



Enviro Energy Solutions Ltd
Your Gateway to the Sun

EAST SERIES THERMOSIPHON SYSTEMS
TECHNICAL, INSTALLATION AND USE MANUAL

...BECAUSE WITH ENVIROENERGY SOLUTIONS THE SUN SHINES FOR EVERYONE...



Version 1-07/17

TABLE OF CONTENTS

General safety instructions.....	page 2
General installation instructions.....	page 3
FUNCTIONING PRINCIPLE AND PRODUCT RANGE.....	page 5
SPECIFICATIONS AND DIMENSIONS	page 6-7
SYSTEM DESCRIPTION AND COMPONENTS.....	page 8
INSTALLATION.....	page 9
I. ASSEMBLING AND MOUNTING THE SYSTEMS.....	page 9
A. Installation on Flat Roof.....	page 9
B. Installation on Pitched Roof.....	page 9
II. CONNECTING THE SYSTEM.....	page 10
A. Hydraulic Connections.....	page 10
B. Electrical Connections.....	page 11
III. OPERATING THE ANTI-FRONT PROTECTION.....	page 11
MAINTENANCE – TROUBLESHOOTING	
A. MAINTENANCE AND SERVICING OF THE SYSTEM.....	page 12
B. TROUBLESHOOTING.....	page 12
DECOMMISSIONING THE SYSTEM.....	page 13

Before the installation and use of a ENVIROENERGY SOLUTIONS Solar Water Heating System please read and observe carefully all the instructions concerning the installation, maintenance and use of the systems, in this manual. The non-observance of these instructions may result in the cancelation of the warranty.

GENERAL SAFETY INSTRUCTIONS

- All installations and maintenance must be performed by qualified and certified professionals, following all relevant local norms and regulations (1), industry codes, and according to the manufacturer's instructions.
- Always make sure that the installation site, especially on pitched roofs and roof tops, is adapted to the weight and mechanical restraints of the system, as well as any further weight expected (snow, rain, etc...). **ENVIROENERGY SOLUTIONS** declines any responsibility that may arise from an improper or defective installation or from incorrect manipulation of the system or accessories composing it.
- For a safer installation on roofs, it is recommended that the system be installed in such a way that the tank be placed over a slat or batten, rather than between them.
- Always make sure there is enough space around the solar system for maintenance purposes, as well as for the electric cabling and plumbing. It is recommended to agree with the client for the location of the installation and the routing of pipes and cabling.
- In regions with heavy snow fall or strong winds, it may be necessary to further anchor the system to the point of installation. In this case it is up to the installer along with the client to determine the best and safe way to install the system. Additional fixing points or equipment may be required.
- Avoid installations under direct solar radiation conditions due to the very high performance of the solar panels and risks of severe burning or thermal shocks to the system. In the case of installation under these conditions, it is very important to make sure the solar panels are well covered and shaded from the sun.
- Never fill the closed circuit or connect the electric element with an empty tank. The tank must always be filled with water during these operations due to a risk of severe damage to the system.
- Before starting the installation or maintenance, the main power supply to the system must always be turned OFF.
- The use of plastic, PVC or polypropylene piping is not recommended for Solar Water Heaters due to the very high temperatures developed by the systems. In any case, make sure that all the piping used in contact or close to the systems outlets can withstand minimum temperatures of 90°C, or 180°C if in contact with the primary circuit.
ENVIROENERGY SOLUTIONS recommends the use of copper or stainless steel piping for safer and higher performance.
- Following the first two years from installation, annual maintenance is recommended. Please refer to the "Maintenance and Servicing of the Solar Water Heating System" section of this manual.
- A mixing valve is compulsory on the hot water outlet in order to limit risks of burning.

GENERAL INSTALLATION INSTRUCTIONS

- Always make sure that the location chosen for the installation of the solar water heater is not shaded by any obstacles (walls or other structures, trees and vegetation, other buildings, etc...) at any moment. It is recommended to ensure at least 4 hours of direct sunlight around mid-day during the winter solstice. In case of obstacles please observe minimum distance of the collector(s) from the obstacle, as per the following calculation:

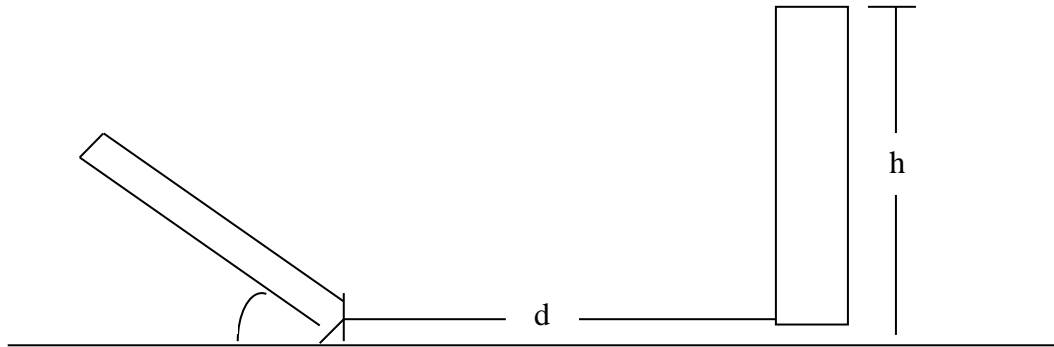
$$d = h \times \kappa$$

where: $\kappa = 1 / \tan(61^\circ - \phi)$ and ϕ = latitude of installation point.

The table below represents the (κ) coefficients for some latitudes:

LATITUDE	36°	37°	38°	39°	40°	41°	42°	43°	44°	45°	46°
κ (m)	2,144	2,246	2,355	2,475	2,605	2,747	2,904	3,077	3,270	3,487	3,732

In order to calculate the minimum distance (d) of the system from the obstacle one must multiply the height (h) of the obstacle by the appropriate (κ) coefficient.



For latitudes other than the ones reported in the table above, the formula must be used in order to calculate the (κ) coefficient.

- The collectors must face towards the South when installed North of the equator and towards the North when installed South of the equator. A deviation of up to 30° East or West is tolerated with a minimum effect on the performance of the system.

Note: a deviation towards the East will result in a greater output of the system until mid-day, while a deviation towards the West will result in a greater performance of the system in the afternoon.

- The optimal inclination depends on latitude of the installation point. In order to avoid fastidious calculations, it is recommended as follows:
 - If the system is used mainly during summer months: $\beta = \phi - (10 \text{ to } 15)$
 - the system is used mainly during winter months: $\beta = \phi + (10 \text{ to } 15)$
 - the system is used all year round: $\beta = \phi$

Where β is the collector inclination and ϕ the latitude of the installation point.

- If the Solar System is installed in a location with a pitch lower than 13° or greater than 45°, additional or different equipment may be necessary.

- Always make sure that all the piping of the primary and secondary circuits, going to and coming from the Solar Water Heater, are very well insulated, even in hot climate regions and treated for UV radiation.
- Always use counter force (opposite force) when installing the tightening fittings (olive fittings) to avoid internal cracking and breaking of copper welds between tubes. Breaking of the welds due to non-observance of this point is excluded from warranty and will result in cancelation of the warranty.
- For closed circuit systems, always prepare and mix thoroughly the thermal fluid mixture in a bucket before filling the system. Never fill the system with thermal fluid and water separately.
- Never lift or hoist the systems from the inlets and outlets since they can be torn, bent or broken creating leakage of the systems.
- Avoid leaving the Solar System for long periods without using hot water (holidays, prolonged absences, etc...) due to risks of overheating, or make sure the solar panels are covered during this period.

WARNING:

IF THE HOT WATER SYSTEM IS NOT USED FOR TWO WEEKS OR MORE, A QUANTITY OF HIGHLY FLAMMABLE HYDROGEN GAS MAY BE ACCUMULATED IN THE WATER HEATER. TO DISSIPATE THIS GAS SAFELY, IT IS RECOMMENDED THAT A HOT TAP BE TURNED ON FOR SEVERAL MINUTES UNTIL DISCHARGE OF GAS CEASES. USE A SINK, BASIN, OR BATH OUTLET, BUT NOT A DISHWASHER, CLOTHES WASHER OR OTHER APPLIANCE. DURING THE PROCEDURE THERE MUST BE NO SMOKING, OPEN FLAME OR ANY ELECTRICAL APPLIANCE OPERATING NEARBY. IF HYDROGEN IS DISCHARGED THROUGH THE TAP, IT WILL PROBABLY MAKE AN UNUSUAL SOUND AS WITH AIR ESCAPING.

- The safety of the system and validity of the warranty are conditioned by the use of genuine **ENVIROENERGY SOLUTIONS** spare parts and accessories. Please only use genuine **ENVIROENERGY** spare parts and accessories from your nearest **ENVIROENERGY SOLUTIONS** dealer or contact the manufacturer.

ENVIROENERGY SOLUTIONS declines any responsibility that may arise from the non-observance of the installation, maintenance and use instructions herein, non-observance of relevant local norms, regulations and industry codes, improper or defective installation, or incorrect manipulation of the system or the accessories composing it.

FUNCTION PRINCIPLE AND RANGE

ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters are Compact Thermosiphon Type solar water heaters. The tank and collector form a single unit, offering the highest space efficiency compared to similar products. There is no absorber plate and the Titanium Selective Coated Water Tank is directly exposed to the solar radiation. The collector tubes themselves form the water tank.

The EAST Series Solar Water Heaters are Direct Systems meaning that solar radiation heats the sanitary water directly without the use of a heat exchanger or thermal fluid circulation. This design enables direct and even heat transmission and distribution to the water therefore requiring significantly less time to heat.

Cold Sanitary Water is coming in the system through the cold-water inlet, is heated directly in the collector/tank, rising to the hot water outlet for use. This simple operating principal makes **ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters** very effective and very efficient hot water production systems.

Anti-frost protection is achieved through a 200w electric element operating during close to freezing temperatures.

Advantages of the ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters:

- Superior quality and durability: made of AISI 316L grade Stainless Steel
- Superior performance: thanks to its direct heating system
- Innovative design offering superior aesthetics
- Maintenance free: No closed circuit to refill
- Ultra slim and ultra low: maximum height of 87cm
- Perfect landscape integration
- Economy of space: no heavy and bulky tanks and mounting structures
- Simple and quick installation compared to other solar systems
- Reducing installation time to a minimum: requires only connecting cold and hot water inlet and outlet

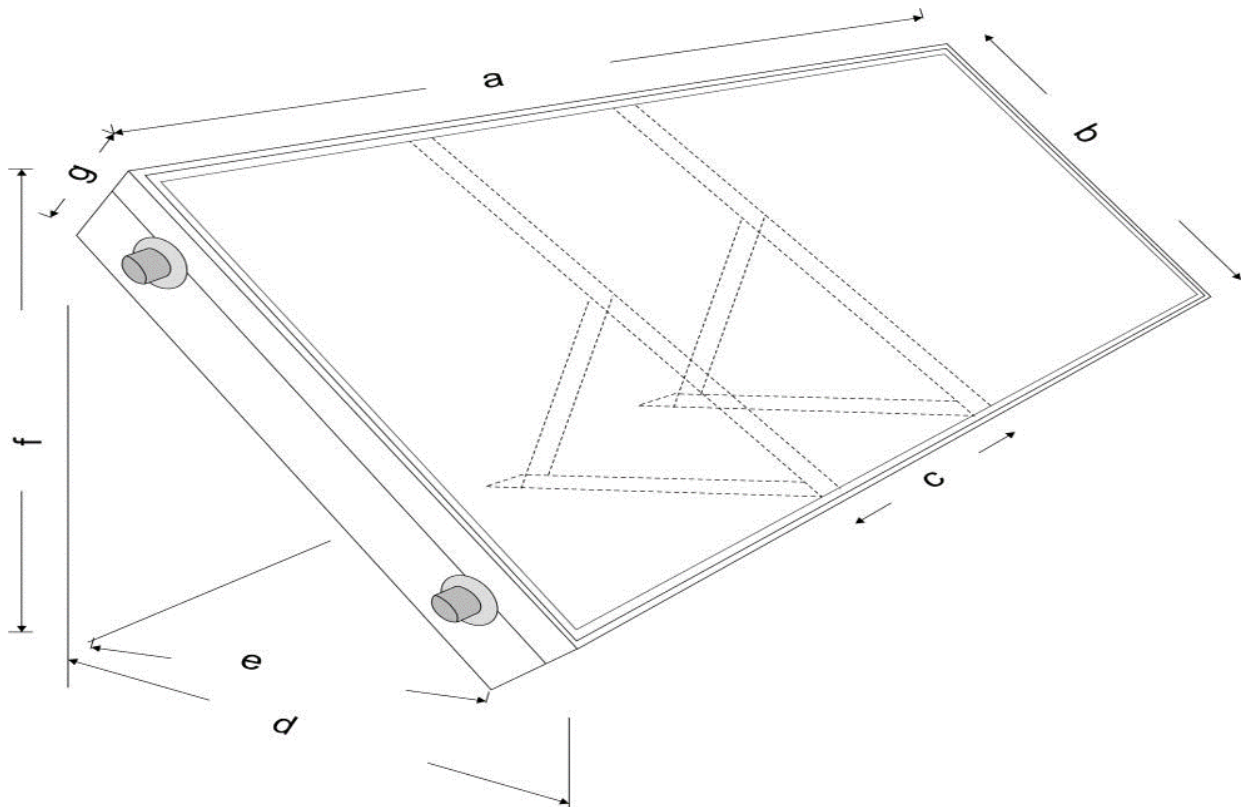
ENVIROENERGY EAST SERIES SOLAR WATER HEATER RANGE					
Model	Nominal Tank Volume (lt)	Tank	Selective Coating	Collector Surface	Weight Empty (kg)
EAST 100	100	Galvanized Steel with Teflon Treatment or 316L Stainless steel	Titanium Selective	0,99 m ²	70
EAST 150	150	Galvanized Steel with Teflon Treatment or 316L Stainless steel		1,97 m ²	98,5
EAST 200	200	Galvanized Steel with Teflon Treatment or 316L Stainless steel		2,34 m ²	118

SPECIFICATIONS AND DIMENSIONS

Specifications	EAST 100	EAST 150	EAST 200
COLLECTOR			
Total surface area (m²)	0,99	1,97	2,34
Aperture area (m²)	0,92	1,78	2,13
Hydraulic design	Meander		
Coating	Titanium Selective		
Dimensions (mm)	1980 x 500 x 240	1990 x 990 x 240	1980 x 1180 x 240
TANK			
Net Volume (Lt)	94	142	209
Tank Body Material (mm)	Galvanized Steel with Teflon Treatment or AISI 316L Marine Grade Stainless Steel		
Tank Body Thickness (mm)	1,5		
No of Tanks/Tubes	2	4	5
Anti-frost protection	Heating element 200w	Heating element 200w	Heating element 200w
Electric Back-Up Element (w)	1000	1500	2000
Element Thread	1½’’		
Max. Working Pressure (Bar)	8		
Max. Test Pressure (bar)	17		
Hydraulic Connections	M¾’’		
THERMAL INSULATION			
Insulation Material	Mineral Wool, Black Glass Tissue faced and Expanded Polystyrene		
Thickness Back and Sides (mm)	50		
Density	60kg/m³		
Frontal Insulation	Polycarbonate Honeycomb 4mm		
COVER			
Number of Covers	1		
Cover Material	Prismatic, Low Iron, Security Solar Glass		
Cover Thickness (mm)	4		
Sealing Material	EPDM rubber and Polyurethane Sealant		
CASING			
Frame Material	Powder Coated Aluminum		
Rear Cover Material	Powder Coated Aluminum		
Rear Cover Material (mm)	10		
Color	Light Gray RAL 7035		
Length (mm)	1980	1990	1980
Width (mm)	500	990	1180
Depth (mm)	220		
Total System Weight (kg): Galvanized Steel with Teflon Treatment and Stainless Steel 316L	70	98,5	118

ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters can be installed with various inclinations. They come with 3 different inclination possibilities (45° , 30° and 25°) but other inclinations are possible by piercing extra holes according to the desired height for the systems. However, please note that for optimum performance it is recommended that the inclination of the systems is always kept between 20° and 60° .

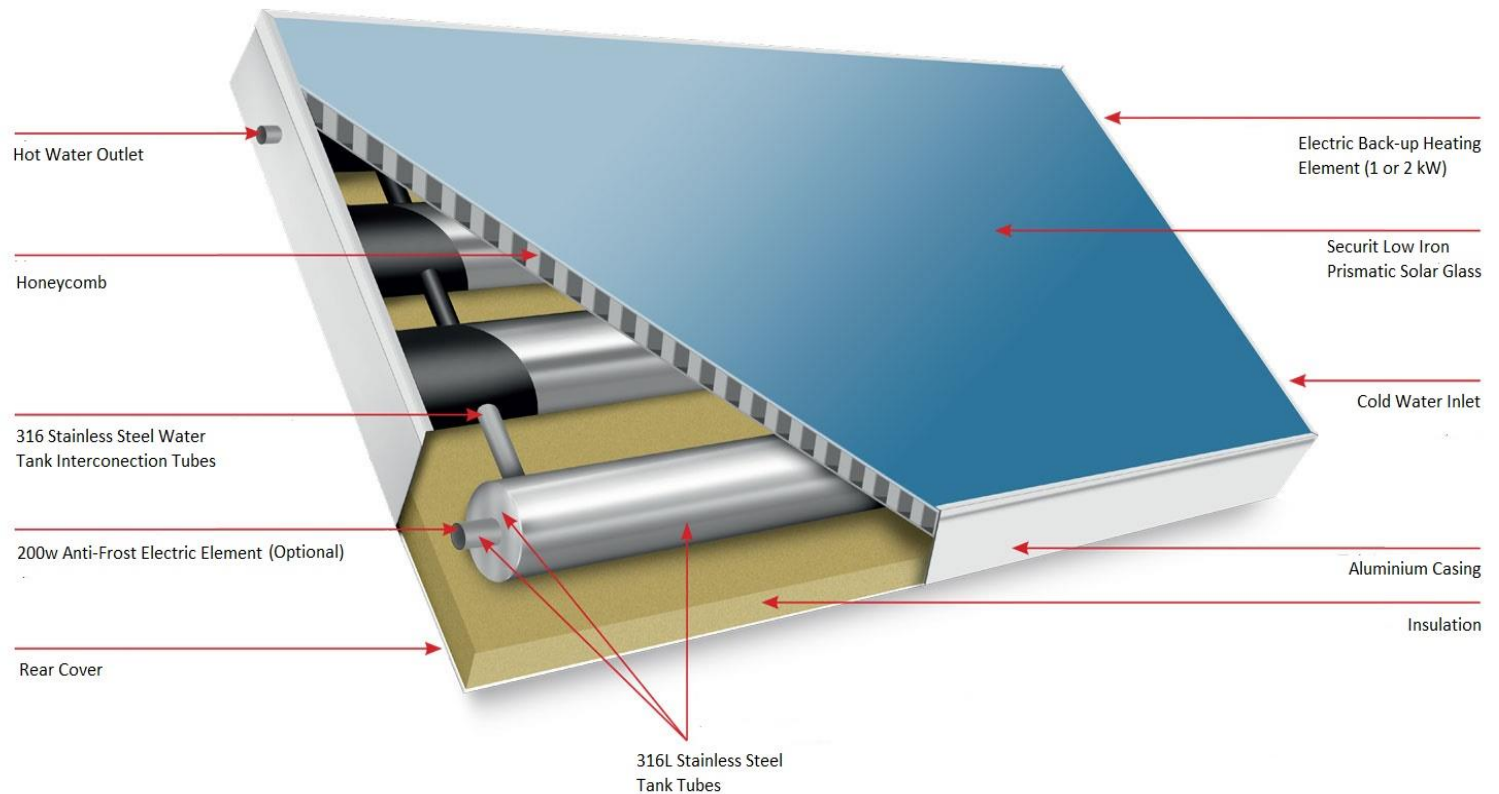
DIMENSIONS:



Model	a	b	c	d	e	f	g
EAST 100	198	50	100	530	640	520	220
EAST 150	198	98	100	880	640	870	220
EAST 200	198	118	100	1010	640	1020	220

SYSTEM DESCRIPTION AND COMPONENTS

ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters consist of one main unit that includes both the tank and collector and various accessories all in one package, including:



Fittings and Accessories

Description	No. of Pieces
Collector legs	2
Mounting Brackets	2
Hexagon bolt M10	6
Pressure Safety valve	1
Brass elbow	1
Electric Back-up Heating Element	1
Anti-frost element	1 (optional)

INSTALLATION

ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters are very simple, easy and quick to install in just 3 steps, requiring minimum time compared to traditional Thermosiphon Systems.

I. ASSEMBLING AND MOUNTING THE SYSTEMS

A. Installation on Flat Roof

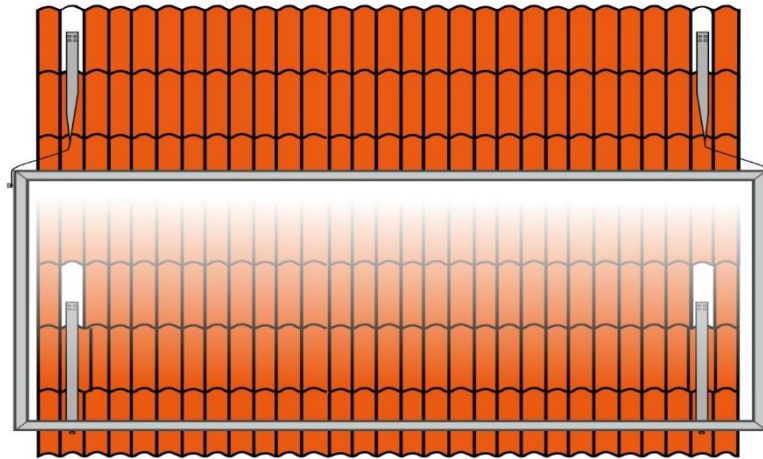
1. Attach the collector legs to the rear side of the system and the mounting brackets at the bottom profile and tighten all M10 bolts.
2. Adjust the inclination by moving the vertical legs through the existing holes to reach the required position or pierce extra holes according to the desired height for the systems.

Attention: keep the inclination of the systems between 20° and 60° and always make sure that the system is levelled and not inclined towards one or the other side or the system may not perform.

Attention: EAST systems must always be installed on their original collector legs.

3. Lift the system upright and bolt into position.
4. Proceed with the hydraulic connections

B. Installation on Pitched Roof



1. Fix the top and bottom collector straps to the beams under the roofing material.

Note: The top collector straps must be installed with a distance of 1,98 m to each other.
The bottom collector straps must be installed with a distance of 0,98 m to each other.

2. Using the M10 bolts connect top straps to the top of the side casing of the collector and tighten.
3. Using the M10 bolts connect the lower straps to the bottom of the side casing of the collector and tighten.
4. Continue with the hydraulic connections.

II. CONNECTING THE SYSTEM

A. Hydraulic Connections

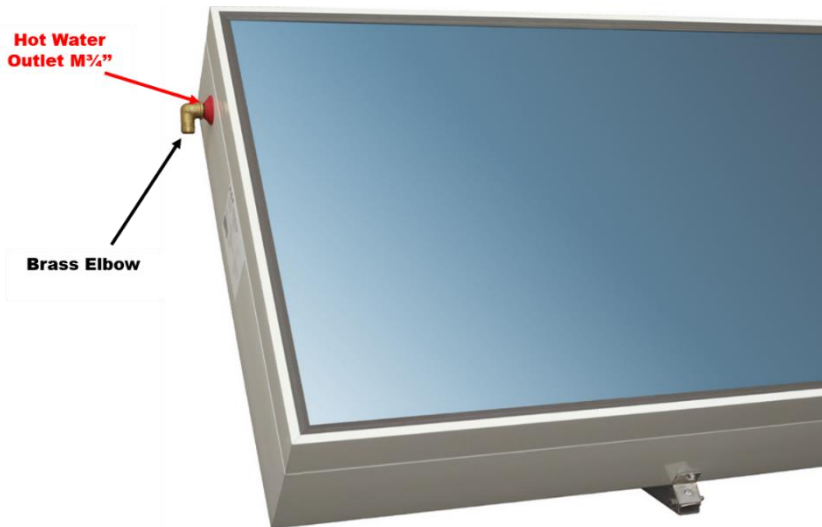
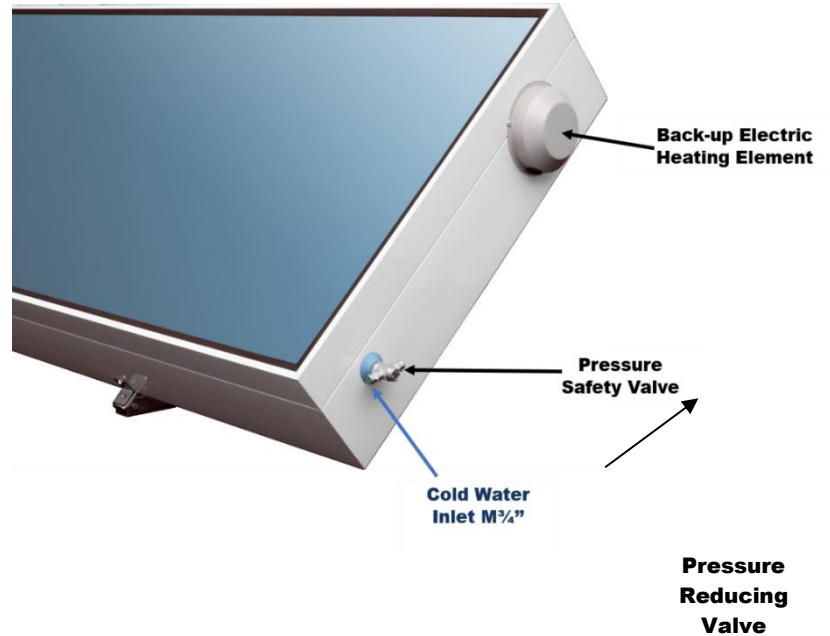
1. Connect the Pressure Safety Valve to the cold-water inlet.

Note: The safety pressure relief valve is used to release the pressure of the system. It also has an integrated non-return valve to avoid heat loss.

Note: It is recommended that Isolating Valve be placed on the cold-water supply circuit at an easily accessible point in order to be able to isolate and empty the systems if required.

2. Connect the cold-water mains to the Pressure Safety Valve (M 3/4 ").

Attention: water pressure entering the system must never exceed the maximum of pressure 4 bar. If this is the case it is mandatory to install a Pressure Reducing Valve after the Safety Valve before connecting the systems to the water main arrival.



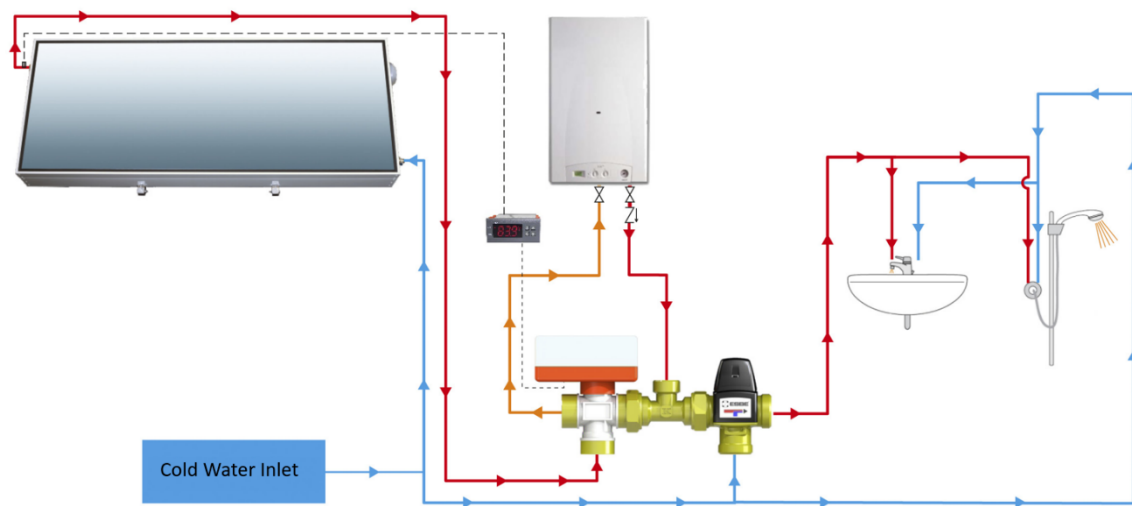
3. Connect the brass elbow on the hot water outlet
4. Connect the Hot-Water Outlet (M 3/4 ") to Hot-water mains
5. Fill system with water
6. Ensure that all the hydraulic connections are correct, water tight and that there are no leaks.

Note: Use pipes suited for sanitary water that can withstand temperatures of at least 100 °C

Note: In case of use of copper piping make sure that there is no direct connection between stainless steel outlets and copper pipes in order to prevent dielectric corrosion

Note: Cold water supply and hot water return lines must always be well insulated with high quality Armacell type insulation (at least 3/4" thickness) to minimize heat loss. Slide the insulation on the tubes and avoid cutting and taping insulation material.

Attention: Appropriate insulation must be able to prevent pipes from freezing.



Example of connection

B. Electric Connections

There are two heating elements on **ENVIROENERGY SOLUTIONS EAST Series Solar Water Heaters**:

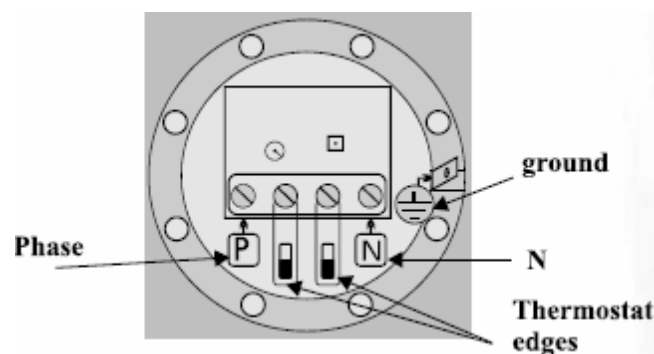
- The 200W heating element located at the lower position operates as antifreeze protection.
- The 2000W heating element located at the upper position is the backup Heating Element of the system

Attention: All electrical connections of the system must be performed by licensed professional according to local norms and regulations

Note: In case of use of both electric elements (anti-freeze and back-up heating elements) it is recommended to use different electrical supply for each heating element to be able to operate independently if necessary.

- To connect the heating elements, connect the separate electrical supply cables to the electrical connector terminal block connected on the heating element.
- Both heating elements have been tested under EN 60335-1 and EN60335-2-21 standards for Safety of household electrical appliances.

Follow the instructions on the image to connect the heating elements with the electrical supply:



Connect the ground cable to the socket of the electric resistance.

III. OPERATING THE ANTI-FRONS T PROTECTION

- Operate the antifreeze protection heating element when the air temperature is below zero (0 °C) to protect the water tank from freezing.
- During extremely low temperatures the system must be drained.
The user is responsible to protect system from extreme weather conditions as per the manufacturer's instructions. Warranty is void if system is not protected as per above instructions.

MAINTENANCE – TROUBLESHOOTING

A. MAINTENANCE AND SERVICING OF THE SYSTEM

In order to ensure the constant well-functioning of the system, **ENVIROENERGY SOLUTIONS EAST Series** solar water heater must be reviewed and maintained periodically (see warranty sheet) and the warranty sheet accompanying must be completed accordingly by the installer.

All installations and maintenance must be performed by qualified and certified professionals, following all relevant local norms and regulations (1), industry codes, and according to the manufacturer's instructions.

Revisions consists by the optical and physical inspection of the tightness of all connections (hydraulic and electrical), verification that all safety valves, pressure reducing valves and mixing valves are working properly, and cleaning of the glass cover.

B. TROUBLESHOOTING

In case the Solar Water Heater does not produce enough hot water, please verify the following:

1. That all hydraulic connections of the system are water tight and there are no leaks.
2. That there are no leaks on the taps or on the piping of the building
3. That the collectors are not dirty, or covered with leaves or dust, or shaded. Clean them.
4. That the system is level, not leaning towards one side.
5. That the supply of cold and hot water is not connected.
6. That the temperature set on the mixing valve is not too low (below 50°C depending on local regulations)
7. If the electric back-up is working. In case it is not working please check the following:
 - That the main power supply is ON
 - That the thermostat is not set too low
 - That the back-up element is not on security mode. The security button must be pushed-in
 - That the thermostat and back-up element are not damaged
 - That the back-up element wiring is properly connected and to the relevant terminals

If problems persist, then please consider:

- a) That the weather conditions allow the proper heating of the system
- b) The hot water consumption does not exceed the solar system's capacity, or the consumers' expectations of are not above this capacity.
- c) The consumer has understood the use of the electrical back-up

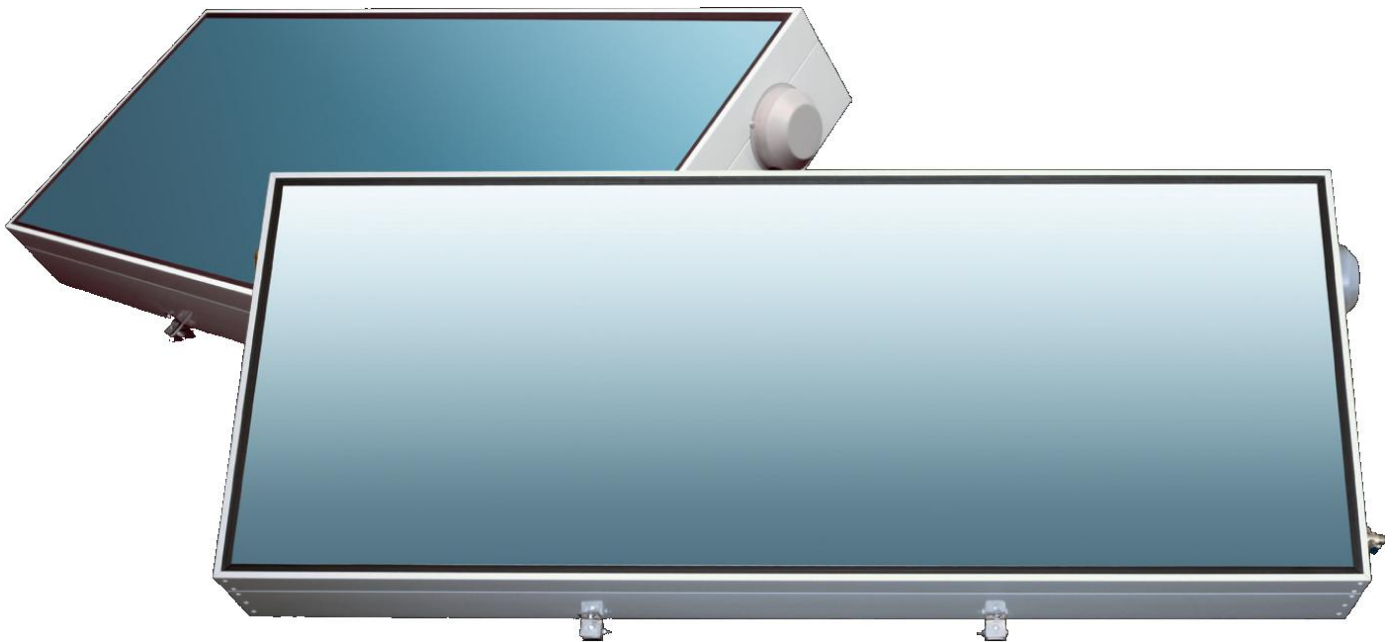
Note: all verifications and interventions must be carried out by qualified and certified personnel.

DECOMMISSIONING THE SYSTEM

All installations and decommissioning must be performed by qualified and certified professionals, following all relevant local norms and regulations (1), industry codes, and according to the manufacturer's instructions.

Always respect the following order:

- Disconnect all electrical connections (if any)
- Empty the system
- Disconnect piping
- Disassemble the brackets.





Enviro Energy Solutions Ltd

Your Gateway to the Sun

**We do not inherit the earth
from our fathers,
We borrow it
from our children..."**



...BECAUSE WITH ENVIROENERGY SOLUTIONS THE SUN SHINES FOR EVERYONE...



Head Office: Enviroenergy Solutions E.S. Ltd
10, Th. Dervi Str. - 1305 Nicosia - Cyprus



Factory: 1st Km. Inofyta – St. Thomas Rd
32011 Inofyta – Viotia - Greece