

*OWNER'S MANUAL*

**SOLAR THERMAL**

**HOT WATER**

MARCH 2009

**Solarsense UK LTD**

4 Merrietts Court  
Long Ashton Business Park  
Yanley Lane  
Long Ashton  
Bristol  
BS41 9LB

Tel: 01275 394139

Fax: 01275 391100

**Installation Address**

# Manual for Solar Thermal

## Section 1 - Intro

This manual is provided for reference and maintenance instructions. It is essential that the checks in Section 4 are carried out. It is recommended that the system is never turned off.

## Section 2 - System Outline

### Basic principles

Energy from the sun is harnessed to provide domestic hot water and are described as 'solar thermal' systems. This is among the most cost effective renewable energy systems that can be installed on dwellings in rural or urban environments.

A heat transfer medium (a water/antifreeze mixture) travels through a series of heat conducting tubes known as a heat collector. During its circulation through the tubes, the fluid picks up heat which is then transferred to the domestic hot water supply as it passes through a coil in the Hot Water Cylinder.

### Circulation system

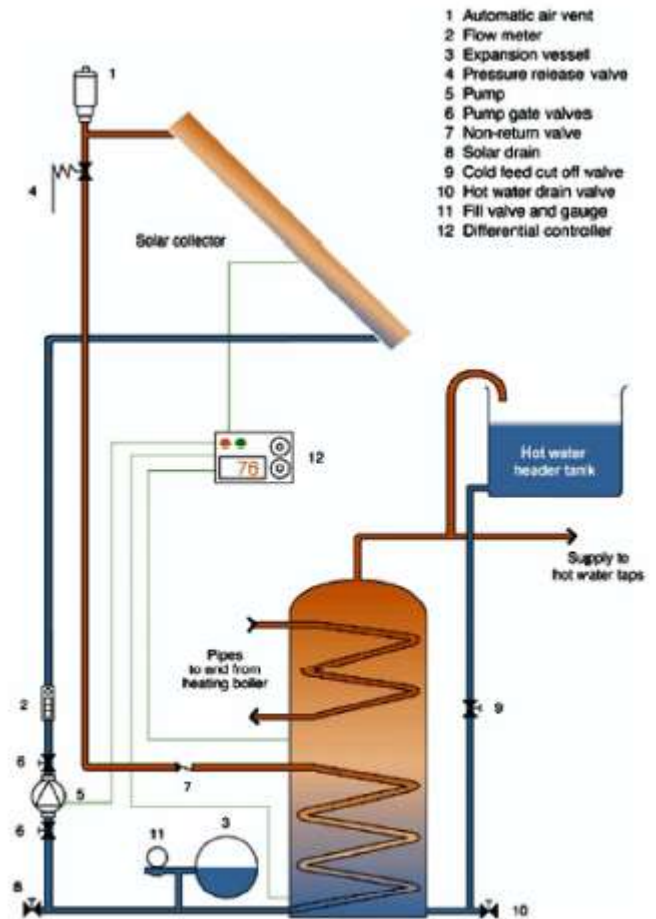
The system is 'Active' in that an electric pump is used to circulate the heat transfer fluid. The controller compares the temperature of the solar collectors with the temperature of the water in the pool heat exchanger. If the collector temperature is hotter than in the pool heat exchanger, the controller will switch on the pump. The circulating fluid will then start to flow through the collectors and heat exchanger, thus heating the water in the cylinder.

### Solar thermal collector - Evacuated tube systems

Evacuated tube collectors consist of rows of parallel transparent glass tubes, each containing an absorber tube covered with a selective coating. Selective coatings are made of materials which reduce radiation heat losses from the collector. This can significantly boost the efficiency of the collector. Sunlight enters through an outer glass tube and strikes an absorber tube, at which point it converts into heat energy. This heat is then transferred to a liquid flowing through the absorber tube.

During the manufacturing process air is evacuated from the space between the two tubes, forming a vacuum. This vacuum greatly reduces heat loss from the system because there is no air to conduct the heat away.

Evacuated tube collectors have the benefit of the sun shining directly on the absorber for most of the day. They perform well in both direct and diffuse solar radiation, which is why they are especially effective in the UK climate.



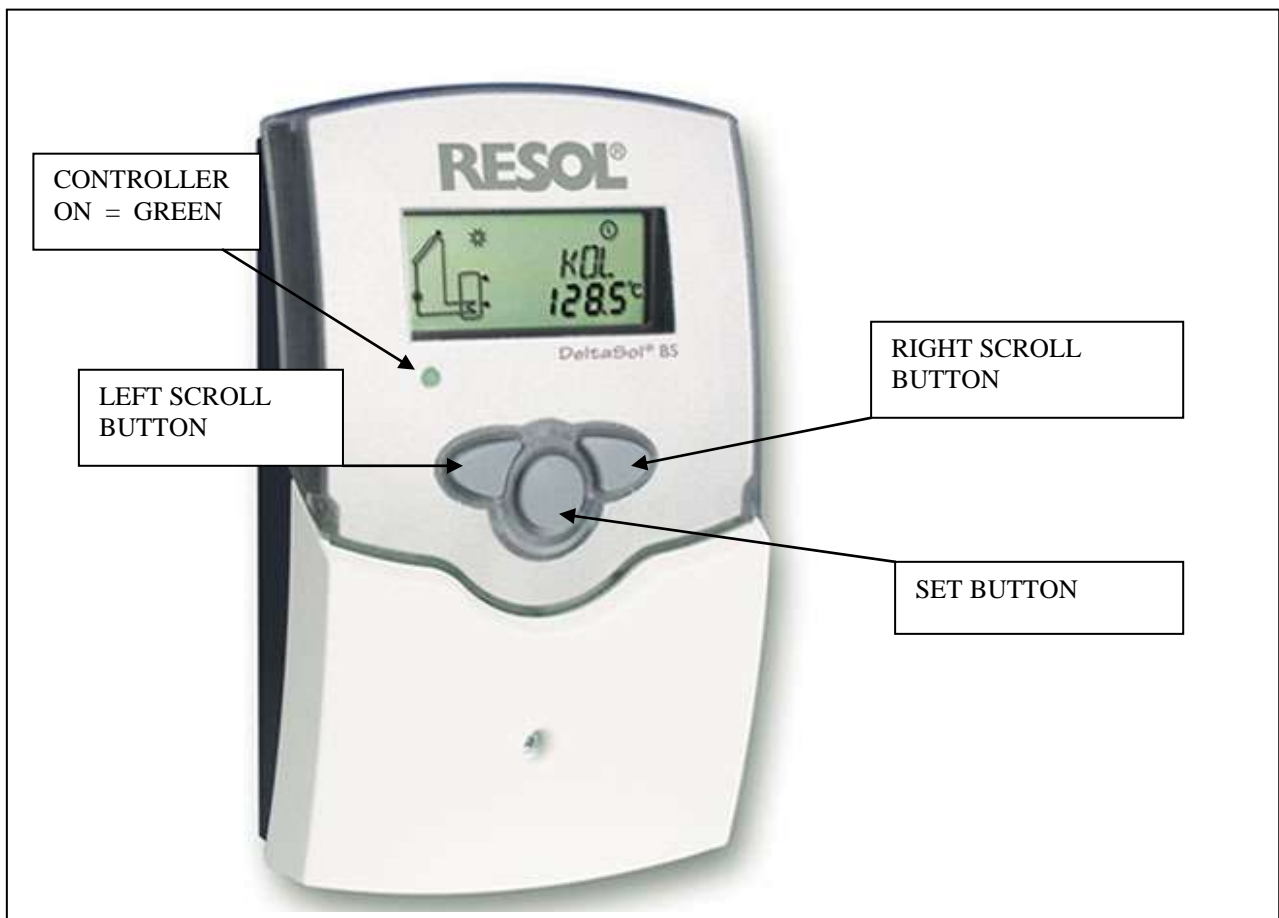
Solar water heating system (Courtesy of AES Solar Systems Ltd)

### Section 3 - System Operation Parameters

When the tubes are heated from Solar radiation, heat is transferred to the Collector tube on the roof. When the collector tube temperature is 7 above the temperature of the pool heat exchanger monitor point the pump will work enabling the cylinder to be heated. When the temperature at the pool heat exchanger reaches 32 either because the pool is up to temperature or if pool pump fails then the valve to pool will shut and the valve to the heat dump radiator will open, when radiator gets to 85 pump will turn off. When this happens the Collector tube temperature could rise to 160<sup>o</sup> Further rise in temperature is prevented as there is a pressure relief valve fitted on the Collector tube which will operate at 6 bar.

The tubes are also fitted with a thermocouple that will stop heat transfer above 95<sup>o</sup>  
The system is also fitted with a low temperature warning to prevent freezing. Even although the system filled with anti freeze, if the temperature should fall below 0<sup>o</sup> then the pump will occasionally work to take some heat from the circuit to prevent the system freezing.

### Section 4 – The Controller



The performance of the system can be monitored using the controller. The controller has three buttons. Pressing the right hand button will switch on the internal light and reveal the collector tube temperature. The words 'COL' appear in the display.

Pressing this button again will reveal the temperature at the heat dump radiator. The words 'TST 1' appear in the display.

Pressing this button again will reveal the temperature at the return pipe from the heat exchanger the words 'TST 2' will appear.

Pressing it again will reveal the pool water heat exchanger temperature

The left hand button cycles back through the above readings.

The middle button is for settings only and should not be used must not be used.

## **Section 5 - Regular Checks by Householder - Essential.**

The following are essential checks to be carried out as periodically as below.

### **General checks**

During the first couple of weeks check for any leaks, then three monthly thereafter.

### **System Pressure Check**

On hot clear days check if the collector temperature reaches 160<sup>o</sup> check the system pressure in the evening when the system has cooled down. If it has fallen below 2 bar on the Pressure Gauge then the system must be topped up as described in the following section.

When the system has reached 160<sup>o</sup> then the pressure will increase, occasionally a check should be made to ensure this does not exceed 6 bar.

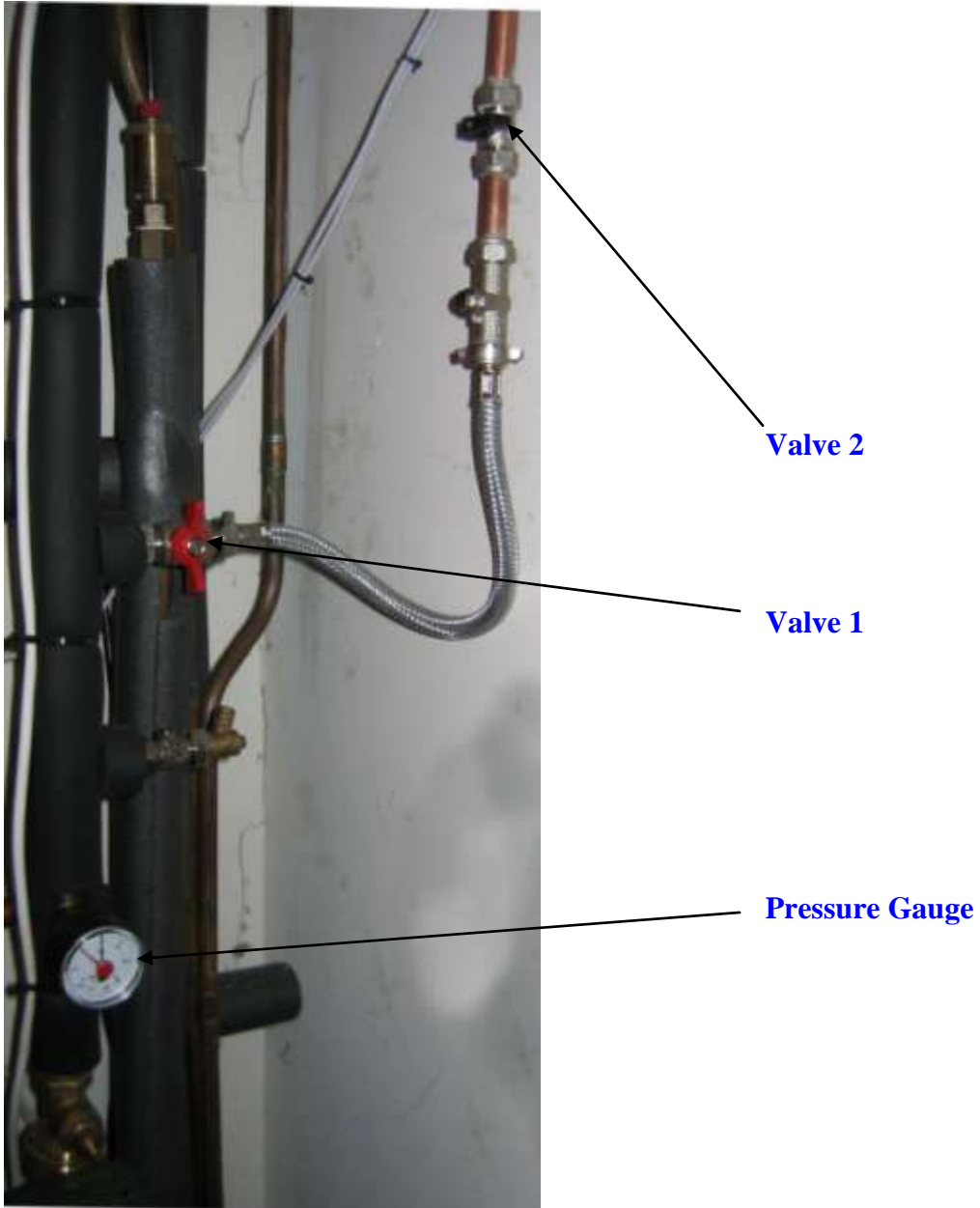
This check should also be done six monthly.

If this check is not done then the system performance will degrade considerably.

### **Top up of System**

If the system pressure drops below 1 bar it should be topped up to between 2 and 2.5 bar when the system is cool. This is done by opening the two taps, one after the other. See figure below: Layout of valves.

Close both taps when the pressure is reached. Note: the tap is closed when the lever is across i.e. at 90<sup>o</sup> to the pipe.



**Figure: Layout of Valves etc**