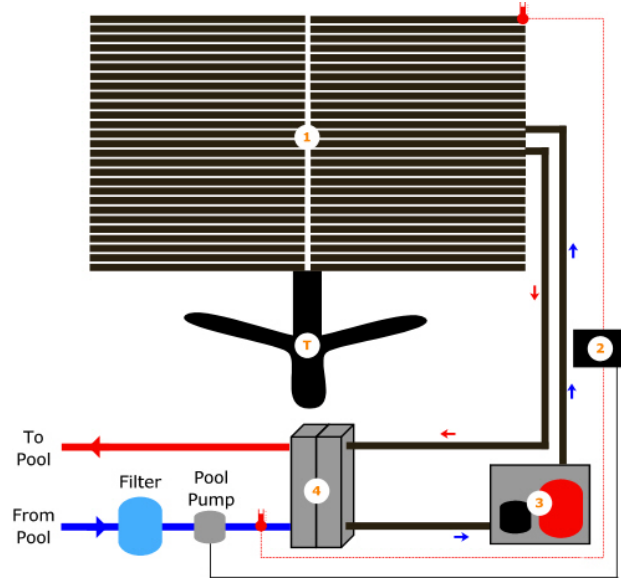


## How The LaZer2 Systems Work

The LaZer2 Panels work just like your existing heat source, except they are powered by free, clean solar energy, rather than an expensive, dirty, carbon fuel. The LaZer2 system acts as your primary heat source. If you have a boiler or electric heater it will automatically raise the water temperature if required.

The system comprises the following main components: LaZer2 Solar Panels, TD4 Digital Controller, Circulation Module, a Heat Exchanger and the LaZer2 Tracking System (if required).



### 1. LaZer2 Solar Panels

The LaZer2 Solar Panels incorporate horizontally mounted vacuum tubes with a curved collecting surface, compensating for the change in the Sun's angle throughout the year. The 93% efficient LaZer2 vacuum tubes are ideal for cooler climates such as Britain's, as they work as effectively when it is 0°C outside, as they do at 30°C. The LaZer2 vacuum tubes have a 25-year warranty, as there is no glass to metal seal that can fail.

Solar energy penetrates the glass and is absorbed by the specially selected coating on the collecting surface. Once absorbed the energy is trapped inside the tube by the vacuum. A unique aluminium insert transfers the trapped energy to the advanced internal manifold, which directly heats the water, minimising energy losses.

A LaZer2 Panel will perform better throughout the year than systems with flat-plate collectors, vertically mounted vacuum tubes or 'heat pipes'.

### 2. TD4 Digital Controller

The TD4 Digital Controller is the 'digital heart' of the system. It uses sensors to compare the temperature of the water in the pool with that in the panel. When the panel is 3°C warmer than the pool, the solar pump switches on and the water circulates through the system transferring heat via the Heat Exchanger. If the temperature difference is below 3°C the pump turns off to stop the pool water being cooled.

The TD4 incorporates SMARTlogic to allow the system to start heating the pool earlier and for longer each day. The Pump Relay automatically operates the pool pump when required.

The controllers LCD Display will continually show the temperatures of your pool water and the panel. A 'Solar Pump' indicator illuminates when the circulation pump is operating and your system is producing hot water. The installation team will configure the TD4 Digital Controller when fitting the system and will select the optimum settings. Once this is done no further user input is required.

### 3. Circulation module

The Circulation Module is made up of the following components:

- Pressure Gauge** - Shows the pressure within the system
- Flow Meter** - Indicates the flow rate within the system
- Pump** - Circulates water around the system
- Expansion Vessel** - Allows for changes in the water volume inside the system
- Filling Loop** - Allows the system to be filled
- One-Way Valve** - Prevents thermo-siphoning

### 4. Heat Exchanger

The specially designed heat exchanger has a large internal surface area to allow the efficient transfer of heat from the LaZer2 system to your pool water.

### T. LaZer2 Solar Tracker

The Solar Tracker utilises sophisticated computer-controlled technology to continuously maintain alignment with the sun. This state-of-the-art system can produce twice the energy of a fixed panel system. Digital sensors take regular readings to accurately locate the brightest part of the sky. These readings are used to position actuators that ensure the collectors are placed to utilise the maximum amount of solar energy available at any given time. The tripod-base can be mounted on any hard, flat surface.

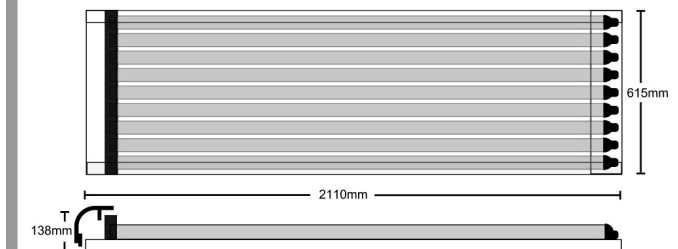
## Installation & Maintenance

The LaZer2 systems are designed for easy installation, and planning permission is not normally required. The low-profile panels can be mounted on most types of roof, walls, the ground and (of course) the LaZer2 Solar Tracker. The Circulation Module will be fitted near the Heat Exchanger and will integrate seamlessly with your existing pool pump and filtration system. The TD4 will be placed to allow you to monitor the system.

The LaZer2 systems have been designed and manufactured in Britain to the highest of European standards (EN12975-1). Once installed no scheduled maintenance is required. The non-toxic anti-freeze and corrosion inhibitor will provide protection for the life of the system. The extra smooth vacuum tube glass will even clean itself.

## LaZer2 Panel Specifications

<b>Gross Panel Area</b>	3.1 m <sup>2</sup>
<b>Panel Aperture</b>	1.0 m <sup>2</sup>
<b>Panel Length</b>	2110 mm
<b>Panel Width</b>	615 mm
<b>Collector Type</b>	LaZer2 Direct Water
<b>Tube Diameter</b>	58 mm
<b>Tube Length</b>	1960 mm
<b>Vacuum Tube</b>	High-borosilicate Glass
<b>Vacuum</b>	P = 5 x 10 <sup>-2</sup> Pa
<b>Tube Strength</b>	Tested to withstand a 25mm hailstone
<b>Absorber</b>	Wavelength Selective Coating AL-N/AL
<b>Efficiency</b>	>93% (optimum)
<b>Solar Absorption of Coating</b>	$\alpha=0.931$
<b>Hemisphere Emittance</b>	$E_h=0.07$
<b>Sunning Suffocation</b>	$H=2.639\text{mJ/m}^2$
<b>Sunning Stagnation</b>	$Y=415.54\text{m}^2/\text{kW}$
<b>Coefficient of Average Heat Loss</b>	ULT=0.53w/m <sup>2</sup>
<b>Operating Pressure</b>	< 4 bar
<b>Design Life</b>	> 25 years
<b>Tube Guarantee</b>	25 Years
<b>Weight</b>	39Kg
<b>EN/BS standard</b>	EN12975 - 1



### LaZer2 Systems will:

- Integrate with an existing pool system
- Work effectively as the only heat source
- Radically reduce water heating bills
- Heat your water for free throughout the year
- Require no scheduled maintenance
- Drastically reduce CO<sup>2</sup> emissions

### LaZer2 Systems Overview

The LaZer2 Solar System and LaZer2 Solar Tracker are the result of extensive research and development, tested alongside other leading solar hot water systems to ensure that they offer the highest level of performance and the maximum amount of hot water. Designed and built in the UK, they are optimised to work in climates like those of Britain.

The stylish LaZer2 Solar Panels heat water whatever the outside air temperature and without direct sunshine.

The LaZer2 Solar System incorporates fixed panels, whilst the panels on a LaZer2 Solar Tracker constantly point at the brightest part of the sky to maximise energy input. Both will provide free hot water for at least 25 years, with no scheduled maintenance and no user input once installed. By using a LaZer2 system to heat your swimming pool water you will be able to maximise the use of your pool, save money and help the environment in the process.

### How To Get A LaZer2 System

Once we have answered your initial questions a survey is carried out to ensure you get the most suitable system and to confirm the total cost. When we have received your order we normally arrive within 3-4 weeks to fit your system. You can then take advantage of you're a swimming pool knowing that it will be heated for free for the next 25 years!

### Grants & Financial Help

The LaZer2 Solar System is designed and built by a fully accredited manufacturer and is UK Government approved. From April 2011 the Renewable Heat Incentive (RHI) will guarantee long-term payments to installers of solar thermal technologies, with the rate of return likely to be 6%. As a further incentive a fully fitted UK LaZer2 Solar System is normally subject to only 5% VAT (standard rate 17.5%). There are 100% capital allowance schemes as well as interest free loans available for businesses.

### LaZer2 Solar System Features & Benefits

#### LaZer2 Solar Panel

##### Vacuum Tubes

Highly efficient, they work as effectively in cold, windy conditions as they do when it is hot

##### Horizontally Mounted

Maximises the amount of energy that can be absorbed by automatically compensating for changes in the angle of the sun

##### Curved Collector

Ensures a constant aperture to the sun, increasing energy input compared to systems with flat collectors

##### Direct Water Manifold

More efficient than an in-direct 'heat pipe' manifold

#### TD4 Digital Controller

##### SMARTlogic

Allows the panel to start heating your cylinder earlier and for longer each day

#### LaZer2 Solar Tracker

##### Digital Light Sensors

Accurately locate the brightest part of the sky

##### Positioning Actuators

Allow the panels to be positioned so that they continually absorb the maximum amount of available solar energy.

### Supplier Details

SOLAR UK is the retail division of Magpie Technologies Ltd, the leading British Solar Thermal Research & Development company and manufacturer of both the LaZer2 Solar System and LaZer2 Solar Tracker. We don't use marketing gimmicks, or high-pressure selling techniques, instead we offer every customer the highest quality products and service at the best possible manufacturers prices. SOLAR UK can supply systems for anywhere in the world.

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Crowborough, East Sussex. TN6 1UB  
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# LaZer2

## POOL SYSTEMS



harnessing the power of the sun to provide you with a

**clean, free & reliable**

heat source

**designed, developed and built in Britain, for Britain**

**sunshine not required**

**high performance even in cold and windy conditions**