



SMART SOLAR

Healthy Hot Water System



360° Sunlight Collector
High Efficiency even in cloudy day



No Copper Toxic
Healthy Hot Water



Smart Solar Controller
LCD Display with Auto heater



316L Stainless Steel
Marine Grade Standard





About Us

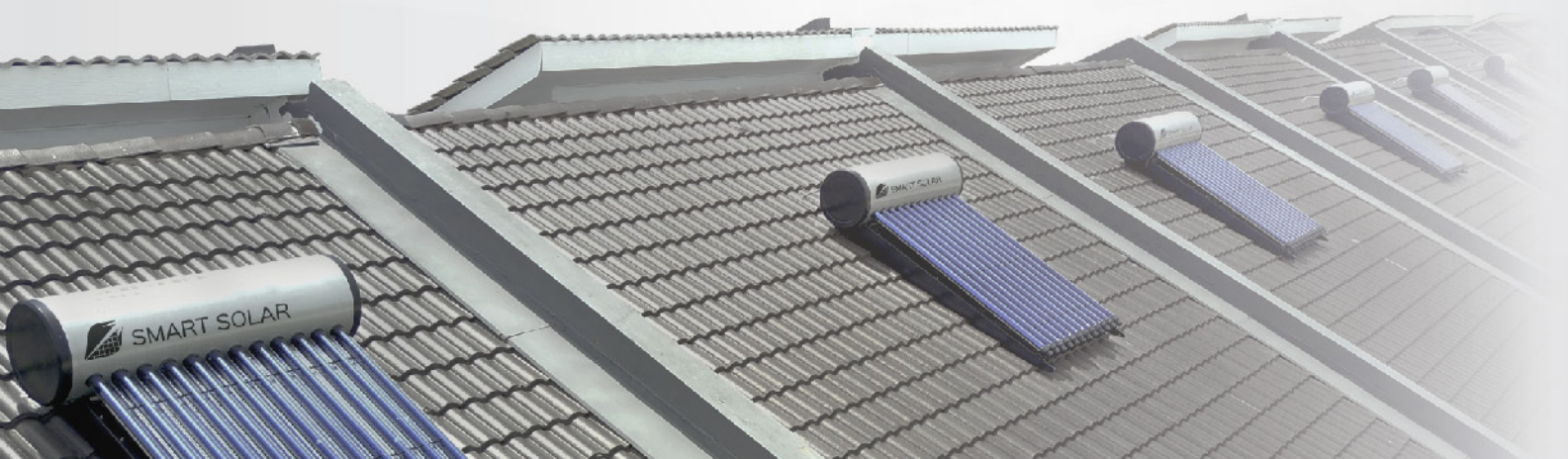
We are a team of 6 people with a combined five years' experience. Before now we found a lot of issue with the old flat panel solar system which was introduced in Malaysia around 1980. Using this old device, we noticed it has many defect which includes, the Efficiency of collector is low, water can't hot when cloudy day, water leaking cause by too many joint between the collector and tank, corrosion in copper pipe forming scale and sediment over the tank and collector, copper toxic that may harm our health. It requires high maintenance, and the last but not the least, it is an old technology at higher price.

With these problems, we saw the need for modernization in the solar hot water system in the country. With the urge for this immediate change, we decided to design a new solar hot water system which eliminated all the issues stated above. We jointly researched for more than two years to make this new and unique evacuated tube hot solar water heater, and fortunately this is the latest design best solar hot water system today.

At Smart Solar, our hot water systems are uniquely designed to work safe, efficiently, healthy and to last. Our components and products are produced using only the highest quality materials to ensure that our clients constantly get the best value for their money. We understand that health and safety are very important, so we have made our solar systems for just that. Smart solar hot water systems come with maximization to the very most out of the sun. It is a top range thermal collector with unrivaled reliability. Plus you get electric boosters to ensure that you won't run out of hot water with our ever reliable smart solar controller.

Our Mission is to provide you with the perfect amount of clean and hygiene hot water on demand anytime you need it, for the lowest cost possible.

If you're thinking of Healthy Hot Water, think Smart Solar!



We Come
Up with

4 SMART CONCEPT

In Designing an

ALLNEW

Smart Solar Water Heater System



More SAFETY

SHOULD HAVE
Temperature Display

SHOULD HAVE
Automatic Heater
Booster

EASY to Install &
Working Independently

SHOULD HAVE
Strong Build Structure

More HEALTHY

SHOULD ELIMINATE
Copper Toxic

Sediment & Scale
CAN BE
DRAIN OUT Easily

More EFFICIENCY

INCREASE Sunlight
Exposure Area

MINIMIZED
Heat Loss
Over Solar Collector

IMPROVE
Heat Transfer
Efficiency

MAINTAIN Hot
Water Overnight

More LASTING

Use HIGH GRADE
Corrosion Resistance
Metal

DESIGN a Close Loop
System

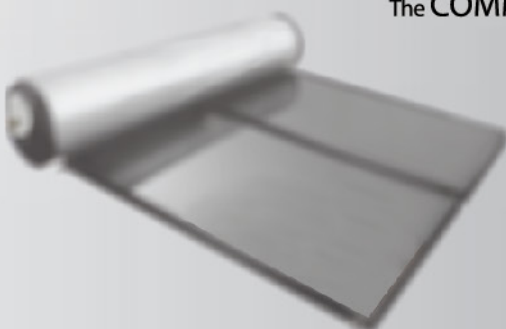
REDUCE Human Error
in Tank Welding

APPLY Anti Corrosion
Agent

TO ELIMINATE

The COMMON ISSUE

Found in FLAT PLATE Solar Water Heater System



- X Copper toxic that may harm your health.
- X Possible leaking cause by many pipe fitting connection between tank & panel.
- X Water not hot enough during cloudy day.
- X Need to manually turn on the backup heater.
- X There is no hot water temperature display.
- X The system is not smart.
- X System performance affected by dirt and mold sticking on the glass.
- X Once the glass is broken, it can't work properly.

We Are Proud to Introduce

THE LATEST SMART SOLAR

Hot Water System with Heat Pipe Evacuated Tube Technology



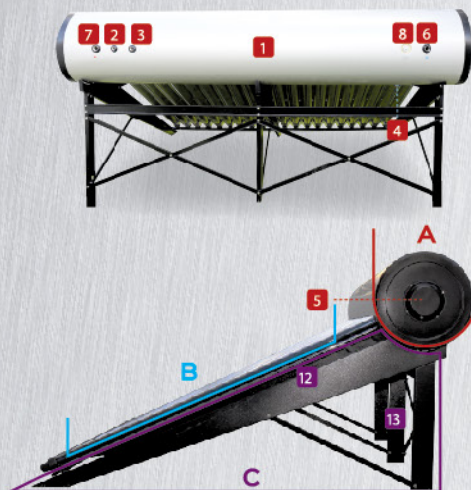
More
SAFETY

More
HEALTHY

More
EFFICIENCY

More
LASTING

Overall STRUCTURE



A. Storage Tank

1. Water Tank
2. Temperature Sensor
3. Pressure Relieve Valve
4. Drain outlet
5. Backup Heater Unit
6. City Water Inlet
7. Hot Water Outlet
8. Anode Rod

B. Solar Thermal Collector

9. Evacuated Heat Tube
10. Aluminium CPC Booster
11. Tube Holder

C. Solar Bracket

12. Main Frame
13. Flat Roof Support Bracket
14. Stainless Steel roof hooks



Our Solar System ADVANTAGES

Durable



Each Evacuated Tube working Independent. There is no leaking even being remove or broken.

Smart Solar Controller



You will know what is the temperature of your solar heater.

Smart Temperature Control



Schedule and Set preheat temperature if below the set point.

Strong Bracket



The weight of the storage tank can be evenly distribute on the roof and the special hook hang strong on the roof.

No Copper Toxic



Close Loop Hot Water System, Water Do Not pass through solar collector.

Clean Water



Sediment, scale can be clear up automatic by Smart Solar Controller.

Pressurized Water Tank



Hot water pressure same as city water. You can put anywhere even at ground area.

Heat Pipe



High efficiency in heat transfer to heat up the water. Modern electronic device like mobile phone or notebook use this concept too.

Evacuated Tube



Convert the sunlight radiation to heat and trap the heat inside the tube by the vacuum state in double wall glass like thermos.

Polyurethane Foam Insulation



Hot water can be keep overnight.

CPC Fin



Increase heat absorbing efficiency by projecting sunlight 360° to evacuated tube. Heating fast even on cloudy day.

316L Stainless Steel



Marine grade standard that make the storage tank over 15 years long service life.

Reduce Human Error



Automated Tech High welding machine.

Active Tank Protection



Magnesium Rod protect from rust and resolve odor. Prolong storage tank lifespan.

Closed Loop System



No water pass through Collector, means no leaking issue.

The CORE TECHNOLOGY - Evacuated Tube



Double Wall Glass

The tube is essentially two glass tubes that are fused at the top and bottom and the space between the two tubes is evacuated to form vacuum. The tubes are made of Borosilicate Glass, a material which used in the manufacture of different kitchen glassware. Borosilicate Glass has the characteristic of being very strong and also has excellent light transparency (>92% @ 2mm thick) .



Heat Pipe

The most efficient method to transfer heat inside tube and to boil the water inside tank is using heat pipe. This technology is also applied in our mobile phone, computer, and notebook for thermal control.



Solar Absorber

The absorber coating comprises a base layer of Aluminium on the outside of the inner glass tube followed by thin layer of the dark purple coloured ALN (Aluminum/Copper nitride) material. Vacuum is an excellent insulator against heat loss and the aluminium silver coating minimal heat reflection. So the result is Solar Absorptance $\alpha=0.94$ and emission ratio $\epsilon \leq 0.06$.



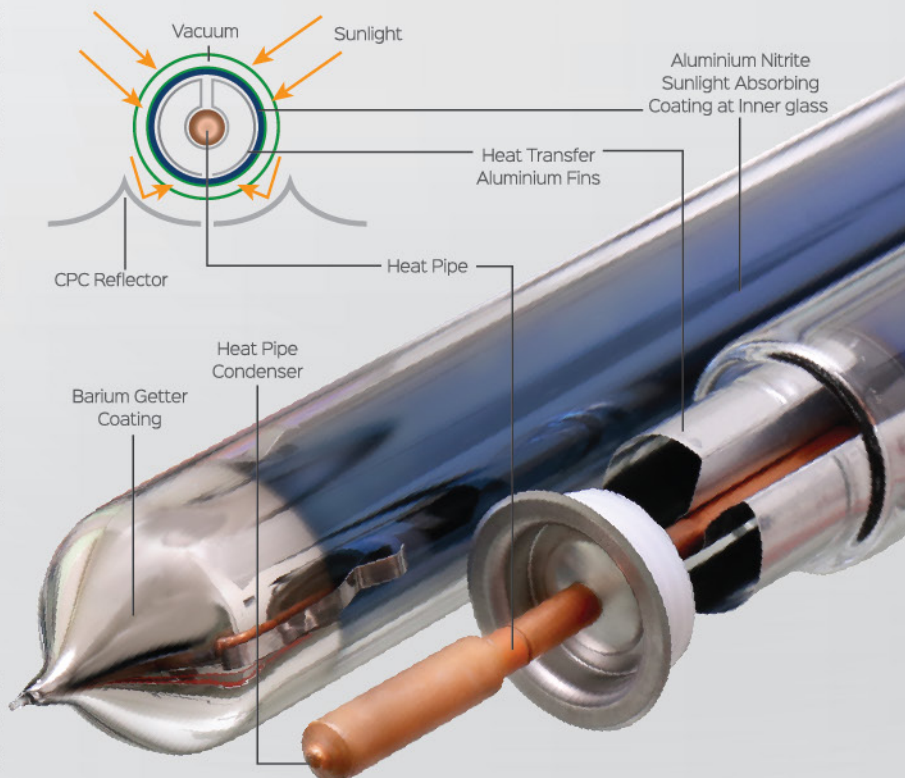
Aluminium Fins

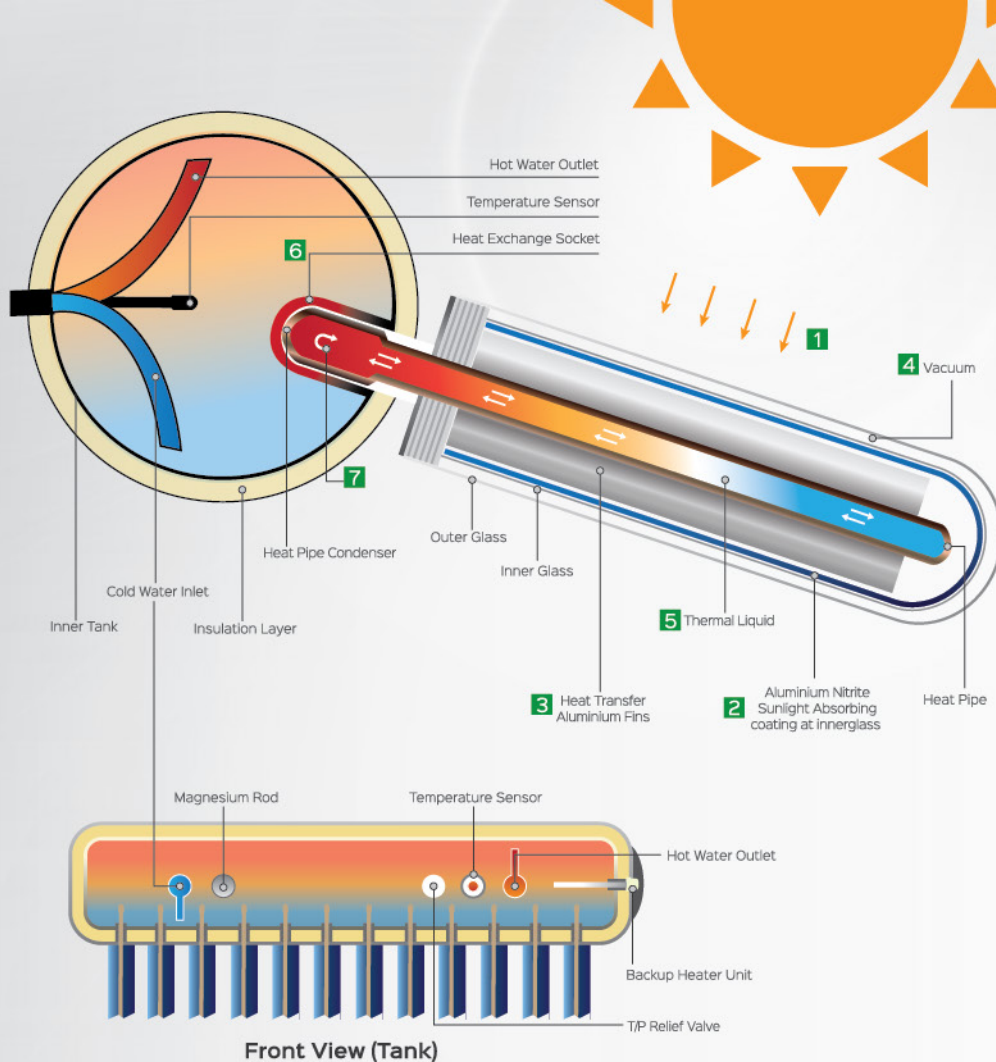
Transfer heat from inner glass coating to heat tube.



Barium Getter Coating

Barium getter "soaks up" any remaining gases in the evacuated chamber to maintain the vacuum over the 15-20 year life of the evacuated tube. It provides a clear visual indication of the vacuum status; if the silver-coloured barium layer turns white means the vacuum is lost and making it easy to identify as faulty tube.





How the Sunlight Generates Hot Water ?

- 1 Sunlight hit the evacuated tube.
- 2 Purple coating of inner glass convert solar energy into heat.
- 3 Heat transfer to the heat pipe by aluminium fins.
- 4 The vacuum between the two glass tubes work as insulation to retain heat inside the tube.
- 5 Thermal liquid inside heat pipe change into vapour and rises to the condenser.
- 6 When passing through the heat exchanger, the heat is absorbed by water in the tank.
- 7 The thermal liquid become lower temperature and returns to the base of the heat pipe.
- 8 Heat collection is a continuous circulation as long as the collector is heated by the sun.



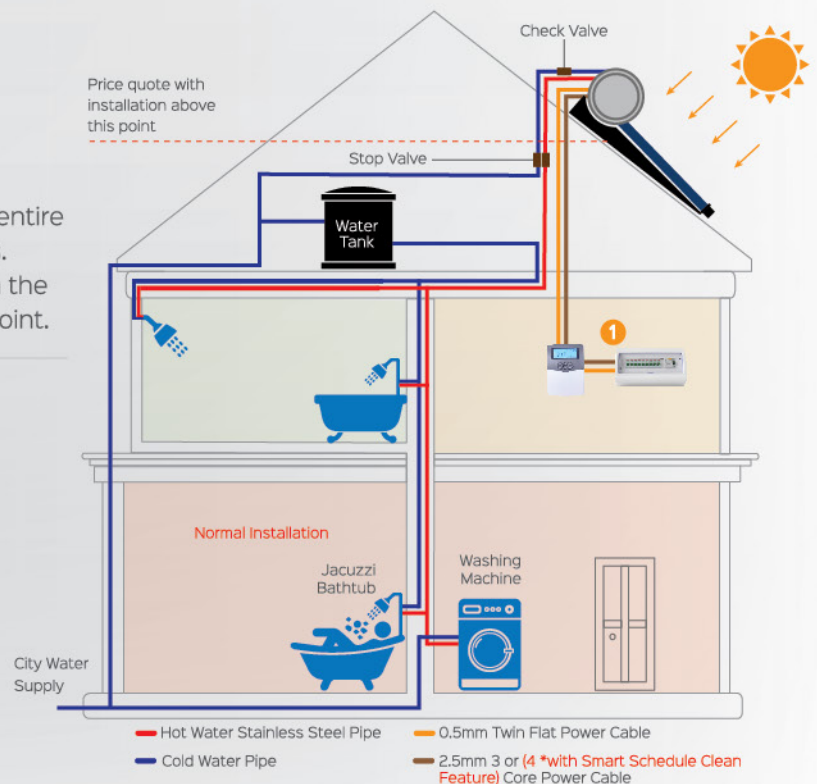
How to Install Our System ?

1 Solar Controller

System Monitoring Display : A clear display of the entire system as well as tank water temperature readouts.

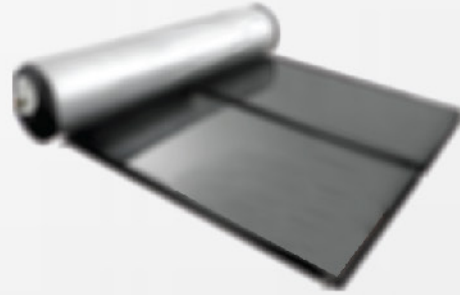
Smart Control : Control the heater operation. When the temperature is below set point, and off above set point.

Temperature measuring	: 0-100 C
Accurate	: +/- 2C
Heater Control Relay	: 1 pcs
Power supply	: AC240V & DC12V
Electric Heater	: 1500W (10A)
Dimension (mm)	: 86 x 89 x 16
RSP	: RM 488



Why Evacuated Tube System ?

Comparison for Evacuated Heat Tube System and Flat Heat Plate System.



✓ Evacuated Heat Tube System

✓ Close Loop System

Water Flow in Storage Tank. There is no copper corrosion issue and no clog issue.



✓ 316L stainless Steel

Marine Grade Stainless Steel that have high resistance and protection in corrosion.



✓ Leaking Protection

No Pipe Fitting connect the tank and the evacuated tube. Therefore, the chance of water leakage is virtually zero.



✓ Most Efficient System

Water Temperature can reach over 90 degrees Celsius (°C) in sunny day, cloudy day can reach 40-50 Celsius (°C). High efficiency 360° CPC sunlight collector booster.



✓ High Heat Retain

High Heat Retain, the vacuum state between inner and outer layer glass create "Thermos Effect".



✓ LCD Temperature Display

Tank equip with temperature sensor. You can clearly know what is the temperature inside your tank.



✓ Smart Heater Control

Auto Switch on Heater when the temperature below set point and auto switch off when the temperature above set point.



✓ Active Protection

Magnesium Rod use as anode rod to maximize antirust protection to prolong the lifespan.



Flat Heat Plate System ✗

Open Loop System ✗

Water Flow through Flat Plate. Copper corrosion happen may cause copper toxic and clog happen in the riser tube.



304
STAINLESS
STEEL

304 Stainless Steel ✗

Normal Grade Stainless Steel

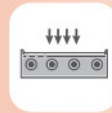
Possibility Leak Issue ✗

There are Copper Compression Fitting connect the pipe between flat plat and tank. Thermal expansion and contraction at outdoor environment will cause leak issue



Old System ✗

Only 50-60 Celsius (°C) in sunny day, during cloudy day need electric heater to assist. Less Effective because sunlight only hit Flat Surface.



Low Heat Retain ✗

Heat loss due to uninsulated between copper plate and glass in Heat Plate panel.



No Such Feature ✗

Don't have sensor



Manual Switch ✗

Need manual switch on when there is no hot water. Forgot to close may cost a bomb to your electric bill!



No Protection ✗

No such feature.



Specification

AVANT-GARDE SERIES	SS-150	SS-200	SS-300
Tank Capacity (Liters)	150	200	300
Overall dimension(LxWxH)	1520 X 1987 X 1200	1850 X 1987 X 1200	2400 X 1987 X 1200
Overall Weight(KG)	73	89	115
Overall Weight (Full)	229	295	421
Multifunction Frame	Slope and Flat Roof		
Number of User	4	6	9

STORAGE TANK

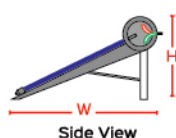
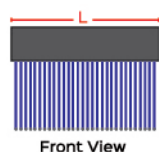
Inner Tank Diameter & Material	Ø360mm, SUS316L		
Outer Tank Diameter & Material	Ø460mm, 304 Stainless Steel		
Heat Exchange Socket	SUS316L Stamping Molding		
Insulation Material	50mm High Density Pressure Injected Polyurethane Foam		
Tank Protector	Magnesium rod		
T&P relief valves	6 Bar / 99°C		
Water PIPE Inlet/Outlet	3/4 in. Stainless Steel Socket		
Backup Heater System	1500W DN25 Incoloy 800 Backup Heating Element		
Smart Solar Controller	Water Temperature Sensor/Smart Schedule Clean*		

HEAT PIPE EVACUATED TUBE COLLECTORS

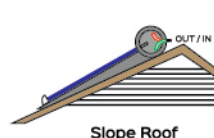
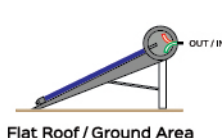
Quantity (pcs)	12	15	20
Core Technology	Dry Contact Heat Pipe		
Tube Material / Thickness	Borosilicate glass / 1.6 mm		
Tube Length	1800 mm		
Outer / Inner Tube Diameter	58 mm / 47 mm		
Tube Coating	SS-CU-ALN/AIN Absorptive Coating		
Vacuum	$P < 5 \times 10^{-3} \text{ Pa}$		
Absorptivity Coefficient	95%		
Emissivity Coefficient	8%		
Heat Pipe	Ø8mm TU1 Copper		
Sunlight Booster	360° CPC (Compound Parabolic Concentrators), Mirror Polish Aluminum Fin		

* Specification subject to change without prior notice.

Dimension Diagram



Installation Location



Tested Quality & International Standard

Our professional consultant is ready to provide you with the best of smart solar solution
For further information, visit www.smartsolar.com.my



See How It Work at :
Smart Solar Malaysia



SMARTSOLAR