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SCE – 01

Vacuum Tube Solar Water Heater

USER'S GUIDE

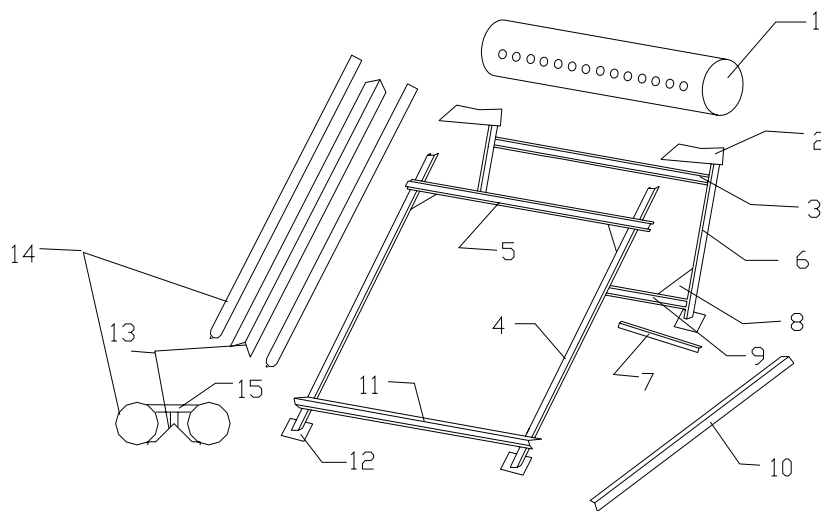
I. Characteristics

The core parts of Ecoenergy Solar Water heater are dual glass tube, vacuum insulated. Special coating on outer area of the inner tube has a property of high absorption and low emission.

Advantages:

- Effective use of natural ecological solar energy
- High thermal efficiency
- Anti-freezing function
- Hail resistance
- All the year round operation
- Long life

II. Structure



- | | |
|--------------------------|-------------------------------------|
| 1. Water Tank | 2. Round Support (Left & Right) |
| 3. Rear-Top Crossbeam | 4. Bevel Support (Left & Right) |
| 5. Bevel Crossbeam | 6. Rear Support (Left & Right) |
| 7. Short Side-Support | 8. Fixed Set Square |
| 9. Rear-Bottom Crossbeam | 10. Long Side-Support |
| 11. Tailstock Support | 12. Support Foot |
| 13. Reflector panels | 14. Evacuated Solar Collector Tubes |

15. Hanging beam

III. Principle of Work

When the evacuated solar collector tubes selectively absorb sunlight, and turn the solar energy into heat energy, water in the vacuum tubes is being heated continuously. As the specific gravity of cold water is heavier than hot water, the hot water in vacuum tubes will rise to the water tank, and on the contrary, the cold water in the water tank will sink into the vacuum tubes to repeat cycle. Hence, water in the heat preservation tank is heated too.

IV. Main Parameter

Absorptance: ≥ 0.90	Emittance: ≤ 0.09
Vacuum: $\leq 5 \times 10^{-3} \text{Pa}$	Area of light collect: 1.81m^2
Insolation temperature: 90°C	Number of tubes: 18
Water volume: 100kg	Rating pressure: 0Mpa
Weight: 60kg	Shape size: $1380 \times 1515 \times 1330 (\text{mm}^3)$

V. Products Materials

Solar water-heater is made of three components: all-glass evacuated solar collector tubes, heat preservation tank and brackets.

1. Vacuum heat collecting tubes: are made of borosilicate glass, with a concentric dual tube structure and vacuum stuff. There is Al-N/Al coating in outer area of the inner tube, which has a property of high absorptance, low emittance and good temperature keeping.
2. Water tank: it includes stainless steel inner tank, temperature keeping floor, tank case and silicon rubber seal ring.
 - a. Stainless steel inner tank: sus304/2B stainless steel, endure corrode, use long life.
 - b. Temperature keeping floor: polystyrene high pressure unite. with low heat loss, shut hole

rate high, and good temperature keeping.

c. Tank case: blue steel plate with two bake and two overlay.

(Seal ring: high quality silicon rubber, with good elasticity, endure high temperature, endure age, nonpoisonous, tasteless, safe and reliable.)

3. Support frame: it's an important part supporting water tank and tubes, sus304/2B stainless steel. With high intensity structure with high strength and endure corrode.

VI. Installation

1. Connect the round supports (L/R)(2) to the bevel supports(L/R)(4) and the rear supports(L/R)(6) respectively.
2. Connect the rear crossbeams (3),(9) and the set square(8) to the rear supports(6).
3. Connect the bevel crossbeam (5), set square(8) and the tailstock support(11) to the bevel supports(4).
4. Connect the long and short side supports (L/R)(7),(10) to the bevel supports(L/R)(4) and the rear supports(6) respectively.
5. Adjust the angles, fasten the bolts and the support feet (12).
6. Connect the water tank (1) to the round supports (2).
7. Apply some lubricant, such as the detergent to the circular nozzles of the vacuum tubes (14) and cover them with dustproof covers. Make the vacuum tubes' axes correspond to the vacuum tubes' hole axes in the water tank(1), and rotate the tubes into the tank slowly, Then put the other end into the tailstock (11).
8. Connect the hanging beam (15), bolts and nuts to the reflector panels (13). Place the reflector panels in the reversed clearance between two vacuum tubes. Then pull out the hanging support, and fasten it vertically between two vacuum tubes.
9. The installation of reflector panels should go in step with the installation of vacuum tubes.
10. Install the vent tube properly in order to avoid swelling up or pumping out the water tank.

11. Completed install the water-heaters, Please refer to following picture for arrange pipeline. Electric magnet valve used for controlling the filling of the water is controlled by Water Level Controller TWL 03 (look chapter VIII). Connect the water supply pipe and fill in tap water, check whether there is leakage for the heater. After the water is full check the installation again, if every thing is acceptable, it then can be used.

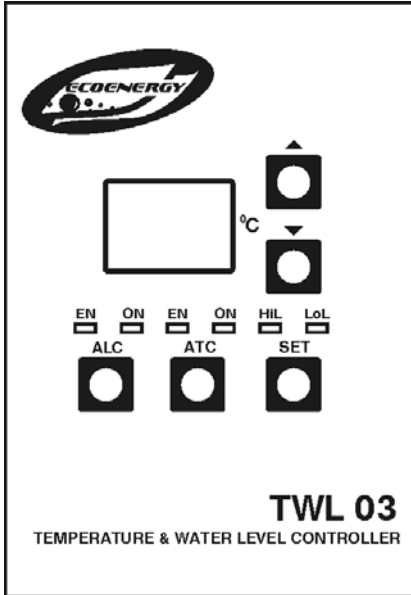
Caution:

- It is strictly prohibited to pour cold water suddenly into the dry vacuum tubes exposed in the sun to avoid blowout of the evacuated collector tubes. Please use sunshade or input water into the tubes in case of installation under the burning sun.
- Installation of water heater must be undertaken by qualified professionals.
- The place where water heater is installed should be even, there is no blocking object to influence heat collection.
- The foundation of water heater must be able to bear twice weight of water volume.
- Installation of water heater must be firm and stable to avoid damage and accident.
- During installation, give full thermal insulation to upward and downward water pipes to avoid freezing in winter.

VII. Operation Instructions

1. Please test the water temperature before use. If heated by electricity, cut off the power before use.
2. In windy days, please keep full water in the water heater to increase the bearing strength and avoid the water heaters damage.
3. Please do not use the water heater when attacked by thunderstorm.
4. In order to guarantee water heater working normally and effectively, it is necessary to do regular maintenance to remove dirt and scale in water heater.

VIII. Temperature and Water Level Controller *TWL 03*



1. Use – to be used together with Vacuum – Tube Solar Heater SCE-01.
2. ATC (Automatic Temperature Control) – unit for automatic controlling the electric heater. It is made up of the following:

Electric heater – 1.1 +/- 0.1 kW

Temperature sensor for tank water temperature

<ATC> button for switching on / off the unit. When the ATC

is on the green <EN> LED indicator lights (Enable).

When the ATC is on you can set the temperature to which water will be electrically heated when the sunshine is not enough. For this setting you have to do the following:

Press <SET> button. The present setting of the temperature indicates. The indication flashes and you can change the temperature by <▲> and <▼> buttons. Acknowledge the new setting by <SET> button.

If after the first pressing of the <SET> button you do not like to change the temperature setting acknowledge by pressing again the <SET> button. If you miss to do this operation the controller will do it automatically.

Indicator shows the tank water temperature. If there is not pressed button for the period of 4 minutes, the indication is switched off and can be switched on by pressing any key.

Switching the electric heater on is executed by relay. When the electric heater is on a yellow <ON> LED indicator lights. There is a fuse of 10 A in the controller for protection of overcharge and short circuit.

3. ALC (Automatic Level Control) - unit for automatic controlling the water level in the tank. It is made up of the following:

High Level (HiL) and Low (LoL) Level Sensors for the water level in the tank.

<ALC> button for switching on / off the unit. When the ALC is on the green <EN> LED indicator lights (Enable).

LED indicators indicating the water level.

If the water level is above minimum a yellow <LoL> LED indicator lights.

If the water level is above maximum a yellow <HiL> LED indicator lights.

Adjusting the water level is executed by an electric magnet valve. The valve is getting open when the water level is below the minimum and is getting closed when the water level is above the maximum. When the valve is open a yellow <ON> LED indicator lights.

Hand valve controlling. The ATC and ALC are off (the green LEDs do not light). In this rate water level is not controlled.

Opening of the valve – by at the same time pressing of the <SET> and <▲> buttons.

Closing of the valve – by at the same time pressing of the <SET> and <▼> buttons.

4. Protections. For securing the safe operation of the heater are setting the following protections:

When the water level is below minimum, switching the electric heater on is not possible.

When there are at the same time registered the water level below minimum and water level above maximum <EL> (Error Level) is indicated. The electric heater and valve are switched off.

When there is a damage of temperature sensor the <Et> error is indicated and the electric heater is switched off.

When there is an overcharge of the valve controller the <EP> error is indicated and the valve and electric heater are switched off.

5. Technical data:

Electric power – $220\text{V}^{+10}_{-15}\%$, 50 ± 2 Hz

Consumed power:

Electric heater is off - ≤ 25 VA

Electric heater is on - ≤ 1.3 kVA

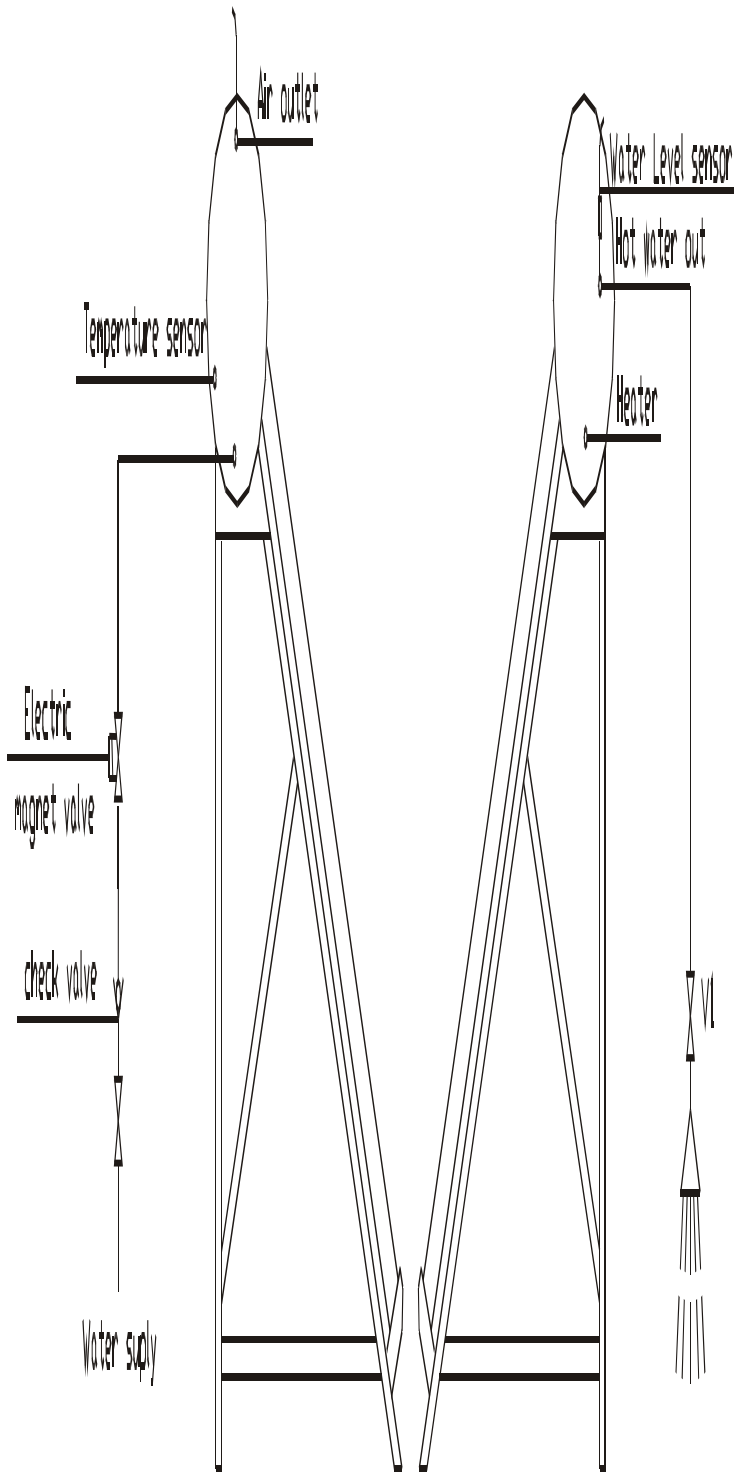
Electric power supply – by hard connecting:

Brown wire – phase (L)

Blue wire – neutral (N)

Yellow- green wire – earth (\perp).

Installation



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Guaranty Card for Solar Water Heater Ecoenergy Models SCE 01 & SCE 11

Serial N:Date of Purchase:
 Buyer's Name:Address:
 Invoice N:Date of Invoice:

Guaranty conditions:

- | | |
|--|--------------------------|
| 1. Water tank | – 10 (ten) years. |
| 2. Vacuum Solar Collector Tube and Reflectors
(not for glass breaking) | – 10 (ten) years. |
| 3. Supporting Frame | – 10 (ten) years. |
| 4. Electric Heater and Microcontroller | – 1 (one) year. |

Service Entry Date	Damage	Delivery Date	Signature

Seller:

Buyer: