Evacuated tube Specialists since 2009

Retrofit an evacuated tube collector to an existing cylinder

Updated for 2025

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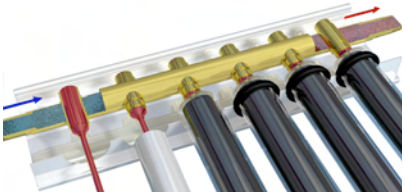
Reducing electricity bills



Converting or replacing an electric water heater with solar hot water would be the single biggest energy saving most families could make. This can be an expensive project to undertake, the lowest cost solution is to add a retrofit “Sydney tube” solar collector to your existing water heater.

It is a simple process; the evacuated tube collector goes onto a roof or onto the ground and connects to your existing hot water heater using one of the methods shown in this info pack.

A low energy pump is used to circulate the water between the hot water tank and the evacuated tube collector.

The pump is connected to an automatic controller that has two heat sensors; one sensor measures the temperature of the water inside the solar collector and the other sensor measures the temperature of the water inside your hot water heater.

When the water inside the solar collector rises in temperature and becomes 8-degC hotter than the water in your hot water cylinder, the pump starts automatically and pushes the hotter water from the solar collector to your tank, the pump stops when the temperature differential between your hot water cylinder and the solar collector drops to 4-degC.

The pump cycle only lasts about 3 minutes, it then rests until the water in the solar collector rises in temperature and the process is repeated until the water inside the hot water tank reaches 70-degC. After this the pump will not start again until the water inside your hot water tank drops to 65-degC. This temperature control protects your hot water cylinder from overheating, which would damage the cylinder.

The water inside a 300-350-litre hot water cylinder can be heated to 70-degC in one day using a “Run On Sun” 30 tube solar collector.

Run On Sun Australia stocks various evacuated tube collectors with different amounts of tubes to suite any size hot water cylinder.

We also have a DC circulation pump and controller that is powered by a solar panel, this solves the problems associated with power outages, the DC pump and controller costs nothing to operate.

Run On Sun

Simple explanation of how the Run On Sun evacuated tubes with copper heat-pipes work.

Each “Sydney tube” is made by fusing together two glass tubes inside a vacuum, the outer tube is clear and the inner tube has three coatings applied to the outside of it, a technique patented by “Sydney University”.

A spiral red copper is the last coating to be applied and can be seen when looking into the tube exactly like in the pictures bellow. The first and second coatings are applied to create high light absorption with low reflection. This allows the light that is absorbed by the inner coatings to be turned into heat energy by the copper outer coating. The heat energy that is generated can’t escape back through the vacuum that exists between the inner and outer tubes.
(You can see the dark blue solar absorption coatings in the picture below)

The copper steam pipe often referred to has a heat pipe runs inside the full length of the “Sydney tube”, it absorbs all of this heat energy and it contains a very small amount of liquid sealed inside under vacuum allowing steam production at around 25-DegC.

The “Sydney tube” will become continually hotter whilst been exposed to light; the steam inside the copper heat pipe will continue to rise in temperature, up to 170-degC.

This steam will rise to the top of the copper condenser bulb. You can see the copper condenser bulbs protruding from the evacuated tubes in the picture bellow.

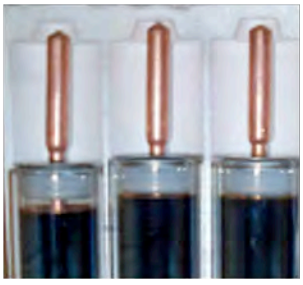
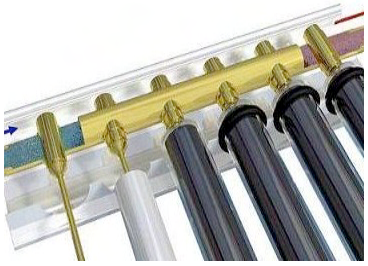
This condenser bulb direct plugs into a pressure-bearing sleeve inside the solar manifold; this heat energy is then transferred to the water that surrounds this sleeve.

Once the water absorbs this heat energy, the steam turns back to liquid and runs back down the heat pipe, condensing back to steam again and repeating the process until the water inside the solar manifold becomes hot.

This heating reaction inside the copper heat pipe takes place at the speed of sound according to one of the professors who helped in the development of this technology.

This technology is why hot water can be generated even in low light conditions.
The great advantage is every tube becomes an individual heating element, which can be plugged in or taken out without affecting the other tubes or the plumbing.

Even in the rare event that a tube should break, it will not stop these systems generating hot water.

Run On Sun

Quality control is the most important factor for the longevity of any solar collector

The “Run On Sun” heat pipe solar collectors are a long life solar water heater with a 12-year warranty on the evacuated tubes, copper heat pipes and solar manifold.

Run On Sun has spent over $50,000 dollars testing our heat pipe collectors to all Australian standards. Out testing is certified by Global Mark, the Australian certification regulator.

We pay the same regulator to audit the manufacturing plant once a year. Every new batch of copper that is used must have a metal analysis certificate to show that the copper is 99.9% pure to meet the Australian standard.

The same strict metal analysis is performed on the silver solder that is used to braze the copper sleeves into the copper header. The silver content must be high and the lead content must be very low to comply with the Australian standard.

Australian engineered frames and optional mounting kits come with a 4-1-safety factor built in for cyclone regions. These frames are made using 2-mm thick 304 grade stainless steel. They also have a metal analysis test done on each batch to make sure that what we pay for is what we get.

Every collector must last longer than the warranty. The testing that is done makes sure that the copper and silver content in every solar collector we sell is consistent, leading to a long trouble free life.

Between 2009 and 2023, only one manifold has been replaced, this was due to highly corrosive water.

The costs associated with manufacturing to these standards are high. The only way we can sell these at a fair price is to avoid distributors and shops. Our business model is focused on selling direct to the public at a wholesale price.

There are two kinds of evacuated tubes in the Australian market. Both these tubes were patented by “Sydney University”.
The first patent was on an aluminium heat absorption coating, the second and latest patent is on the copper heat absorption coating, which is 14% more efficient than the older aluminium coating.

All “Run On Sun” evacuated tubes are made using the more expensive and more efficient copper coating.

There are two glass thicknesses; Many tubes within the Australian market are made with 1.6 - 1.8-mm glass. All “Run On Sun” tubes are made with 1.9 - 2.1-mm glass raising the hailstone impact rating from a 25-mm diameter hailstone to a 35-mm hailstone.

Run On Sun Australia P/L

Heat pipe collectors

Quality-Certification

The Run On Sun Australia P/L heat pipe collectors have passed all Australian and New Zealand standards testing and are certified by Global Mark.
It is a requirement that all solar collectors and solar water heaters sold in Australia and New Zealand that are connected to a potable water supply must carry a Certified product identification number which can be checked on the Global Mark certified product register.

So many non-Certified low cost Chinese brands are showing up in the Australian market with no certification. The copper content and lead content are unknown, these may cost less, but low purity copper is associated with pin-hole corrosion making them false economy.

The Run On Sun heat pipe collectors are high quality and are not limited to the Australian standards. The same collectors are rebadged under different brands that have full European, Canadian, US and UK certification.

EN-12975-2: 2006 European solar keymark, mandatory for all solar collectors sold throughout Europe. Tested by TUV Rhineland and Certified by DIN CERTICO.

AS/NZS-2712-2007 Design and construction. Certified by Global Mark.

AS/NZS-2535-2007 Solar collector performance testing Certified by Global Mark.

AS/NZS-4234-1994 Energy savings for Victoria prior to April 2013. Certified by Sustainability Victoria.

AS/NZS 4234-2008 Energy savings for Victoria. Mandatory for all solar water heaters and solar collectors sold in Victoria from April 2013. Certified by Sustainability Victoria.

AS/NZS-4020 Products in contact with potable water. Certified by Global Mark.

Certified Product - AS/NZS2712

Global-Mark.com.au®

ID Number: 100864

AS/NZS 2712-2007
ID No: 100864

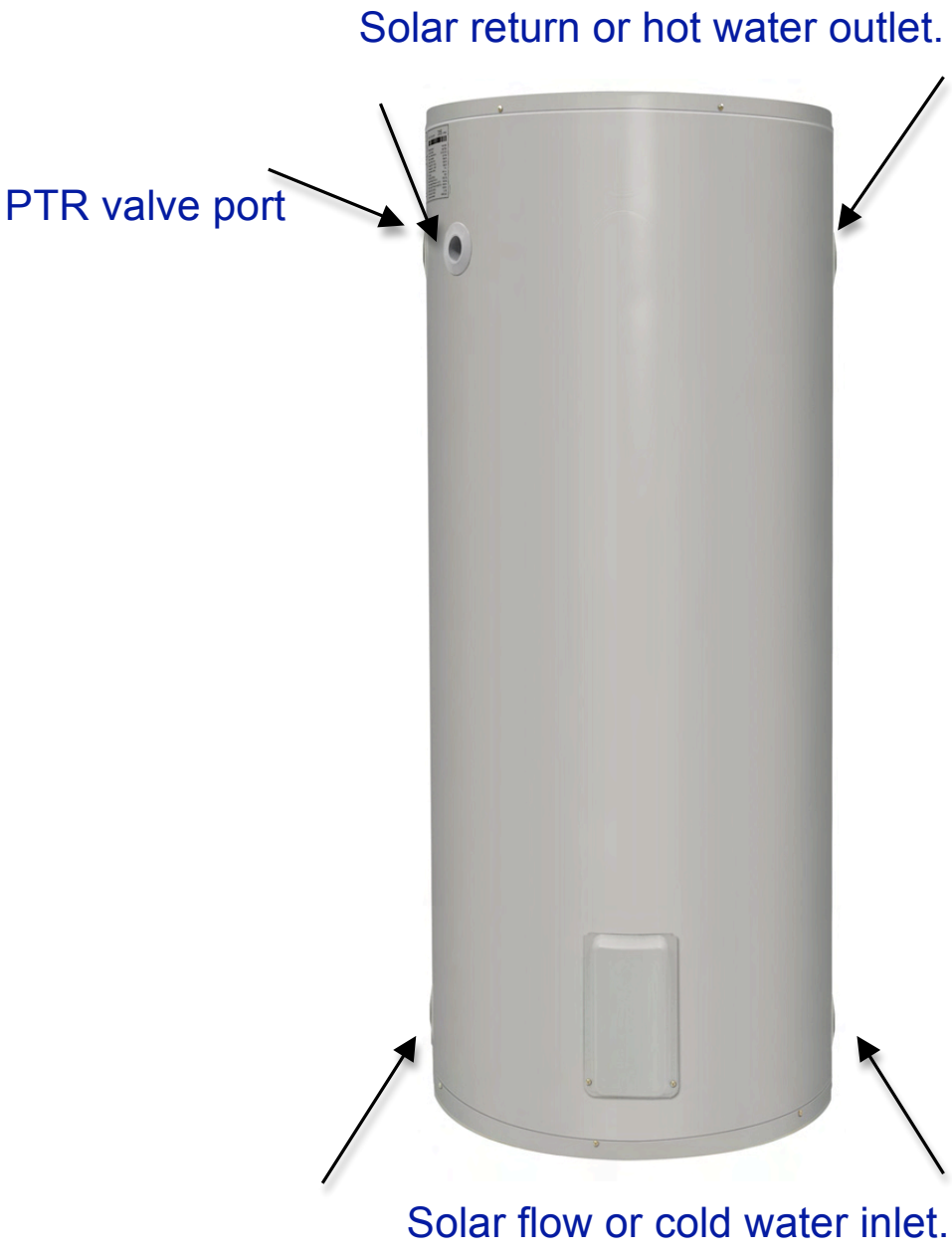
Run On Sun

Retrofit

Cylinders with two hot water outlets and two cold water inlets:

A simple retrofit using the two spare ports for the solar flow and the solar return.

Note: Near the top of the cylinder there needs to be a third port for the pressure temperature relief valve, this will be marked.



Retrofit

Cylinders with single inlet and outlet:

A new P/T valve incorporating a hot water outlet is now available from Run On Sun.
Incorporating this valve will leave the old hot water outlet free for the solar return.
The solar flow is achieved by adding a simple brass T fitting to the cold water inlet.

240-Volt controllers and pumps

“Run On Sun” Aestiva controller S1000

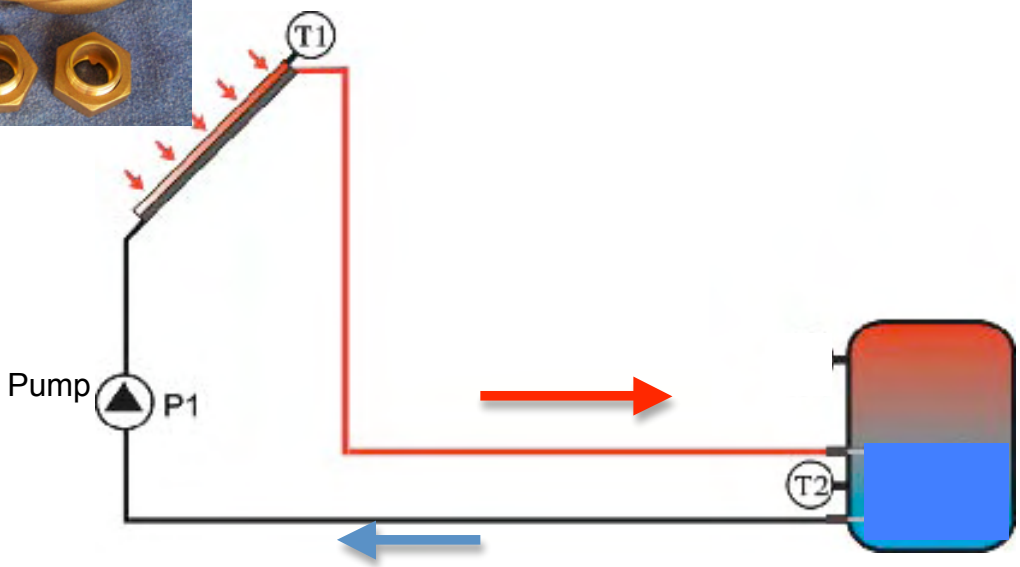
Add $70 for this controller to be added to the kit.
Controller S1000 comes with a fully wired control box, it comes standard with a T1 and T2 sensor, it has a plug socket for the power supply and a plug socket for the circulation pump.
This controller is certified to Australian Standards

Quality controller

A pump controller is included in the retrofit kit.
The controller comes with T1 collector temperature sensor and T2 tank temperature sensor.
The pump is turned on and off by the temperature differentials between the two sensors allowing maximum solar gain, the controller also stops the pump cycles once the hot water in the tank reaches pre set maximum temperature. A frost protection feature is built in, this stops pipe freeze in areas that need pipe freeze protection.
Note: Controller shown may not be actual controller supplied.

DZR Brass Pump - is included in the kit.

The Run On Sun pumps come with an Australian standard DZR brass pump body and unions.
These pumps have been tested to AS/NZS 4020 for products in contact with drinking water.
They come with a 3-year replacement warranty.



PV Direct – 240-volt power supply not needed.

Controller ROSA-100 runs directly from the solar panel. (No freeze protection)

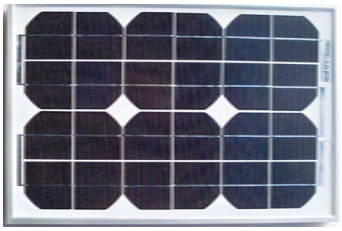
Solar controller ROSA-100.
No freeze protection, no battery needed.

Controller terminals.

NTC, (T2) sensor for cylinder. (Grey PVC)

PT, (T1) sensor for solar collector. (Black silicon)

12-volt, 5-Watt DC solar pump.



20-watt PV solar panel.

IMPORTANT:
1/-Make sure that the sensors are connected to the correct ports which are marked inside the control box.

2/-The solar panels have been specially designed for this controller with a maximum VOC of 15.5 volts, never connect controller ROSA-100 to a standard solar panel, the voltage will be too high and this would destroy the controller.

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Prices:

Australian standard one-way high temperature check valve comes with every retrofit kit as an essential item.
This valve goes on the outlet side of the pump.

All the collectors come with a heavy-duty 2-mm thick 304-grade stainless steel frame.

All prices below include the packing onto a heavy-duty custom made pallet, making these systems ready for safe transport to anywhere in Australia.

Collector and frame for Thermosiphon. (Quantity discounts do apply)
12-tubes with a 15 or 30-degree frame. $1090
18-tubes with a 15 or 30-degree frame. $1290
24-tubes with a 15 or 30 degree frame. $1490
30-tubes with a 15 or 30-degree frame. $1650

Collector and frame with 240-volt pump, solar controller and an Australian standard high temperature check valve.
12-tubes with a 15 or 30-degree frame. $1490
18-tubes with a 15 or 30-degree frame. $1650
24-tubes with a 15 or 30-degree frame. $1830
30-tubes with a 15 or 30-degree frame. $1950

The PV direct pumps come with unions and isolation ball valves.
Includes the ROSA100 controller with sensors, solar panel and an Australian standard high temperature check valve.
12-tubes with a 15 or 30-degree frame. $1590
18-tubes with a 15 or 30-degree frame. $1750
24-tubes with a 15 or 30-degree frame. $1930
30-tubes with a 15 or 30-degree frame. $2050

Note: A discount of 7.5% will be applied when purchasing two collectors and a discount of 10% will be applied when purchasing more than two collectors.

Warning:
PV direct must not be used in areas where pipe freeze is common during winter.

Run On Sun

Extras that can ship with the retrofit kits:

P/T valve incorporating hot water outlet:

To make it simple to retrofit an evacuated tube collector to a tank with one hot water outlet.
Available in both 850-Kpa and 1400-Kpa.
(Check your existing P/T valve for pressure rating)
$80 each. This price is only with a retrofit kit purchase.

Expansion control valve:

Expansion control valves are essential for solar water heaters due to hot water expanding up to 4% as it becomes hotter, set at a lower pressure than your P/T valve, it starts to drip once this lower pressure is reached, this saves your p/t valve from opening and wasting lots of hot water.
The expansion valve hangs off a brass T fitting next to the cold-water inlet on your tank.
$50 each. This price is only with a retrofit kit purchase.

Solar insulation:

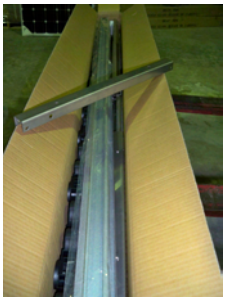
The solar flow and return (Copper pipes) between the tank and the solar collector must be insulated with a high temperature rated insullation. Run On Sun stocks Thermobreak solar, an Australian made product that can withstand the high temperatures and is UV resistant.
Most people purchase between 6-10 lengths and normally add a roll of aluminium tape to seal the joins.
Thermobreak
15-mm insulation per 2-meter length $16.
20-mm insulation per 2-meter length $19.

50-mm Aluminium tape:

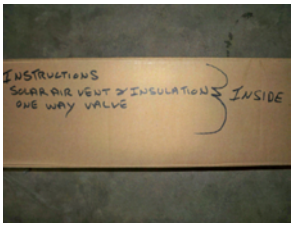
High quality Thermobreak aluminium tape is available from Run On Sun for sealing the insulation joins on the Thermobreak insulation; this stops water penetration and is UV resistant.
$22 per roll.

Run On Sun

Quality controlled packing procedure to get a system ready for road freight to anywhere in Australia.



Every frame box is opened and checked to make sure it is correct and complete before it is packed and leaves our warehouse.



Check valve and instructions are added to the frame box at our warehouse.

Every tube is checked in our warehouse before been packed onto the pallet

The serial number is recorded from the compliance label and the manifold connectors are added to the solar manifold box before it is packed onto the pallet.

Tubes are packed first, followed by the frame and manifold boxes. The pump and solar controller go in the space at the end of the tube boxes. The pallet is then fully encapsulated.

The encapsulated pallet is finished with warning stickers and is then moved outside our warehouse ready to be picked up for road freight to anywhere in Australia.