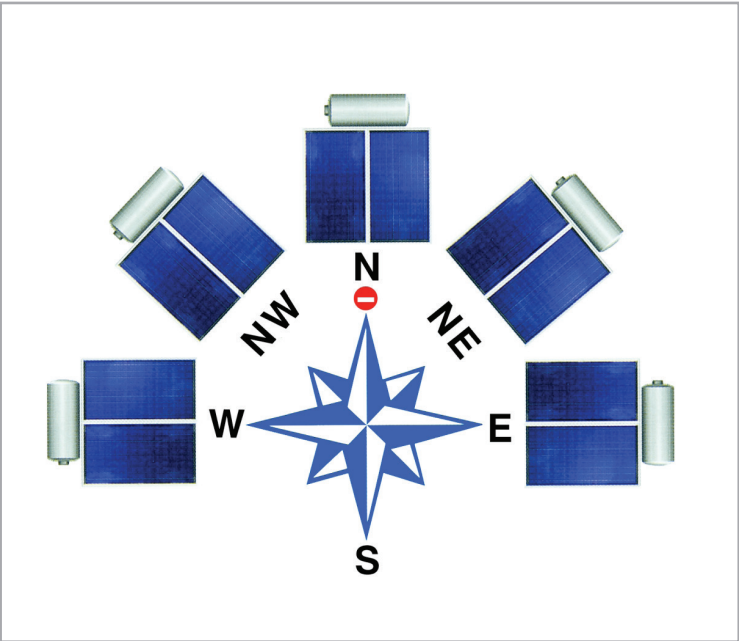
As the angle of incidence of the solar radiation changes with the season and with the system's place of installation, the collectors' angle of inclination must be almost equal to the place of installation latitude. This inclination gives a maximum annual energy production. Avoid the system being shaded by trees, buildings, other obstacles in order to guarantee the collectors' surface to at least 4 hours of full exposure of solar radiation during midday.

Installation specification: should the installation surface of the solar heater (inclined or flat) not be compatible with the standard equipment supplied with the system, a different type of equipment must be used.

The installer is responsible for choosing the equipment. The company is in no way responsible. Prior agreement with the customer, the installer is responsible for proposing and installing the different equipment required.

Particular atmospheric conditions: it is necessary to make sure that, in regions characterised by heavy snow, this is immediately removed. In this case and in regions affected by storms, strong wind, heavy showers, cyclones and tornado, the system to be placed on the roof must be as stable as possible and secured with further metal straps.

We recommend stipulating an insurance policy for the solar water heater in areas where these conditions occur and hailstones larger than 20 mm are seen. However, we recommend fixing the solar water heater to the basic support system using more metal belts than supplied.



Piping: the piping and cables' path must be agreed between the installer and the customer to guarantee perfect solar system installation, in compliance with the local standards on water and electric systems.

Make sure the connection pipes between the tank and the collector and the pipes from and to the water heater, are adequately isolated to support temperatures between: -30°C and 120°C. Anti-UV protection must be used for the insulation.

Anti-freeze liquid: the special heat transfer means used in the closed circuit protect the system against freezing and salt accumulation inside the collector's pipes. The double wall where the heat transfer mean circulates does not communicate with the water storage tank. The thermal fluid must be mixed with an adequate amount of water to protect the system. The responsibility for an adequate amount of heat transfer mean and use of a different liquid from that supplied with the solar water heater, lies with the installer and the company.

The use of water or other inappropriate liquid may cancel the warranty.

The work execution area must be cleaned and tidied-up once installation is completed. The warranty form must be filled-in, signed by the customer and immediately sent to the company. The customer must also fill-in the check list supplied by the company. The company does not undertake any liability deriving from an inadequate installation or incorrect use of the components used for installing the solar water heater.

POSITIONING THE SOLAR COLLECTORS

The plant can only be installed on flat roofs and surfaces with adequate supporting capacity. Make sure the roof and/or construction have an adequate supporting static capacity, according to the maximum loads foreseen in the installation point, before installing.

The entire system must be checked by an expert, such as a qualified engineer, from a static point of view, should the plant be in an extremely windy or snowy area. Reinforced or more solid constructions may be required in particular cases.

SOLAR COLLECTOR		
INSTALLATION MODE	WIND LOAD [km/h] / [kN/m ²]	SNOW LOAD [kN/m ²]
Inclined surface Angle of inclination 15° – 75°	151 / 1.1	1.25
Flat surface Angle of inclination: 35°	151 / 1.1	1.25
The system can only be installed where the wind and snow loads are below those stated above.		

Space requirements for roof installation

Tiled roof

The following steps must be carried out for roof installation:

- The minimum distances from the roof ends must be:
- From sides: same distance to the width of two tiles.
- From the top of the roof: same distance to three rows of tiles.
- The minimum distance limit of 0.8 m must be respected to avoid exposing the collectors and assembly accessories to wind, which force increases along the roof perimeter.

Space requirements for single installation

Flat roof

The system must be installed at at least 1.5 m from the roof edges, so that:

- The systems are accessible for maintenance.
- The plant and fixing system are not exposed to strong winds developing at the ends and along the edges of the roof.
- The snow is removed.

GENERAL PREVENTION MEASURES

- The solar heat systems and relative piping must be installed respecting the health and safety and accident prevention instructions.
- Keep the work place clear and without objects that can obstruct executing the work.
- Do not allow children, animals and other people to come into contact with the instruments or near the work place. This rule must be respected, particularly when restructuring already existing buildings.
- Preserve the anti-freeze liquid in a safe place, away from the reach of children.
- Remove the devices and electric instruments of the current collector or protect them against an accidental switch-on during maintenance execution, assistance or change in installation.
- Only use the instruments provided for this specific solar system. The use of other inadequate components or instruments can cause accidents.

Personnel requirements

- The thermal solar systems must only be installed by qualified companies and trained personnel having appropriate authorisation.
- Work on the plants and electric wires must only be carried out by qualified and trained electricians.

Personal protective equipment

- Wear protective goggles, adequate work clothes, protective shoes and helmet and a specific net for long hair.
- Do not wear wide clothes or jewellery as they may get caught up in the moving parts.
- Should the anti-freeze liquid come into contact with the eyes, despite using the protective goggles, keep the eyes open and rinse them with running water.
- Wear the protective helmet during installation carried out level with or above the head level.

Boiler installation

- For boiler transport, assembly and installation, use suitable forklifts for the boiler dimensions and weight.
- Protect the glazed surface against impacts that might occur during transport and installation.
- There is a risk of accidents due to the boiler weight. Make sure the capacity of the support plan where the boiler will be installed is also adequate for a full boiler.

Dismantling the system

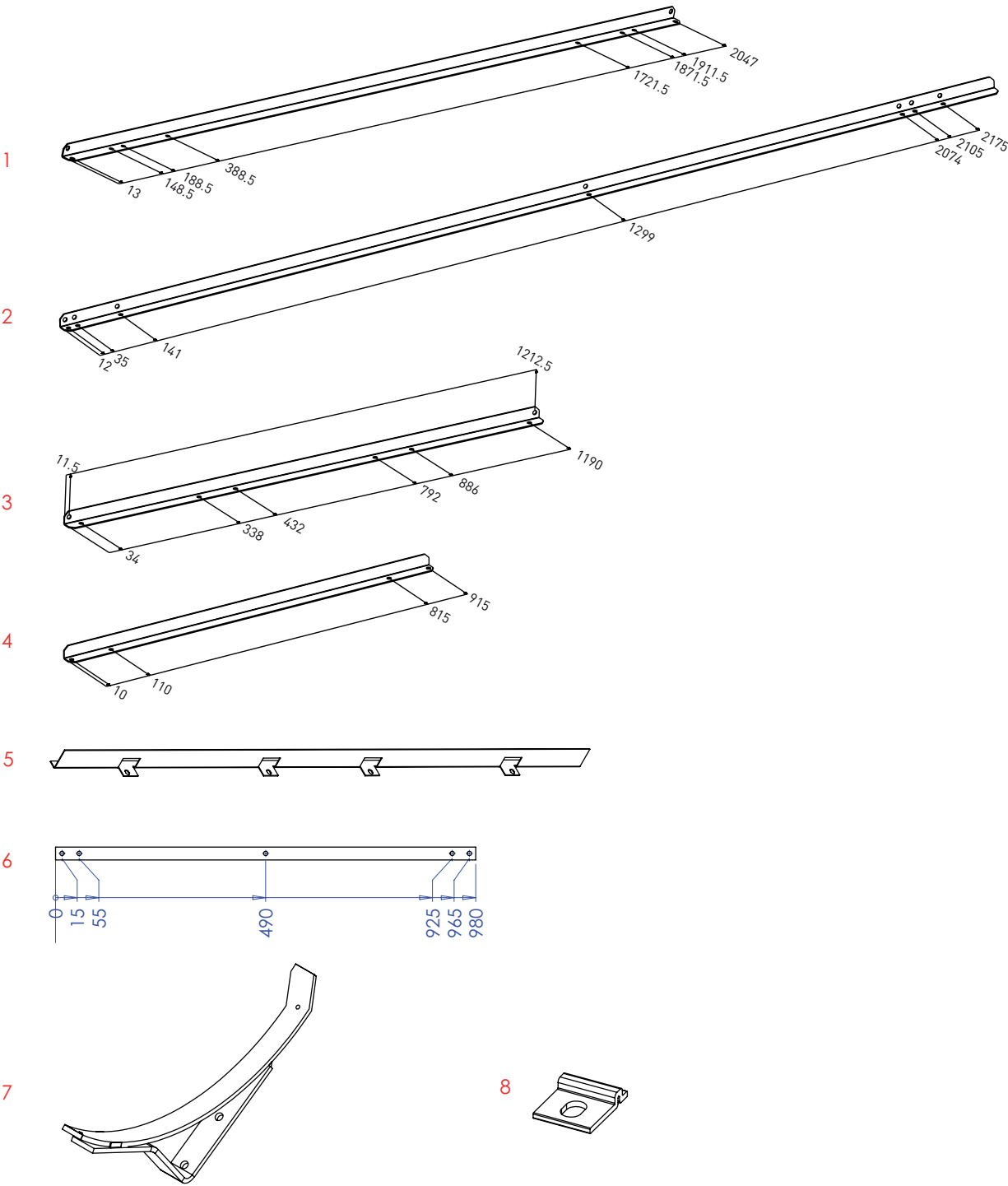
The thermal solar system must only be dismantled by qualified companies and trained personnel having appropriate authorisation. Only trained and qualified electricians can disconnect the electric parts.

Exhausted thermal solar systems must be disposed of in compliance with local regulations. Where possible, particular attention must be paid to materials recycling.

PROTECTION AGAINST LIGHTNING

The metal parts of the entire system conform with the main requirements of Standard EL0T 1197 and the special protective requirements against lightning of Standard EL0T 1412 that considers the environmental conditions and the altitude.

SUPPORT FRAME FOR SOLAR BOILER



SUPPORT FRAME FOR FLAT ROOF

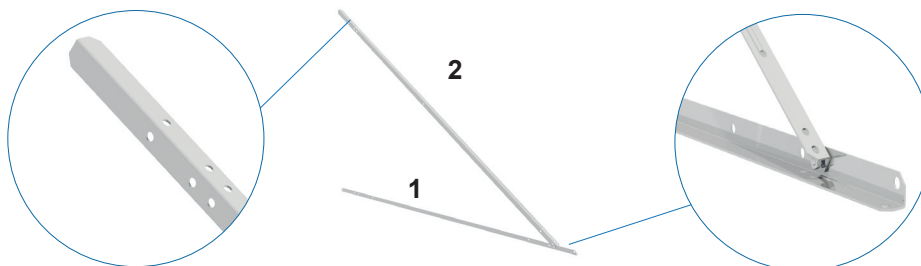
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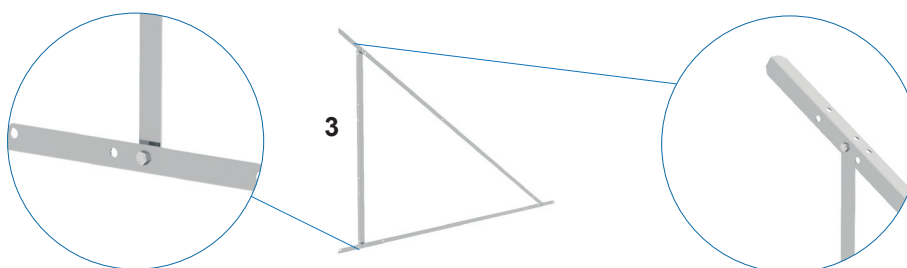
ATTENTION: After installation, check the collectors' surface has an inclination angle of 35° respect to the horizontal position.

SYSTEMS WITH 1 OR 2 COLLECTORS

1. Tighten parts 1 and 2 using the provided screws and M8 nuts.
Repeat the same operation for the second coupling.



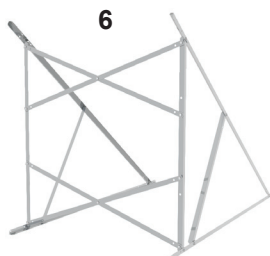
2. Tighten vertical part 3 to the above parts.



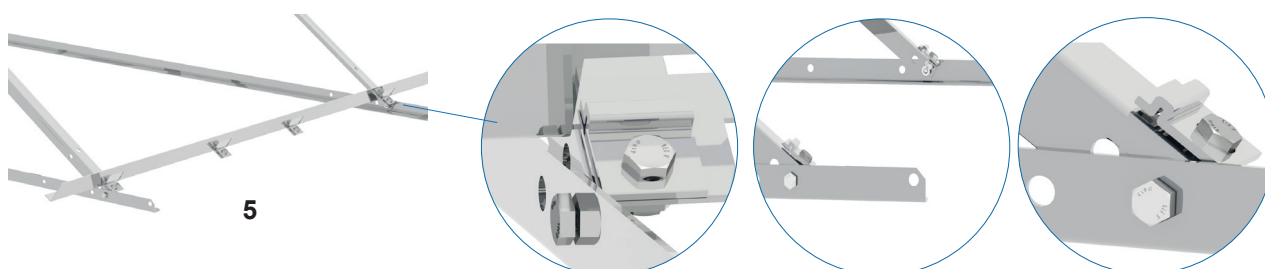
3. Tighten diagonal part 4 to the above parts and fasten all screws. Repeat steps 1, 2 and 3 for the other pairs of parts.



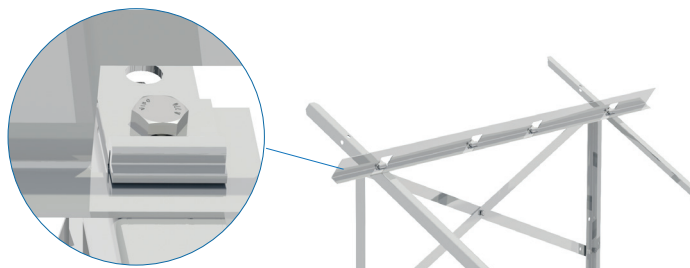
4. Cross position parts 6 of the Drawing and fasten the screws.



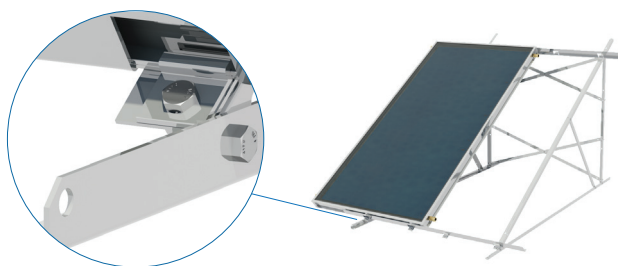
5. For the two collector model, place the collector 5 support on the lower part; place the four fixing washers of the collectors between the spaces of the parts, without fastening the M8 screws with nuts.
Part 5 is not required for the single collector model. The collector is fixed with the 2 fixing washers of collectors, as described in figures 5a and 5b.



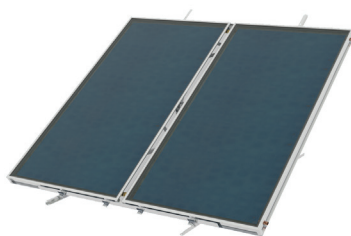
6. Repeat the same operation for the top part.



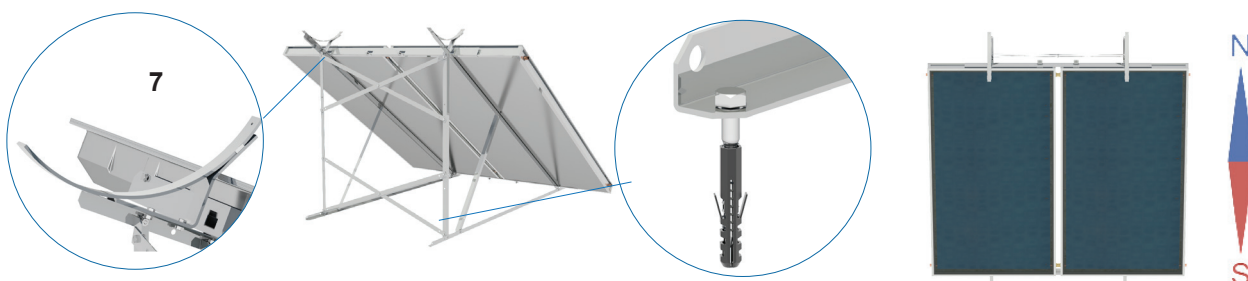
7. For the two collector model, firstly place the left one lifting the upper support part of the collector. Slightly tighten the M8 screws and nuts with the collector support parts when the same collector is placed underneath, in order to easily temporary assemble and centre it with the system. Position the Ø22 fittings mechanically fastened to the collector edges.



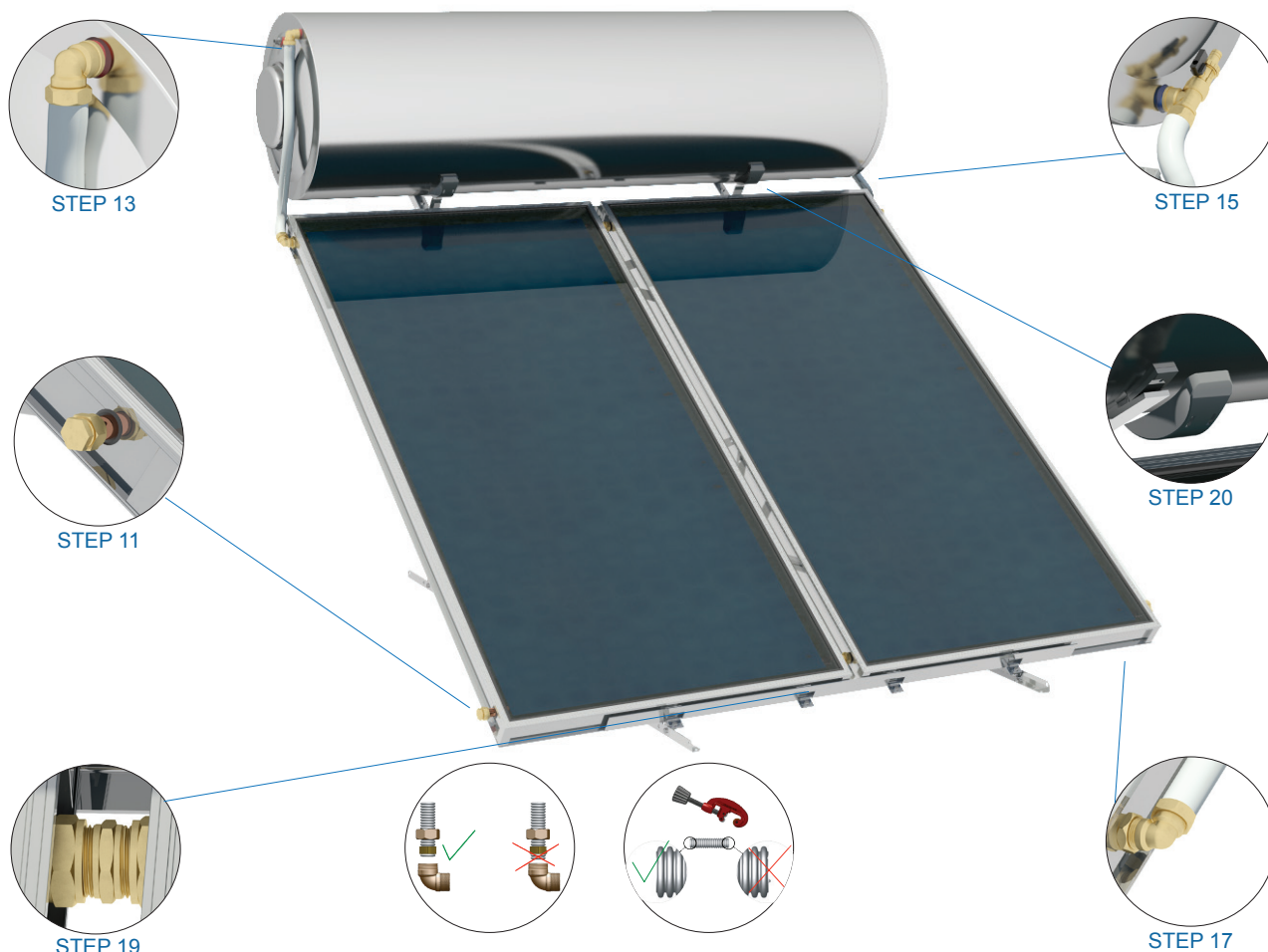
8. Join the second collector and fasten the fittings.*



9. Tighten the two tank supports. Fasten all screws to the base. Properly direct the base with the collector. Firmly fix the base using the 4 D10 U-bearings and some bolts (M8x60).



10. Position and mechanically fasten the Ø22 socket on the top-right part and on the bottom-left part of the collector(s).*
Position the water storage tank on the base with the electrical components on the left (looking at the tank from the front).
11. Centre the water storage tank position on the collector(s) and turn the tank (if required) so that the DHW and cold water sockets remain vertical respect to the horizontal surface.
Tighten the water storage tank to the base using the screws supplied in the packaging.
Make sure the plant is not inclined and is properly levelled. Do this using a spirit level.
12. Place the small flexible pipe on the appropriate stainless steel connection DN16 at the side of the water storage tank where the electric heater is located and to the socket marked "collector input".
13. Join the other end to the top left socket of the collector using the corner block Ø22x DN16 STAINLESS STEEL*, firstly passing the pipe through the isolation tube.



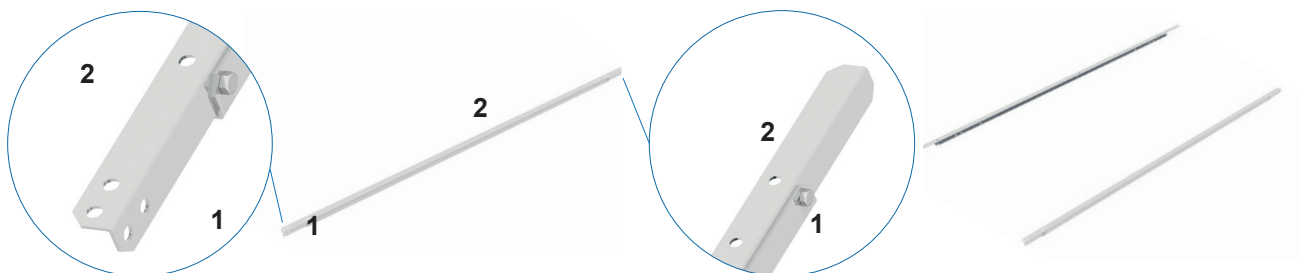
14. Position the T-fitting with filler valve to the socket on the right of the water storage tank, marked with "collector return".
15. Position the large flexible piping with the appropriate connection to the T-fitting on the right of the water storage tank.
16. Position the other end to the bottom right socket of the collector using the corner block Ø22x DN16 STAINLESS STEEL*, firstly passing the pipe through the isolation tube.
Fasten all system fittings and all screws to the base.
Make the hydraulic connection, fill the closed circuit and make the electrical connection as described in the relative sections.
Check for leaks.
17. After having placed the collectors in parallel to each other, fix them to the support base.
18. Fix the support base covers of the water storage tank.

* Use the lock-nuts to avoid mechanically deforming the copper pipe.

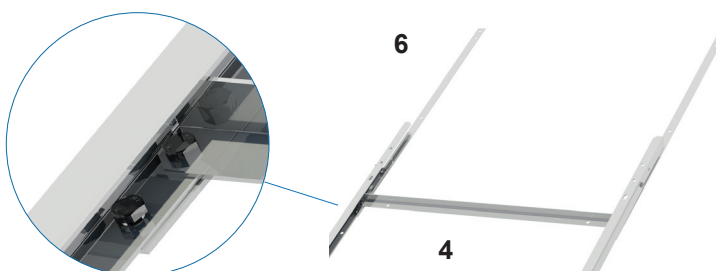
SUPPORT FRAME FOR INCLINED ROOF

SYSTEMS WITH 1 OR 2 COLLECTORS

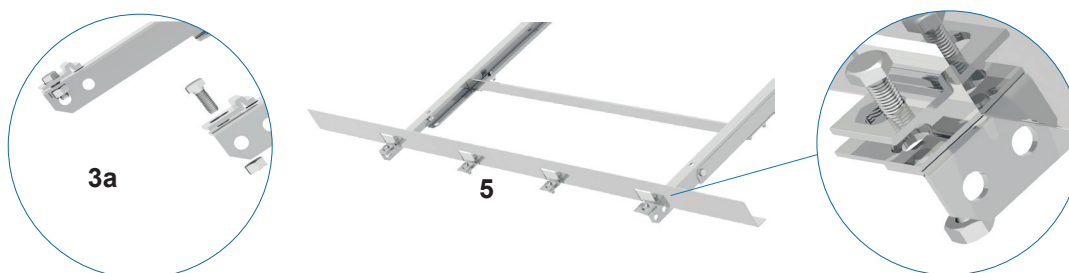
1. Tighten parts 1 and 2 using the M8 screws and nuts provided with the packaging. Repeat the same operation for the second coupling.



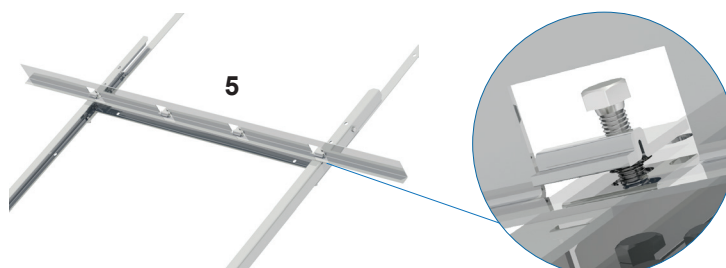
2. Place horizontal parts 4 to the upper parts to build the structure. Tighten straight parts 6 (used to support the base to the tiles) to the lower part.



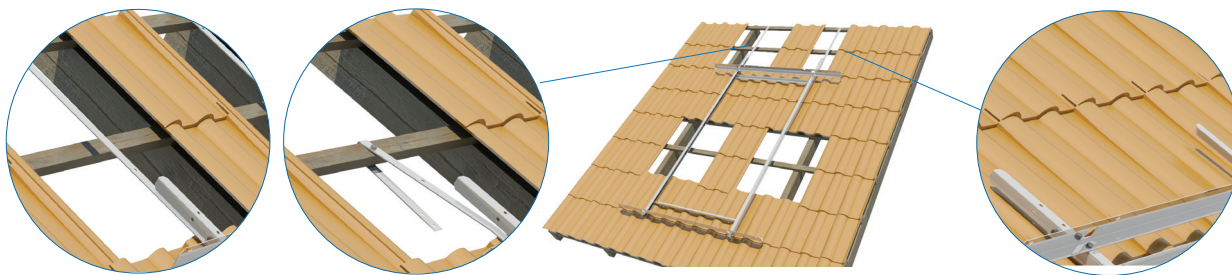
3. Place the collector 6 support part on the lower part, for the two collector model; place the four fixing washers of the collectors between the spaces of the parts and tighten the M8 screws with the nuts. Part 5 is not required for the single collector model. The collector must be fixed with the 2 collectors' fixing washers, as described in figure 3a.



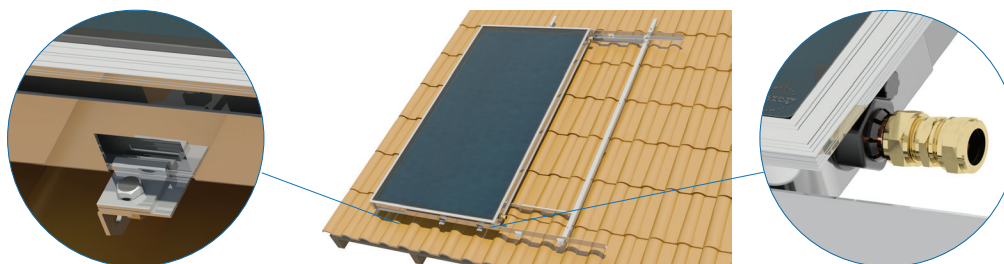
4. Repeat the same operation for the top part.



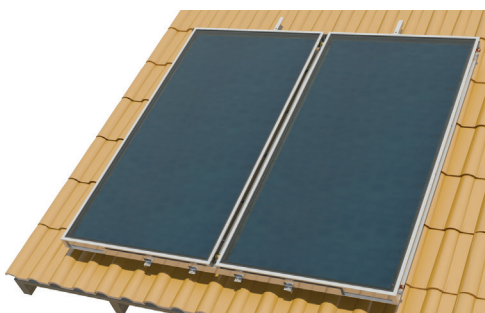
5. Using a spirit level, fix the straight parts of step no. 2 to the tile bundles in order to place them in horizontal position respect to the next. Manually bend the straight parts of step 2, enclosing the tile bundles. Drill and fasten using lag bolts. Use a spirit level to place the base horizontally.



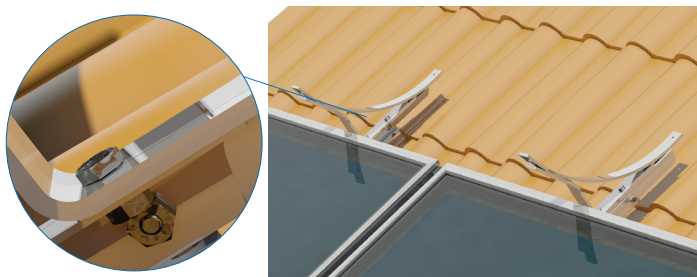
6. For the two-collector model, firstly place the left one in the lower part by lifting the upper collector. Position the screws with the collector support washers (4 for each collector) without fastening them. Position the Ø22 fittings mechanically fastened to the collector edges.



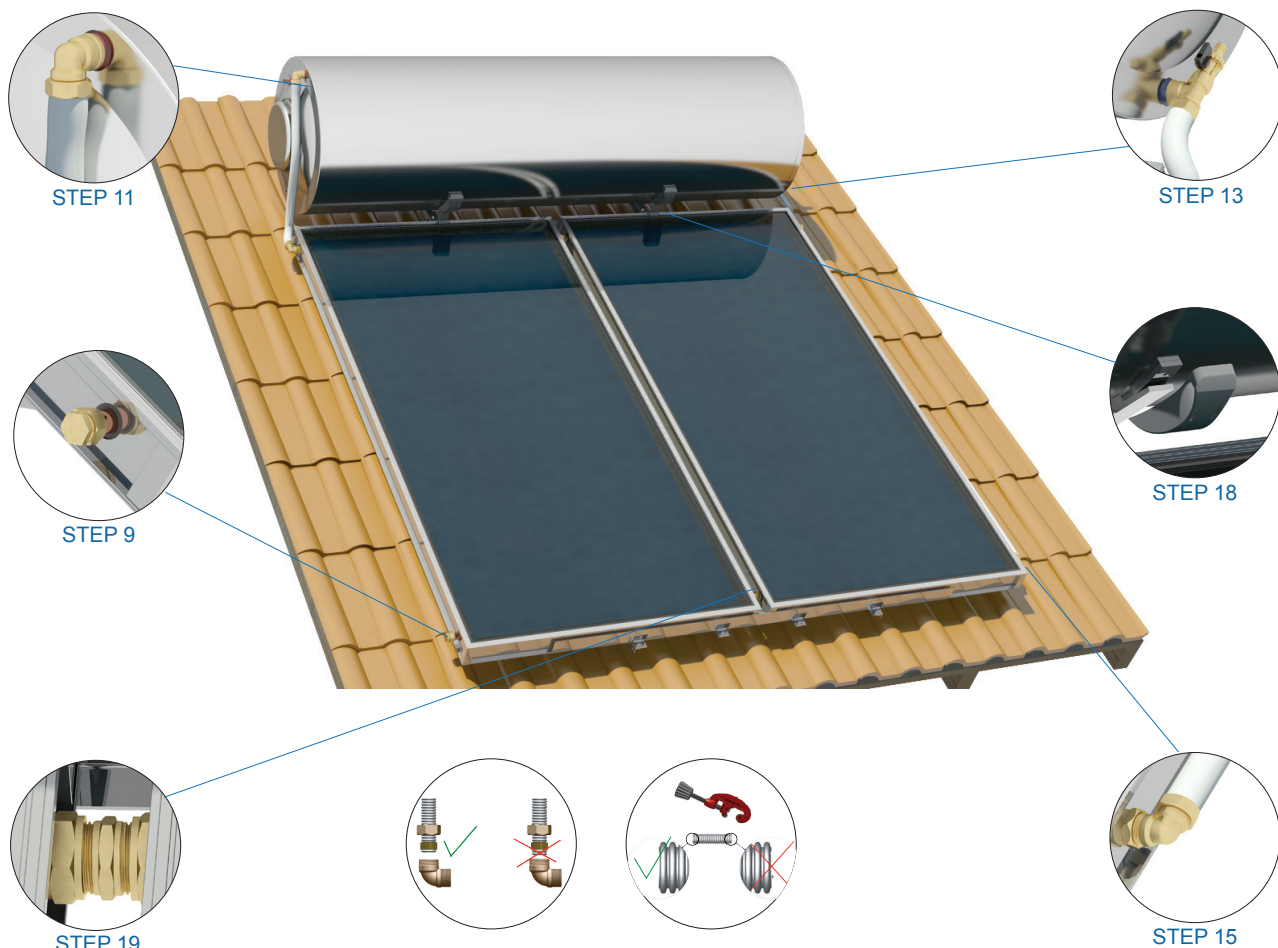
7. Join the second collector and fasten the fitting.



8. Tighten the two tanks supports. Tighten all screws on the base.



9. Position and mechanically fasten the Ø22 socket on the top-right part and on the bottom-left part of the collector(s).
Position the water storage tank on the base with the electrical components on the left (looking at the tank from the front).
10. Centre the water tank storage on the collector(s).
Turn the water storage tank (if required) so that the D.H.W. and cold water sockets remain vertical respect to the horizontal level. Tighten the water storage tank to the base using the screws supplied in the packaging.
Make sure the plant is not inclined and is properly levelled. Do this using a spirit level.
11. Place the small flexible pipe on the appropriate stainless steel connection DN16 at the side of the water storage tank where the electric heater is located and to the socket marked "collector input".
12. Join the other end to the top left socket of the collector using the corner block Ø22x DN16 STAINLESS STEEL*, firstly passing the pipe through the isolation tube.



13. Position the T-fitting with filler valve to the socket on the right of the water storage tank, marked with "collector return".
14. Position the large flexible piping with the appropriate connection to the T-fitting on the right of the water storage tank.
15. Position the other end to the bottom right socket of the collector using the corner block Ø22x DN16 STAINLESS STEEL*, firstly passing the pipe through the isolation tube.

Fasten all system fittings and all screws to the base.

Make the hydraulic connection, fill the closed circuit and make the electrical connection as described in the relative sections.

Check for leaks.

16. Position the collectors in parallel to each other, fix them to the support base.
17. Fix the support base covers of the water storage tank.

* Use the lock-nuts to avoid mechanically deforming the copper pipe.

HYDRAULIC CONNECTION

PLANT CONNECTION TO THE HOT AND COLD WATER MAINS

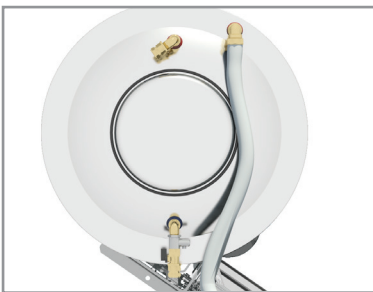
The "COLD WATER INPUT" and "HOT WATER OUTPUT" connection couplings, respectively identifiable by the red and blue washers, are located at the side of the boiler.

ATTENTION! The connections to the hot and cold water mains must be carried out using removable fittings and not by welding.

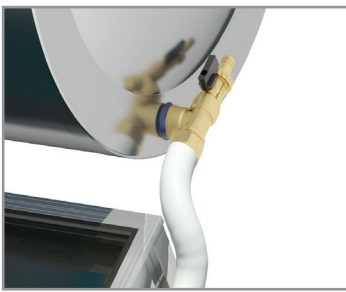
1. In the "COLD WATER INPUT" firstly fasten the safety valve (10 bar) and then a ball valve.
Then connect the cold water supply to the ball valve using an isolated plastic hose (Drawing 1).

NOTE: The safety valve must have a drain pipe connected to the output. This pipe must remain on the ground where the hot water discharge is safe and without floored areas. Do not close or block the drain pipe or output valve ends. In situations of high radiations, drinking water can be drained from this pipe.

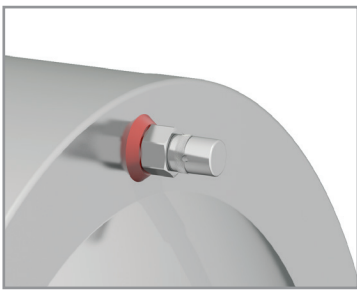
2. The "DHW OUTPUT" is connected with the hot water coupling of the utility circuit using an isolated plastic hose. The plastic hose is recommended to minimise the electric-corrosion phenomena.
3. Fill the tank WITH WATER: the water storage tank can be filled with cold water with the ball valve and hot water cock open. The water storage tank is full and the hot water cock can be closed, when water starts flowing from the cock.
4. Place the thermostatic valve to the solar water heater at 38°C to avoid hot water burns.



Drawing 1



Drawing 2



Drawing 3

FILLING THE CLOSED CIRCUIT

ATTENTION! The boiler must be filled with water before filling the closed circuit with anti-freeze liquid.

1. Connect the water filling pipe to the specifically designed filling device, to the right of the boiler (fig.2) and fill about half of the closed circuit. Then dilute the anti-freeze liquid in a clean container, with double the amount of water. Disconnect the filling pipe from the filling device and empty the prepared anti-freeze liquid solution using a fennel. Connect the new filling pipe and fill the closed circuit.
2. Hermetically tighten the 3.5 bar safety valve to its position (fig.3) and disconnect the filling pipe from the filling device, fixing its cap, once the closed circuit is full.
3. Uncover the collectors and clean the glass by removing all information stickers.
4. Check for leaks and make sure the connection pipes of the collectors and boiler, and the cold and hot water pipes of the plant are properly isolated to avoid heat leaks and to protect them against freezing.
5. Do not use hot water for 24 hours after installation. Only start the closed circuit after the 24 hours.

THE ANTI-FREEZE LIQUID is a propylene glycol based product able to guarantee efficient heat transfer properties at both high and low temperatures. It is not toxic and gives a protection up to - 37°C (55% volume solution/volume with water). It is purposely designed to give excellent anti-corrosive properties. The anti-freeze liquid gives protection in water solutions, based on the diluting degree, as indicated in the following table:

PERCENTAGE %	20	25	30	40	45	50	55
TEMPERATURE °C	-6	-10	-13	-20	-25	-32	-37

ELECTRICAL CONNECTION

ELECTRICAL COMPONENTS DESCRIPTION

(ELECTRIC HEATER - THERMOSTAT - ACCESSORIES)

WIRING DIAGRAM - General rules

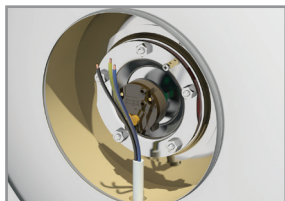
The electric heater must only be used in emergency conditions.

The solar plant must be electrically installed by a qualified technician, according to the local standards in force, the rules and regulations applicable in the installing building.

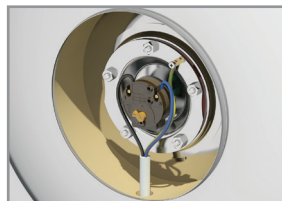
The system's electric heater must never be activated with the boiler empty! If so, the electric heater warranty expires.



Drawing 1



Drawing 2



Drawing 3



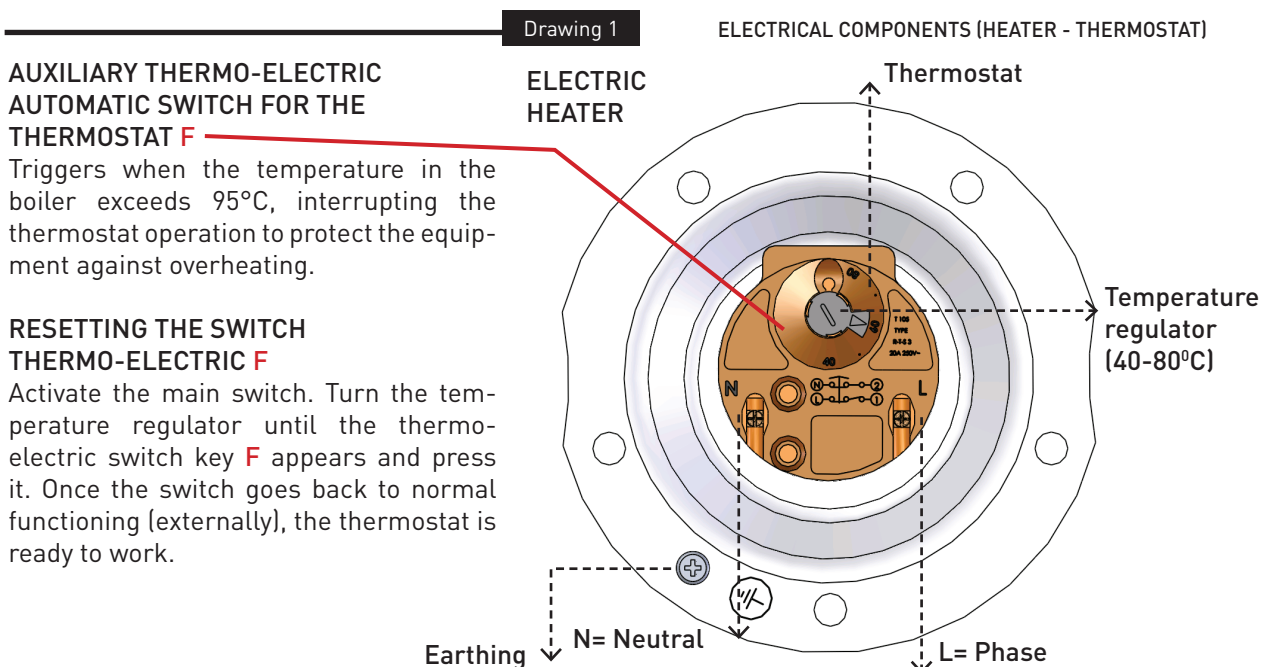
Drawing 4

NOTE: The electric heater is classified according to local regulations in the country of destination.

- 1.. Remove the screws of the protective device covering the electric components (Drawing 1).
 - 2.. Connect the electric heater to the mains using a 3x4mm² section electric cable (for a 4 kW electric heater) (Drawing 2).
 - 3.. Pass the cable end through the gasket, towards the electric components.
 - 4.. Connect the black cable (phase) to the L cable and the blue cable (neutral) to the N connector on the thermostat. Connect the yellow cable (earthing) to small screw M4 on the electric heater marked with the earth symbol (Drawing 3).
 - 5.. The thermostat is connected to the electric heater in factory. Adjust the thermostat to 60°C.
- Attention: the thermostat must be properly applied to the electric heater (Drawing 1).**
- 6.. Close the electric components' covering (Drawing 4).
 - 7.. Switch-off the central mains switch.
 - 8.. Connect the other cable end to the electric board using a bipolar disconnection switch with a minimum distance of about 3 mm between contacts. The type of automatic switch must be adequate for the electric heater in use.

Attention! It is fundamental to install a safety relay.

Note: The daily load of hot water (40°C) that must be reached by the system without any use of solar energy (or in 24h electric heater functioning at 2kW), according point 5.10 of Standard EN 12976-2:2000, is maximum 1000 L.

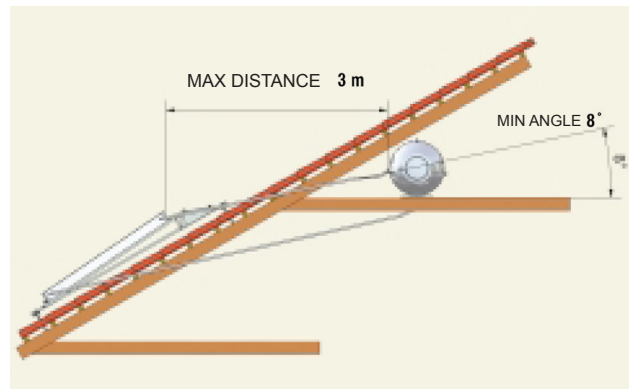


PLANT ASSEMBLY ON A TILED ROOF WITH THE BOILER UNDER THE ROOF (NATURAL CIRCULATION OPERATION)

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Respect the maximum and minimum distances and the piping inclination for the natural circulation system to work properly. The maximum distance between the collector output and the boiler input must not exceed 3 m. The inclination of the pipe connecting these 2 points must not be less than 8°.



COIL HEAT EXCHANGER CONNECTION

Concerns the solar heating (triple action) fitted with high exchange surface coil, to heat the alternative water boiler using the central heating system.

The coil heat exchanger is placed in front of the electrical parts.

HYDRAULIC CONNECTION

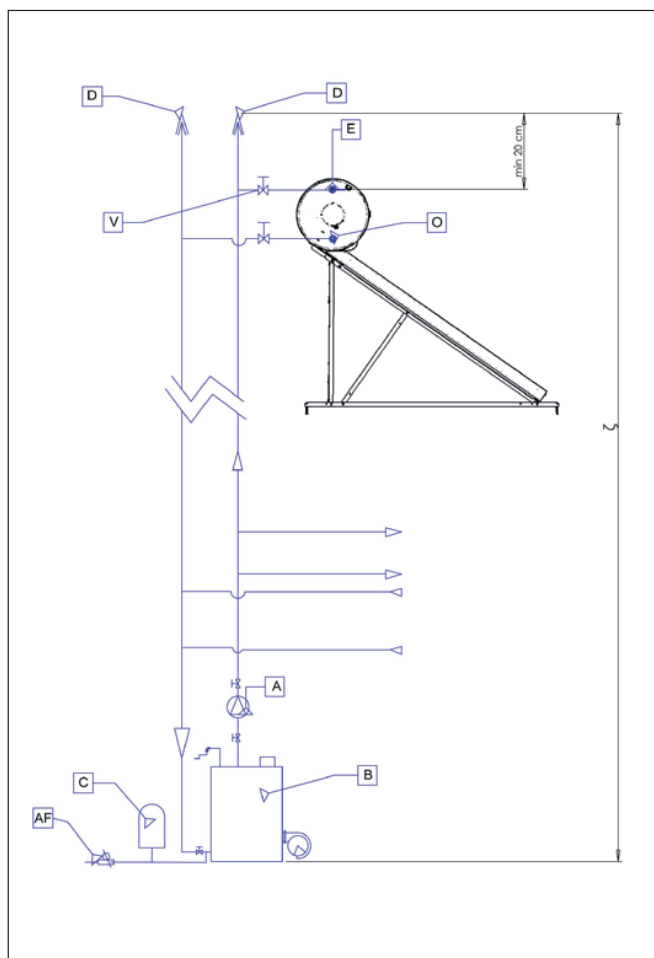
The central heating system to which the coil heat exchanger is connected must be fitted with:

- Solar system isolation valves.
- Automatic discharge valves to the highest point of the pipes that must be properly isolated.
- Adequately angular connection pipes to prevent trapping air in the circuit.
- The connections to the coil heat exchanger must be made using fittings.

Follow the steps below to connect the coil heat exchangers to the central heating system:

- 1) Place the fittings on input E and on output O of the exchanger.
- 2) Place a ball valve with adequate V diameter.
- 3) Place D automatic discharge valves on the water supply and on the central heating system return lines.
- 4) Isolate all connection pipes with 9 mm thick isolating material.
- 5) Adjust the AF automatic filling valve, 1/2 bar beyond the static height H (e.g. it must be set at 2 bar for a 15 m height).
- 6) Fill the plant with water and check for leaks.

- A) Circulator
B) Central heating system
C) Expansion vessel



TROUBLESHOOTING

THE PLANT DOES NOT PROVIDE A SUFFICIENT AMOUNT OF DHW

Carry out the following operations:

1) Consider the atmospheric conditions. 2) Avoid excessive night consumption of D.H.W. 3) Verify if your D.H.W. requirements have increased, making impossible for them to be satisfied by the system. 4) Check if the solar panel is shaded by an obstacle. 5) Check the position horizontal of the system. 6) Carefully check all system connections are tight and tighten or replace any loose connections. 7) Check the building pipes and cocks for any leaks. 8) Check the D.H.W. is not mixed with the cold water. 9) Check the connection pipes are not folded. 10) Check the thermal liquid level and top-up, if required. 11) Check for trapped air inside the boiler or in the collectors.

Contact the dealer or the manufacturer's after-sales assistance if the yield is still insufficient after said checks.

THE PLANT DOES NOT SUPPLY DHW USING THE ELECTRIC HEATER

The following operations must only be carried out by a qualified technician!

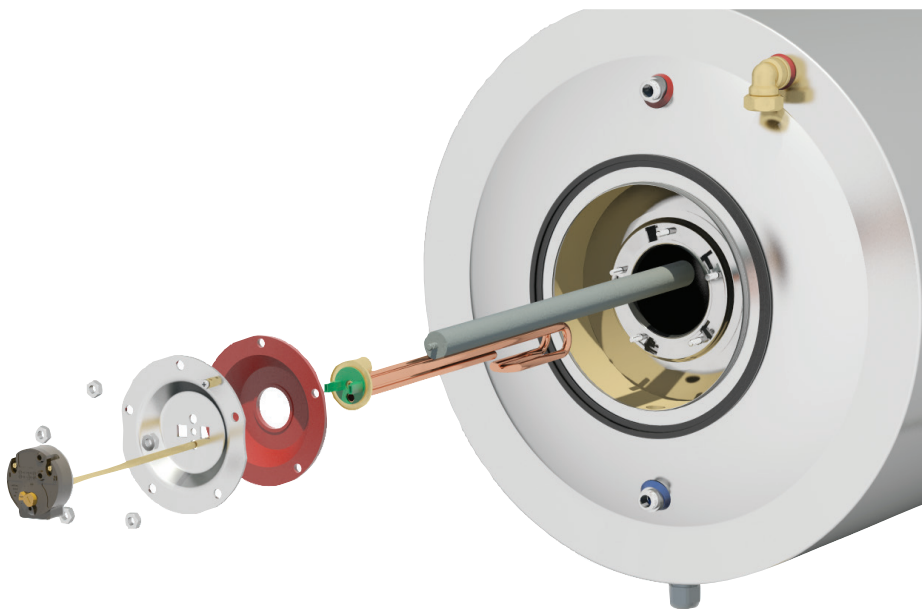
1) Disconnect the current supply and open the electric box. 2) Check the cable connection between the thermostat and the heater. 3) Check if the thermostat temperature is below the utility requirements. 4) Check the electric heater.

5) Check the electric power supply.

6) Connect the power supply and measure voltage at the heater ends.

7) Check the thermo-electric protection F of the thermostat is pressed inwards. On the contrary, turn the thermostat regulator until the thermo-electric switch F key appears.

Then press the key for thermostat functioning.



ROUTINE MAINTENANCE (SERVICE)

Routine maintenance must be carried out by an authorised technician or by the manufacturer's after-sales assistance, every two years.

The routine check is essential for the warranty validity.

The inspection concerns the entire system, more specifically:

1) Disconnect the current supply. 2) Drain the boiler water. 3) Remove the lid from the electric box. 4) Disconnect the phase, neutral and earth wire. 5) Remove the heater by loosening the M8 screws. 6) Remove the magnesium anode from the heater flange. 7) Tighten the new anode $\varnothing 26 \times 500 \text{ mm} / 500 \text{ g}$.

8) Reposition the heater with the gasket. Loosen the external magnesium cap in the centre of the right boiler part. Replace the anode with a new one $\varnothing 22 \times 300 \text{ mm} / 200 \text{ g}$ on the cap, and loosen. 9) Open the water supply and a D.H.W. utility until the boiler is full. 10) Check for leaks. 11) Connect the electric parts in their previous positions. 12) Check the thermostat is properly applied to the heater. Put the lid back on the electric box. 14) Connect the electric power supply.

We recommend a routine check by a qualified technician for plants with heating element.

ATTENTION!

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- Any intervention or work on the solar water heater must only be carried out by qualified technicians and by qualified and authorised technicians only where electric components are present.
- All maintenance data of the solar water heater must be entered in the relative table on the warranty document (warranty validity).
- Make sure the plant is insured in areas characterised by extreme atmospheric conditions (hail, storms, tornado, etc.).

COMPLETED INSTALLATION INSTRUCTIONS

Make a final check before using the system. Open all valves and check for leaks. Repeat the inspection after 30 minutes. Check the system is filled with water and anti-freeze fluid as per the company instructions. A qualified technician must be called in case of a fault.

A solar panel requires almost 2 days after installation, to reach its maximum yield.

We, therefore, recommend avoiding hot water consumption during the first two days after installation, even in sunny conditions. Basic routine maintenance assures a long life-span and maximum system yield.

- We recommend checking the plant twice a year at the installation place. Check for collectors' crystal damages (break), water mains and utility connection pipe leaks, isolation of the pipes and cleaning of crystals.
- Replace the collector crystal if broken. Clean the crystals by washing during a low sun period to avoid contractions, expansions due to temperature change.
- The customer must replace the components (screws, wedges, pipes, etc.) if worn.
- Annually check the closed circuit refrigerant liquid (top-up if required) to make sure the system functioning is efficient.
- Cover the collector surface if long periods are foreseen without using water (e.g. summer holidays), to avoid extremely high temperatures developing, causing the intervention of the thermo-electric protection of the thermostat and interrupt the electric circuit (see page 24 - RESETTING OF THERMO-ELECTRIC SWITCH F).
- The safety valve will probably intervene letting water leak in case of high pressure in the boiler. This is normal and it protects the plant against overpressure. The use of a pressure reducer - expansion vessel is required in case the water main pressure exceeds 6 atm.
- Do not activate the electric heater in the following cases: a) in case of water supply disconnection; b) when the pipes are frozen and water does not flow from the plant to the cocks.

Attention! Install cocks with up to 38°C thermostatic adjustment to the D.H.W. utility, in order to avoid burns due to the high temperature of the water in the solar panel.

CHECK LIST

INSTRUCTIONS FOR THE INSTALLER

Using the following check list, once installation is completed, the installer must check all of the indicated points and mark the relative column with a √.

LIST	CHECK
COLLECTORS AND EXTERNAL PIPES	
Was the support frame installed and fixed according to the currently in force instructions and standards?	
Is the collectors' position and direction perfect?	
Is there damp inside the solar collectors?	
Are the hydraulic connections to the solar connectors correct?	
Is there a good UV protection on the thermal insulation?	
Are the pipes properly isolated?	
Was installation on the roof carried out in compliance with the currently in force standards?	
HYDRAULIC CONNECTIONS	
Are there leaks in the closed circuit, in the connection or in the heat exchanger of the pipes?	
Are the safety valves properly installed?	
Is there a hot/cold water mixing valve?	
ELECTRICAL CONNECTION	
Is the electric heater properly connected? (if present)	
Was the electric connection made according to the currently in force standards? (isolation, earthing, etc.)	
GENERAL	
Was the warranty properly filled-in and given to the customer?	
Has the customer been provided with the use instructions?	
Is the chosen model adequate and based on the customer requirements?	
Was the customer informed of the other options for D.H.W. production?	

Installer data

Full name.....
 Address.....
 Telephone.....

Distributor data

Full name.....
 Address.....
 Telephone.....



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