

## Technical Manual and Information Pack



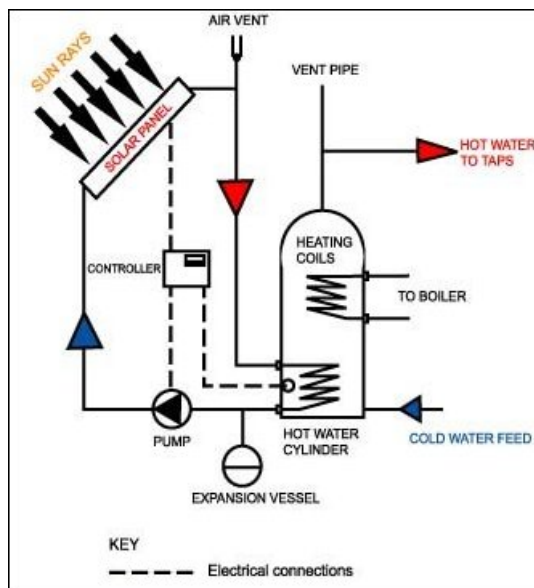
# HELIOS<sup>TM</sup>

Solar water heating systems

## Solar Water Heating Systems The Basics

What is Solar Water Heating?

Solar Water Heating (SWH) is a system for heating water using energy from the sun. Solar energy is collected by a panel, which is connected by pipes to a hot water storage device such as a hot water cylinder. Systems can be installed for domestic hot water, swimming pools or commercial applications.



Why install Solar Water Heating?

It will save you money by using free energy from the sun to heat your water.

It helps the environment by reducing greenhouse gas emissions.

It takes your hot water system into the 21st century.

It could add to the value of your house. If installed properly, it should be virtually maintenance free.

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The diagram shows a typical SWH sealed system used to replace or supplement a conventional domestic hot water system.

The collector (solar panel) should face south or close to south and lie on a pitched roof that will provide the natural angle to face the sun.

A conventional central heating pump forces water through a coiled pipe in the solar panel where it is heated by the sun. The heated water then flows down and through a second (lower) coil in your hot water cylinder. The hot water passing through this coil heats the water in the cylinder.

The slightly cooled water is then returned back to the solar panel via the pump. The controller box continuously compares the temperature in the panel against that in the hot water cylinder (see dotted lines). It switches the pump on when the water temperature in the panel is hotter than that in the cylinder and switches it off when the reverse conditions apply. The secondary heat exchanger can be used to supplement heating with a boiler, as long as the water in the hot water cylinder is at the required temperature, your existing boiler if you use one, will not switch on. Alternatively the secondary coil can be used to supply free hot water to heating delivery systems like under floor heating or radiators.

## Solar Water Heating Systems Hot Water Tanks



An extra coil in your hot water tank

Normally there is one solar heat exchange coil in the hot water cylinder, Joliet supplies hot water tanks with an additional heat exchange coil for connection to your boiler or a secondary heating circuit.

Joliet tanks also feature an electric immersion heater with thermostat as standard.

tank capacity	200L	300L
inner vessel diameter (mm)	φ438	φ542
water tank dimension (mm)	φ520	φ620
material and thickness of the inner vessel	BTC340R 2.0	BTC340R 2.0
material and thickness of the shell	galvanised sheet 0.5	galvanised sheet 0.5
insulation thickness (mm)	40	40
surface area heat exchanger (top)	0.4M2	0.4M2
surface area heat exchanger (bottom)	0.7M2	0.7M2
water pipe size	G3/4"	G3/4"
rated heating power	1.5KW	2.5KW
overall dimension (mm)	φ520x1530	φ620x1530
packing cubage	0,492	0,697
weight (kg)	68	95

An air vent is installed at the highest point and is required to prevent air locks. As this is a sealed system, an expansion vessel allows for expansion and contraction within the system as it heats up or cools down.

The system is filled using a one-way valve. Care must be taken to ensure that water contaminated by anti-freeze does not get into the water feed supply. .

The electronic display board can be mounted in a convenient inside location which gives both roof panel and cylinder water temperatures.

## Solar Water Heating Systems Solar Flat Plate Collector

Lightweight anodised aluminium frame

Operation temperatures from -33 to 120 degrees C

4mm thick tempered glass face prevents hail damage

Black chrome coating ensures maximum absorption



Description	Specification
Collector Type	FP3.0-A
Dimension LxWxT	2000 × 1000 × 95mm
Gross Area	2.03 m <sup>2</sup>
Aperture Area	1.84 m <sup>2</sup>
Absorber Area	1.73 m <sup>2</sup>
Net Weight	41.6kg

Transparent Cover	
Number of covers	1
Dimensions of the Opening	1970 × 970mm
Cover material(optional)	A.Tempered Textured Glass B.Low-Iron Tempered Textured Glass
Cover Thickness	4mm
Cover Transmission	87%-91%

Absorber	
Dimensions L x W	1840 × 950mm
Material	Red Copper
Surface Treatment	Black chromed
Construction Type	Fin & Tube(Ultrasonic Welding)
Header Material	Copper TP <sub>2</sub>
Header tuber size	φ 22/φ 25 mm × δ 0.8mm 2pcs
Riser Material	Copper TP <sub>2</sub>
Riser tuber size	φ 10 mm × δ 0.6mm 8pcs
Fill Capacity	1.8L including the header pipe

Thermal Insulation	
Insulation Material	Fibre Glass Insulation (Black backing)
Insulation Thickness	Back: 50mm
Conductivity(W/mK)	<=0.048W/m.k under test temperature 70°C

Casing	
Frame	Aluminum Alloy
Frame Colour	A.Bronze / B.Silver / C.Black
Back Plate	Galvanised Steel Plate, δ 0.21mm/ δ 0.4mm
Sealing Gasket	EPDM

SWH depends on radiation not direct sunlight so it works even on dull days. However, in Northern countries, winter, although a panel can be effective in helping warm your water, you may still need your existing hot water heater to provide some of your water heating needs.

However, in the autumn, spring and summer, a solar panel can yield surprising results, often not requiring any support from your boiler.

Depending upon your system and how and when you use your hot water, you could find that almost all your needs are met by a SWH panel at these times of the year.

## Domestic Solar Water Heating Systems Helios Complete Kits

Joliet Helios Domestic Solar Water Heating kits are supplied complete and include:

A 200 or 300 litre domestic water storage tank with two heat exchanger coils and an internal electric immersion heater with thermostat. One or two flat plate solar collector panels. A 5 or 8 litre expansion tank. A three speed circulating pump and a digital system controller with a temperature sensor.

The system uses a dual 'closed loop' water systems prevent contact between heating circuit and domestic hot water. System components are guaranteed for two years.

### Digital controller

- Pump cycle function based on temperature readings
- Clear LCD display
- Preset immersion heater timer control function for night time
- Anti freeze protection
- Over temperature protection
- Temperature display
- Auto recovery memory after power cut
- Error code display
- Second pump control cycle

### Expansion Tank

- Over pressure protection of the collector circuit
- Standard  $\frac{1}{2}$  or  $\frac{3}{4}$  plumbing connection depending on the model size

### Circulating pump

- Wilo circulation pump
- Suitable for water/glycol mix
- Manual 3 speed control
- Working temperature range -10 to +110 degree
- Maximum working pressure 10 bar



## Domestic Solar Water Heating Kits

**Helios 200** - 200 litre water tank, 5 litre expansion tank, one FP-3 flat plate solar collector panel, digital controller, pressure gauge, circulating pump

**Helios 300** - 300 litre water tank, 8 litre expansion tank, two FP-3 flat plate solar collector panels, digital controller, pressure gauge, circulating pump

## Commercial Solar Water Heating Systems

Helios commercial Solar Water Heating kits are designed to order dependent on the hot water capacity required.

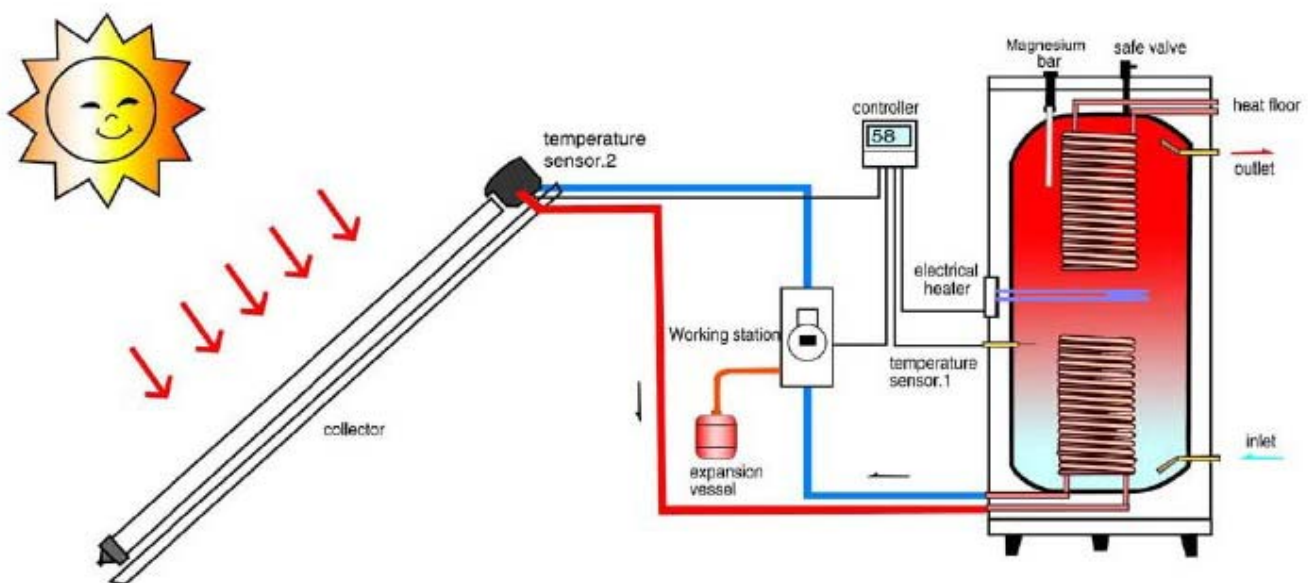
The water storage tank or tanks are supplied as standard with two heat exchanger coils allowing the second coil to be used to provide back up heating from another source OR to provide a secondary solar powered heating circuit for under floor or other forms of heating.

Joliet technical engineers will dimension a solar hot water system to suit individual needs and site conditions.



Commercial systems are supplied with all necessary components and fixings.

Customised systems can be designed for locations where there is no local power supply, using small scale hybrid power generating systems, supplied by Joliet Technology, to supply the small amount of electrical power needed to operate the circulating pump and digital controller.



## Solar Water Heating Systems Standards and Performance



WATER STORAGE AND HEATING TANKS (Pressurised)

EN50366:2003

Household and similar electrical appliances. Electromagnetic fields

BS EN 60335-2-21:2003

Specification for safety of household and similar electrical appliances. Particular requirements for storage water heaters

For AC mains product:

EN55014-1 Power disturbances test & Terminal voltage test

EN55014-2 (EN61000-4-2), ESD test

EN55014-2 (EN61000-4-3), Radio frequency electromagnetic fields test

EN55014-2 (EN61000-4-4), Fast transients test

EN55014-2 (EN61000-4-5), Surges test

EN55014-2 (EN61000-4-6), Injected currents test

EN55014-2 (EN61000-4-11), Voltage dips and interruptions test

EN61000-3-2, Harmonics test

EN61000-3-3, Voltage fluctuation test

EC Directives:

73/23/EEC

89/336/EEC

THERMIC SOLAR EQUIPMENT – COMPONENTS AND CAPTURE PANELS

EN12975-1 & 2 Solar water heaters and components specific.

