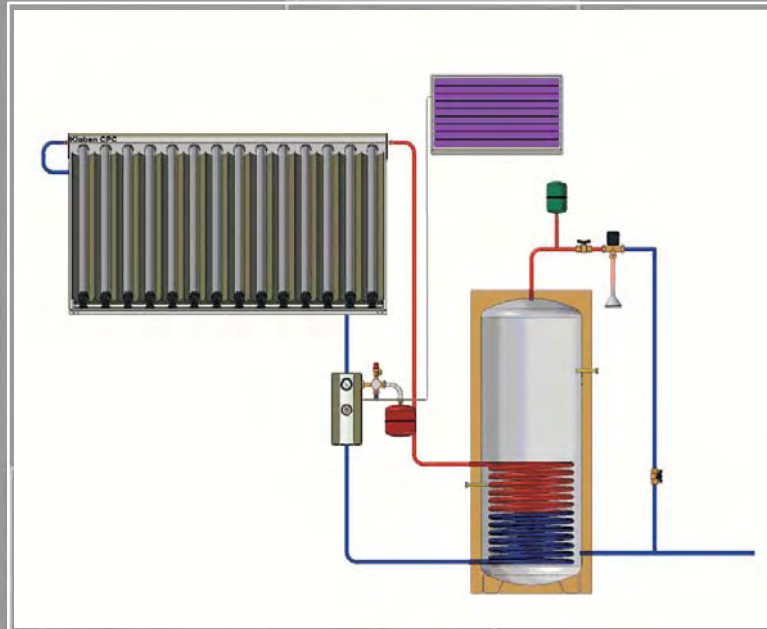


# Manual for EcoEnergy System



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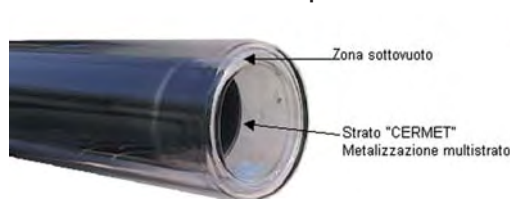
# 1 - THERMAL SOLAR SYSTEM ECOENERGY

## 1.1 - Utilising Solar Energy

The working principle of a solar heating system can be easily explained. A collector receives the solar radiation, and as a result heats up. This heat produced is channelled in the greatest possible quantity to a hot water tank. No fuel is used during this process, and so there are no CO<sub>2</sub> emissions, thus no environmental pollution. The quantity of solar energy that the collector is able to transfer into the house depends mainly on its capacity to absorb light, but also on its insulation from the external environment, which prevents the dispersion of energy from the collector itself.

## 1.2 - The vacuum tube

The creation of a vacuum by removing the air from a glass container achieves excellent insulation, a principle which has been known for a century now and applied in the form of the thermos. By using this type of insulation, the collectors can improve the conversion of solar energy even in between seasons and in the winter period.



A special multi-layer metallic paint, made from recyclable products, called CERMET, is applied to make the internal space especially selective to infra-red refraction for the absorption of solar energy.

The vacuum protects the selective coating from any outer agent, preserving its long life.



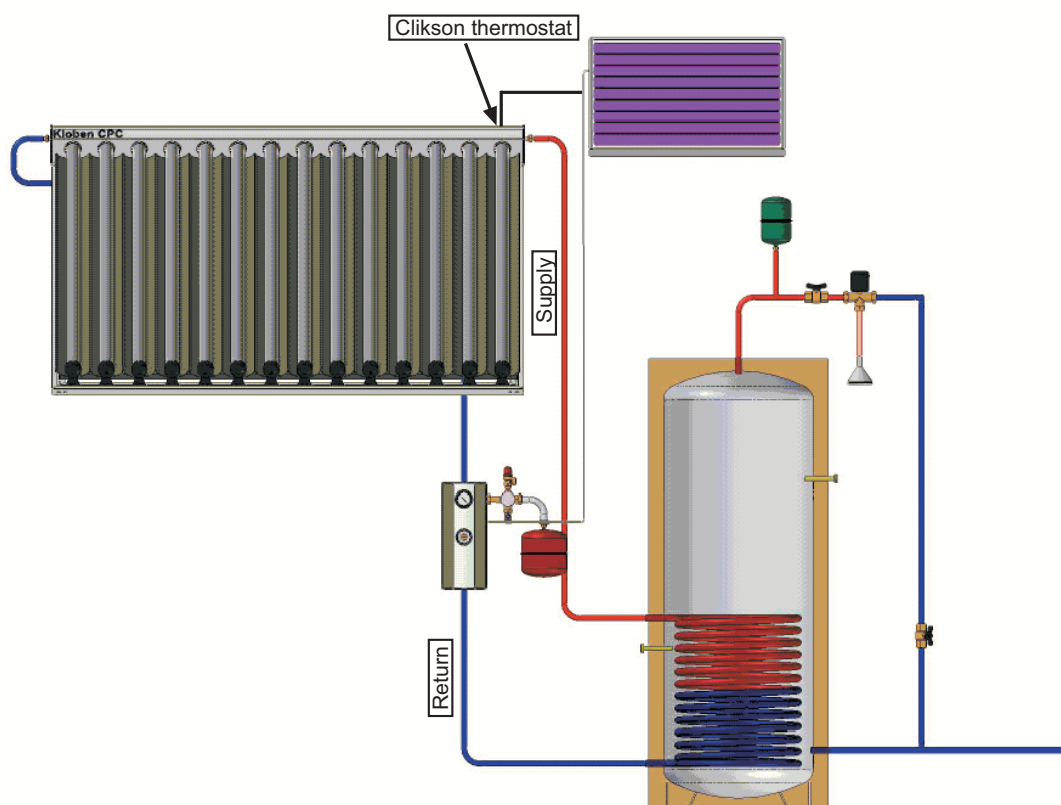
Inside the glass tube lies a copper pipe folded into a U-shape with aluminium thermal conductors, to transfer the solar energy from the inside wall of the glass pipe to the collector case. The heat transfer fluid flows into each copper pipe, then connected in parallel to the upper part of the panel to a single collector.

## 1.3 - Advantages of the vacuum technology

- ✓ High temperatures and high efficiency even in unfavourable atmospheric conditions, such as an overcast sky, or in case of low temperatures.
- ✓ High solar absorption even from oblique light, thanks to the circular shape of the absorber
- ✓ Excellent heat exchange capacity.
- ✓ Long life, as there are no metallic passages interrupting the glass pipe and compromising the vacuum.
- ✓ Long life, as the selective surface is protected by the vacuum.
- ✓ Maximum efficiency from a small surface area
- ✓ Attractive shape and design
- ✓ Very high year-round output.
- ✓ Low assembly costs: the collector is already pre-fitted and easy to mount.
- ✓ Replacement of the pipes without having to drain the solar circuit.

## 2 - WORKING PRINCIPLE AND PRELIMINARY CONTROLS

### 2.1 Working principle



### 2.2 Preliminary controls

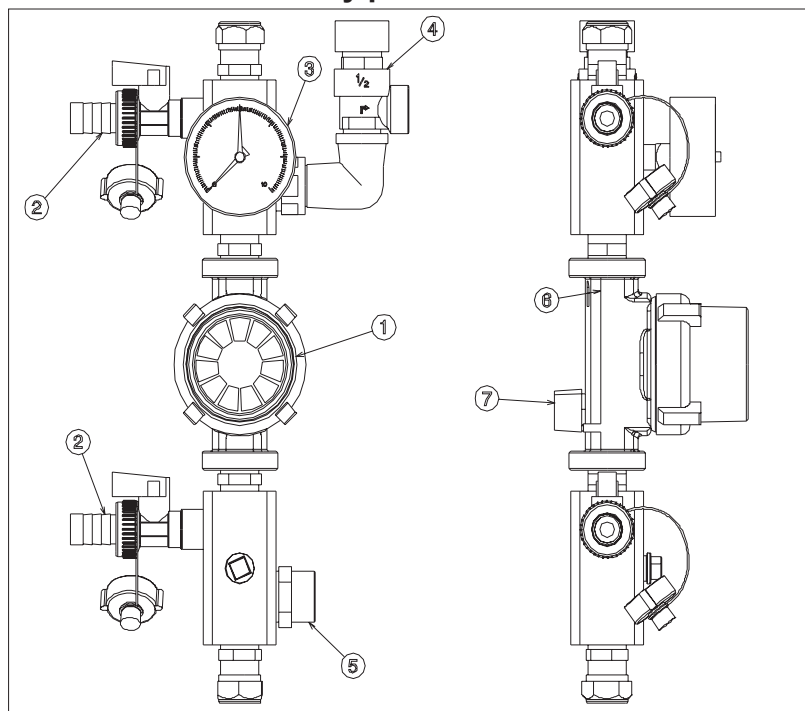
- ✓ Avoid siphon forming during the plant installation
- ✓ The maximum admissible hydrostatic difference of level is 5 m
- ✓ Before beginning the solar plant filling, it is necessary to verify that the solar collectors are at low temperature. It is obligatory to cover the solar collectors at least 3 hours before beginning the filling.
- ✓ The solar plant filling must be effected following in detail the instructions of the present manual. It is suggested the use of the supplied loading pump (cod. 101010045). A correct plant filling allows the complete air removal from the solar circuit, and consequently assures its good functioning
- ✓ Verify that with empty plant, the expansion vessel is set at pressure 2,5 bar.
- ✓ The optimal suggested pressure for the plant's efficient functioning is 3 / 3,5 bar. The pressure must be set during charging of the system.
- ✓ Verify that the whole connection piping are Ø 16 mm insulated. The whole piping length (supply + return) must not be longer than 20 m.
- ✓ The whole piping forming the solar circuit must be in copper.
- ✓ The solar collectors can not be exposed to the solar irradiation for long periods, without being charged (max 15 days).

## 3 - THE ECO ENERGY SOLAR STATION

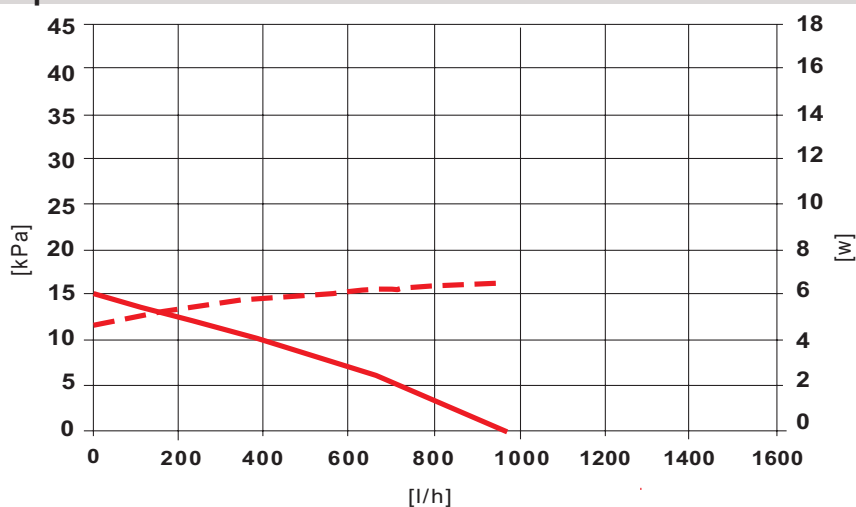
### 3.1 - Components

- 1) - Circulation pump 12 V (model D2)
- 2) - Fill and drain valve
- 3) - Manometer and pressure gauge
- 4) - Safety valve (6 bar)
- 5) - Expansion vessel connection
- 6) - Non return valve
- 7) - Pump sluice valve

**POWER SUPPLY: by photovoltaic cell model KC40**



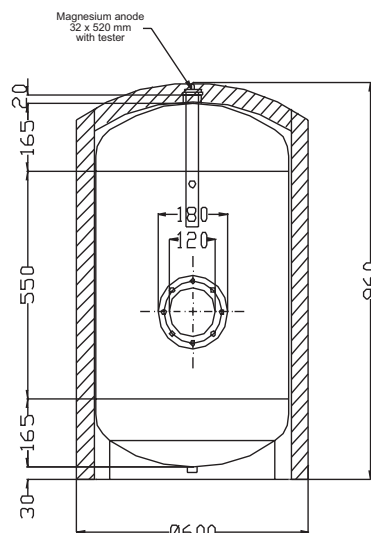
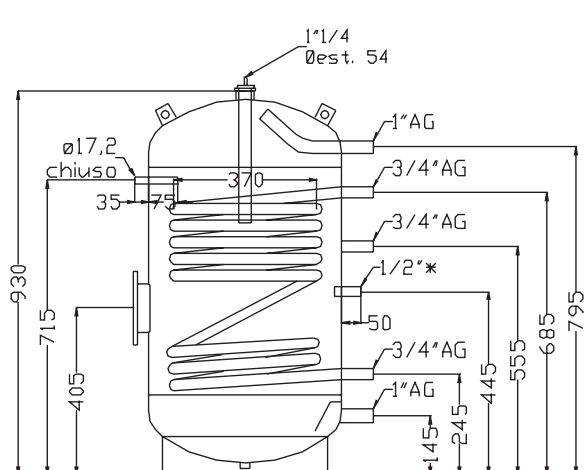
### 3.2 - Pump D2 carachteristics



The curve refers to the single pump, without non return valve and sluice valve, that can reduce the head performance of max 3kPa, and the flow performance of max 400 l/h

# 4 - THE ECO ENERGY TANKS

## DIMENSIONS

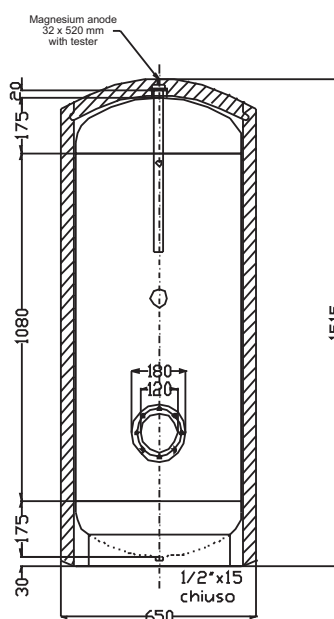
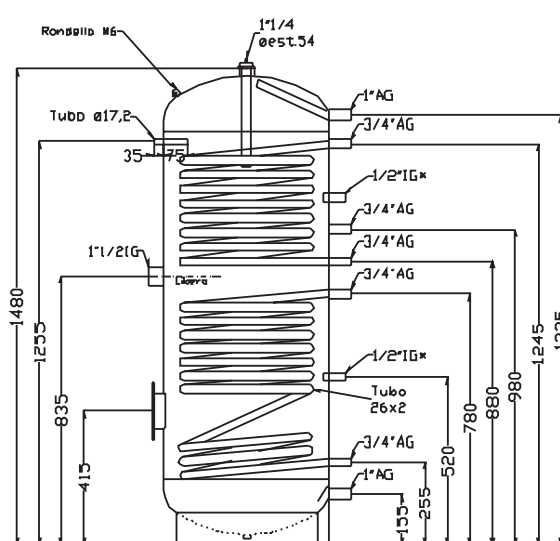
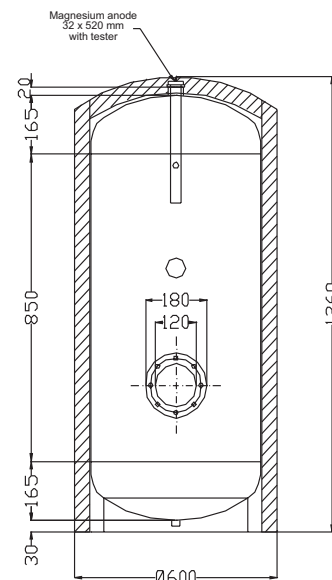
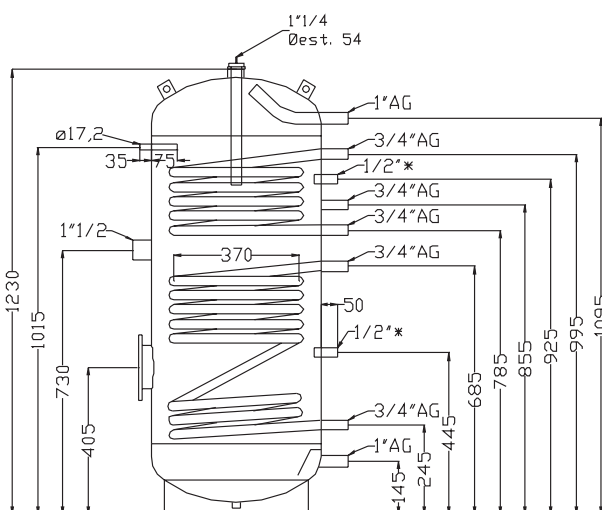


ECO ENERGY 150

← Tank capacity = 1500L

ECO ENERGY 200

Tank capacity = 2000L



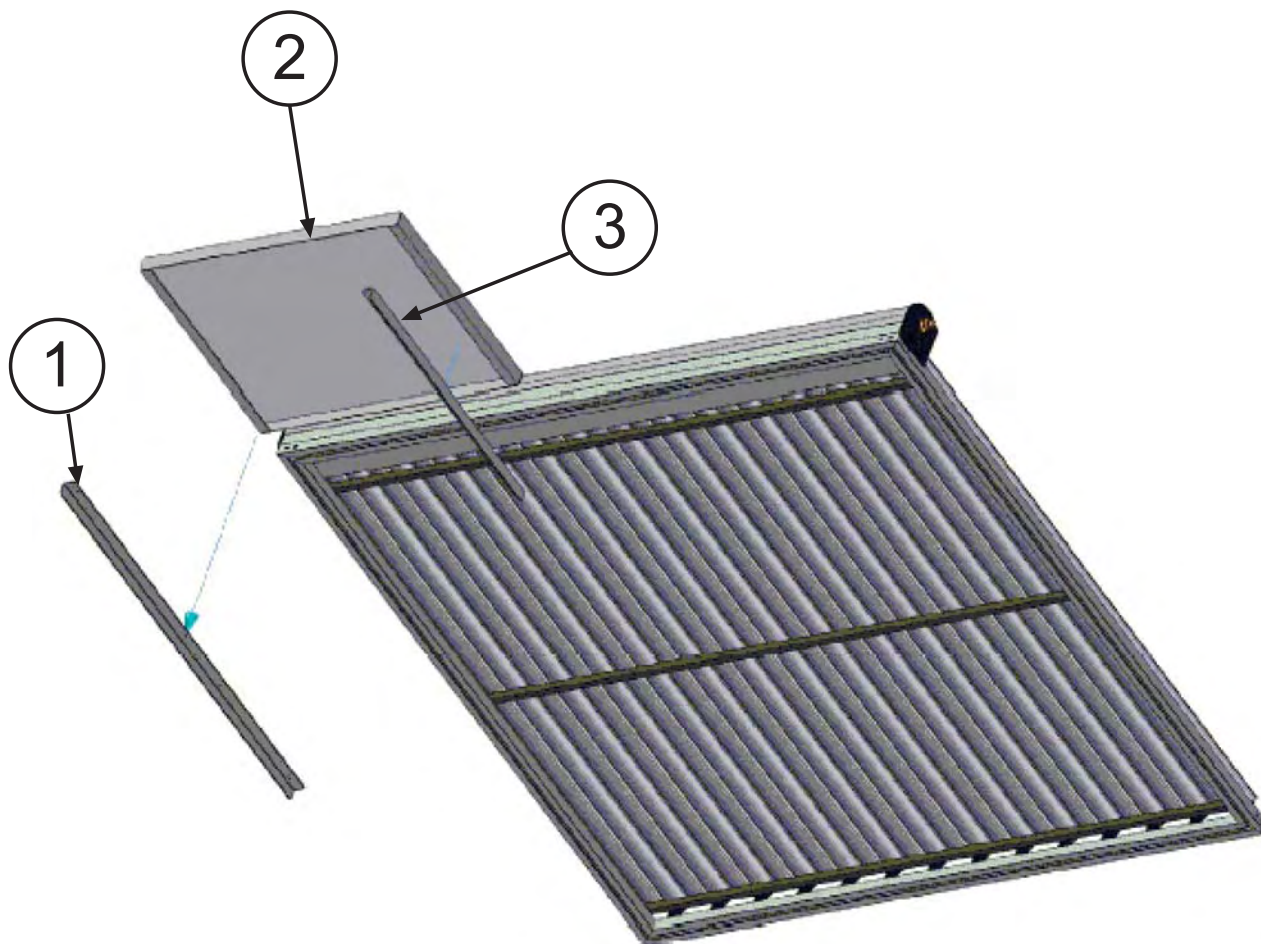
ECO ENERGY 300

← Tank capacity = 3000L

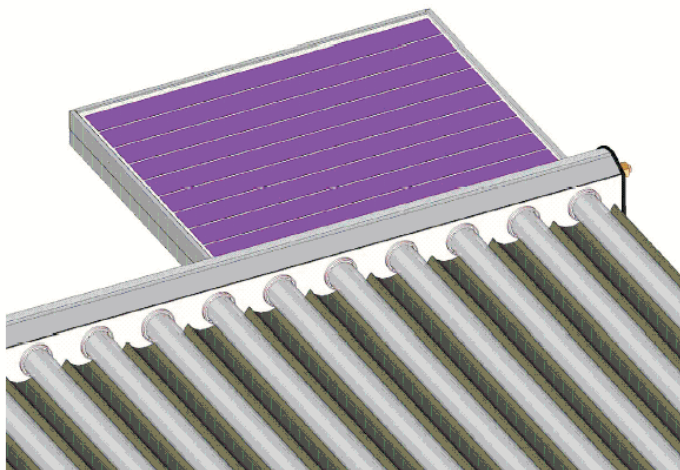


## 5 - PHOTOVOLTAIC CELL MOUNTING

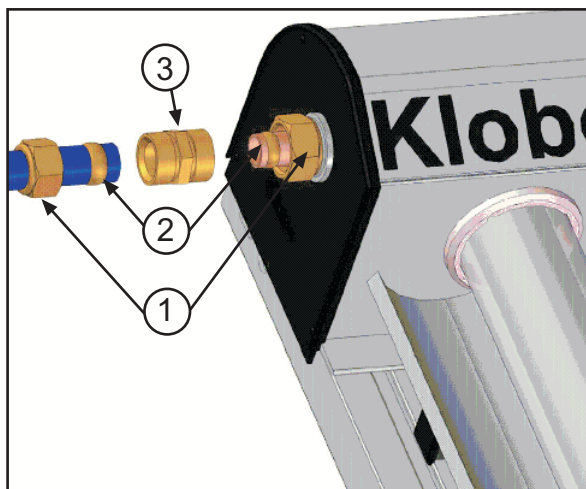
- a) Position the support nr. 1 (length 1000 mm) on the right side of the solar collector.
- b) Afterwards position the photovoltaic cell nr. 2.
- c) Position the second support(nr. 3) with length 656 mm, as shown in the figure.
- d) Control that each used bolt is correctly tight.



Alla fine delle operazioni sopra descritte controllare il corretto serraggio della bulloneria utilizzata

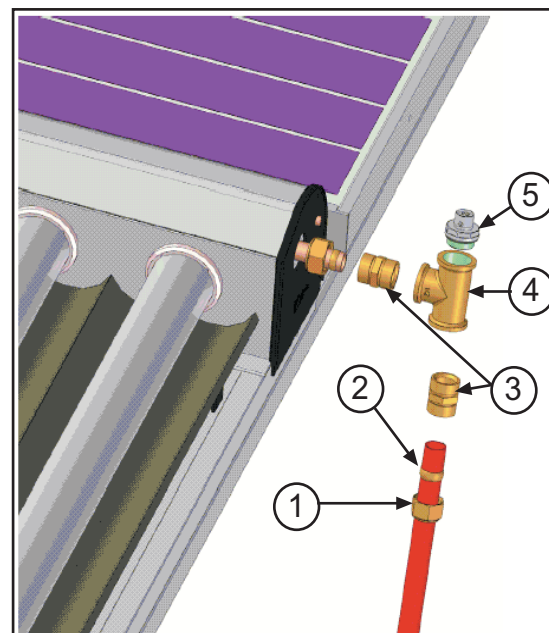


## 6 - AIR VENT AND FITTINGS MOUNTING



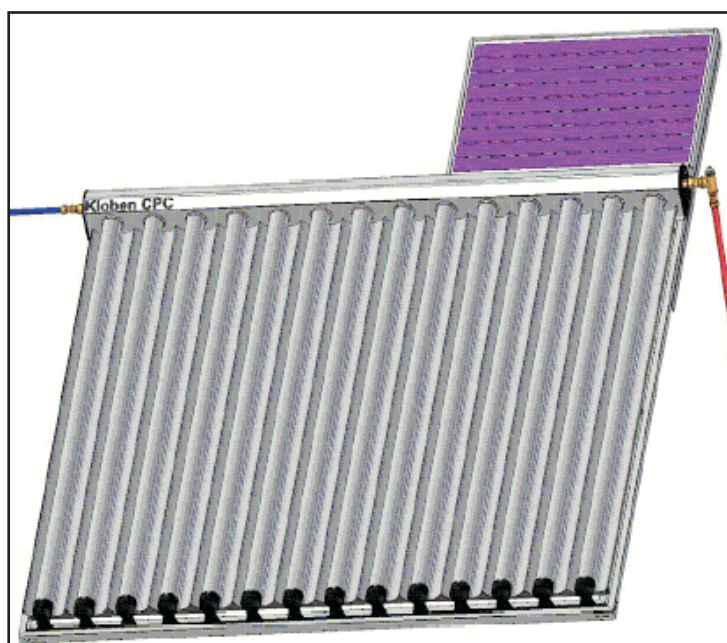
### Legend:

- 1 - Threaded nut
- 2 - Brass ring
- 3 - Nipples
- 4 - "T" fitting
- 5 - Manual air vent



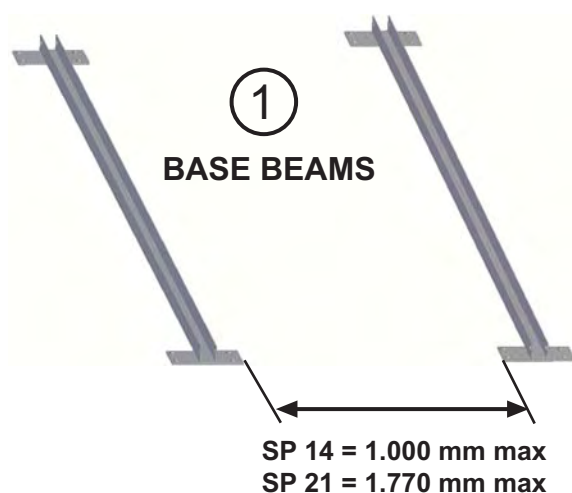
### Air vent mounting:

- a) Assemble the "T" fitting (4) together with the nipples (3) and the manual air vent (5) as shown in the above figure.
- b) Position the threaded nuts (1), land the brass rings (2) on the supply and return pipings, tightening with care, to avoid to damage the pipes.
- c) After the plants filling, check the fittings sealing.

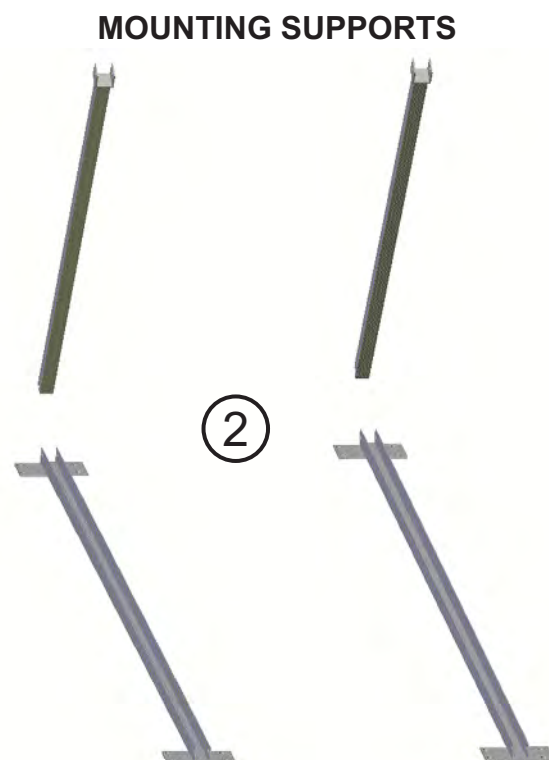




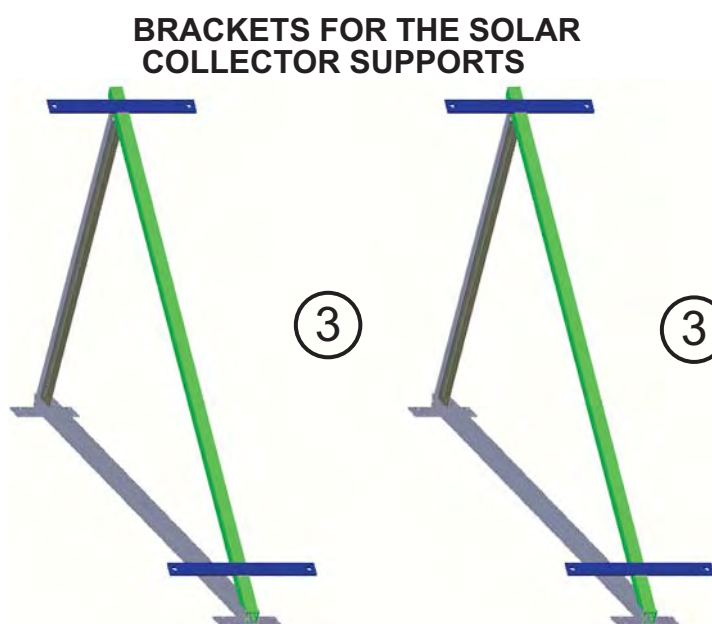
## 7 - FLAT ROOFS ASSEMBLY



- 1** Place the base beams with fixing plates on the roof or ground, paying attention to observe to the distances as indicated.



- 2** Fix the mounting supports to the base beams, using the the supplied bolts

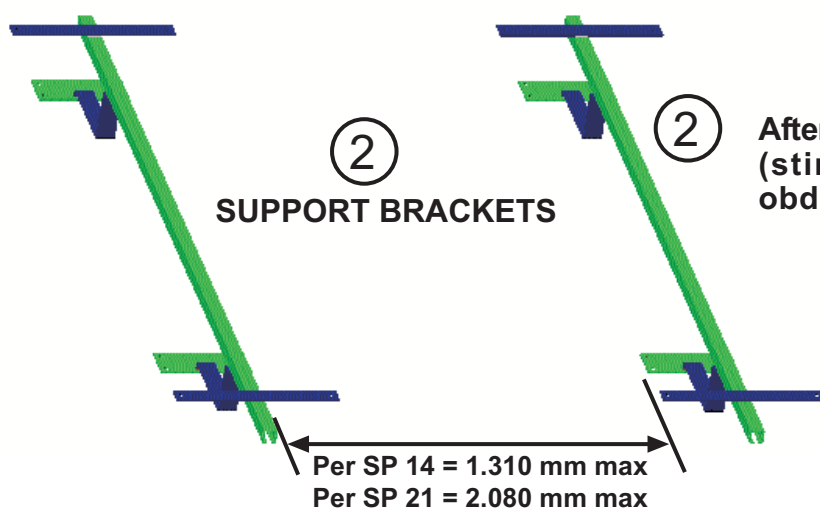
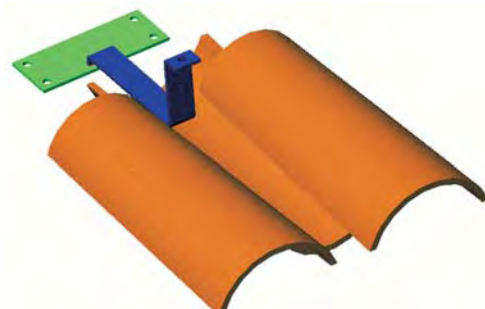


- 3** Place the brackets (stirrups) on the obtained structure, and tighten them using the supplied bolts.

## 8 - INCLINED ROOFS ASSEMBLY

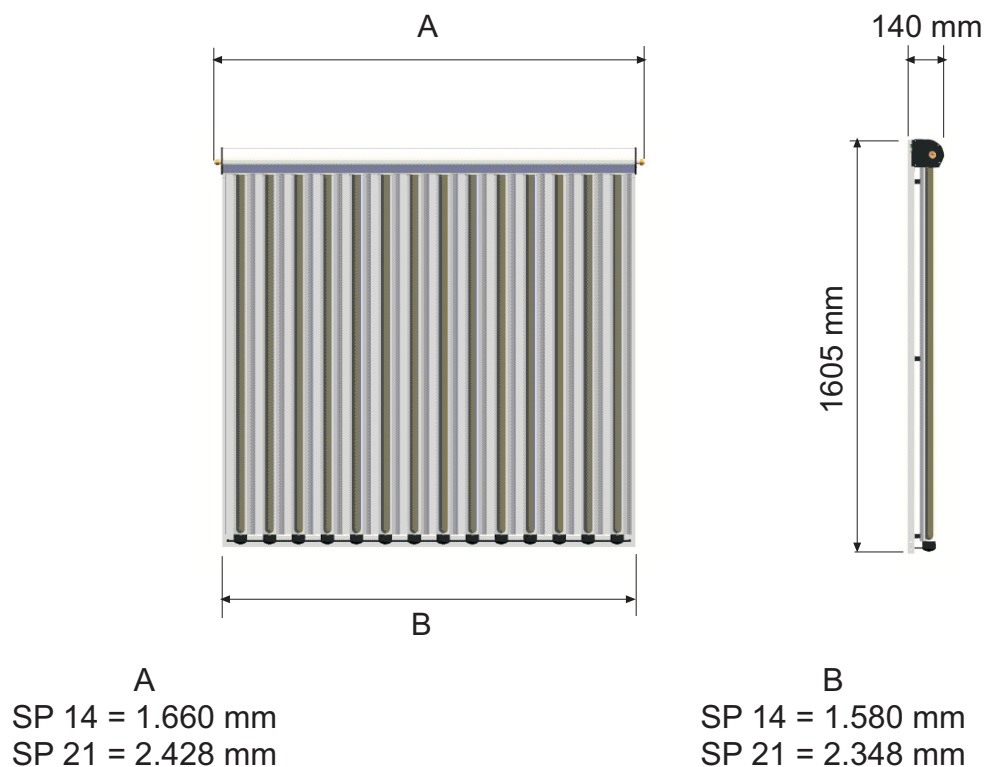
- ① Properly fasten the fixing plates on the roof. The choice of the bolts to use has to be made in relation to the typology of ground floor. Each fixing plate is supplied with 4 holes of 11 mm diameter

### ① FIXING PLATES



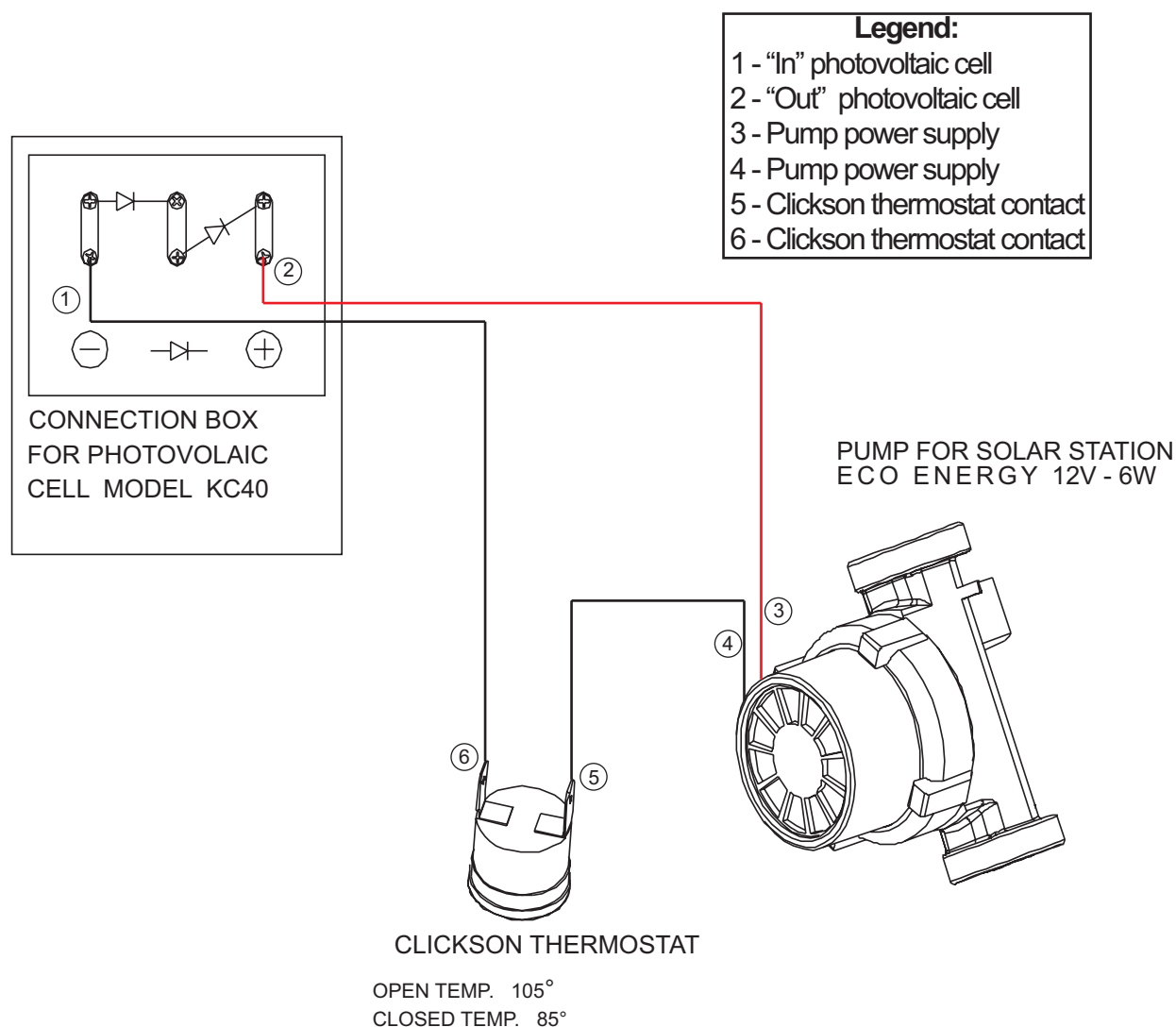
- ② Afterwards place the support brackets (stirrups) on the fixings plates, observing the indicated distances.

## 9 - COLLECTOR DIMENSIONS



## 10 - INSTRUCTIONS FOR ELECTRIC WIRING

To obtain the correct system working, it is necessary to proceed with the electric wiring of the supplied components (clickson thermostat, circulation pump, photovoltaic cell connection box) as shown in the following scheme.

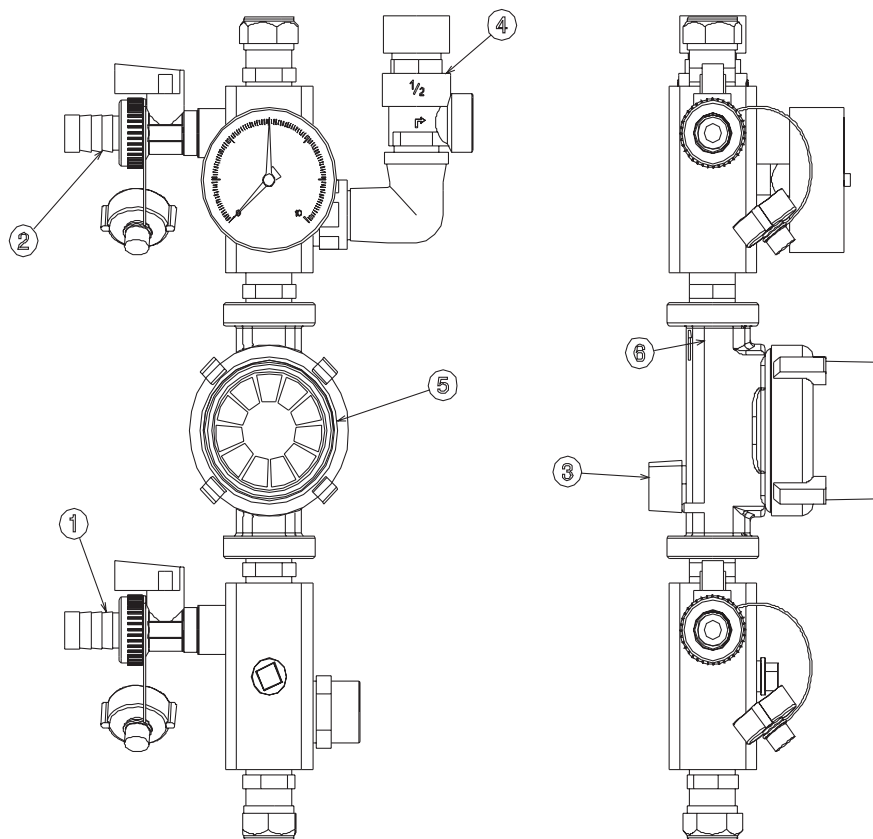


The control of the solar circuit temperatures is performed by the supplied clickson thermostat already installed on the collector supply pipe. It has the function to stop the pump power supply, by reaching of a security temperature of  $105^{\circ}\text{C} \pm 3,5^{\circ}\text{C}$ , avoiding the fluid circulation at too high temperatures. Afterwards the pump is re-activated by the clickson thermostat by reaching of a temperature of  $85^{\circ}\text{C} \pm 5$ .

For the clickson thermostat wiring, it is suggested the use of a  $0,5 \text{ mm}^2$  cable ( max current 2,5 A).

## 11 - SOLAR PLANT FILLING

**N.B.:** Before starting the solar system filling, the solar collectors must be covered for at least 3 hours.  
Verify that with empty plant, the expansion vessel is set at pressure 2,5 bar.



- Open the fill and drain valves nr. 1 and 2.
- Close the pump sluice valve nr. 3.
- Let the antifreezing fluid will flow in the opposite direction than normal (from valve nr. 1 to valve nr. 2).
- Keep the pump working for min. 10 min., to expell the air present inside the circuit.
- Open the pump sluice valve nr. 3 and fill the pump zone.
- Re-close the pump sluice valve nr. 3
- Close the fill and drain valve nr. 2.
- Let the solar circuit filling up to 3 bar pressure (the pressure is displayed on the pressure gauge Nr. 8)
- Close the fill and drain valve nr. 1.
- Switch off the filling pump.
- Open completely the pump sluice valve nr. 3.
- Check and desair the manual or automatic air vent.
- Uncover the solar collectors.