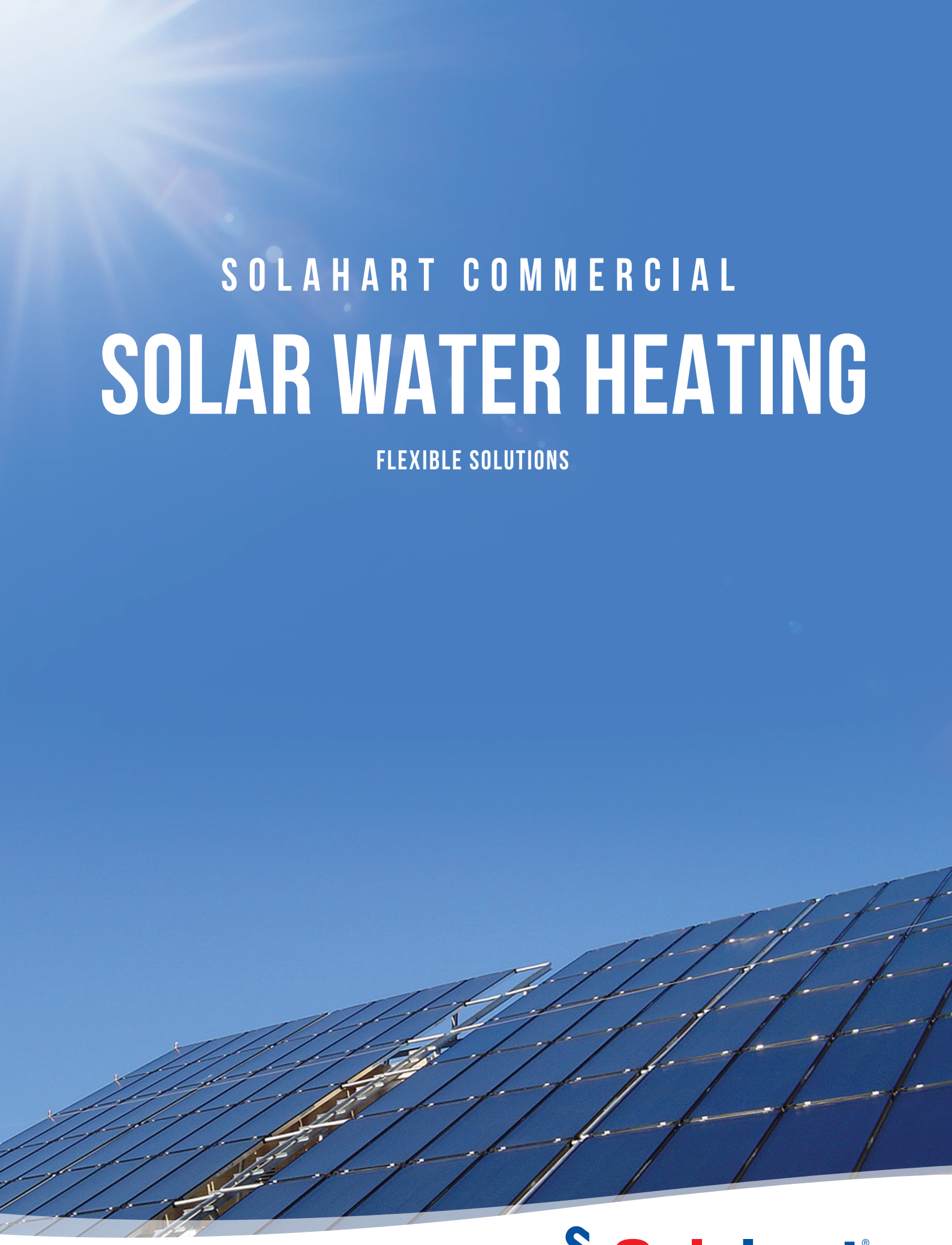
SOLAHART COMMERCIAL

SOLAR WATER HEATING

FLEXIBLE SOLUTIONS



Solahart®

HOT WATER Free FROM THE SUN®

New York University, Saddiyat Island, Abu Dhabi

A Wealth of Experience

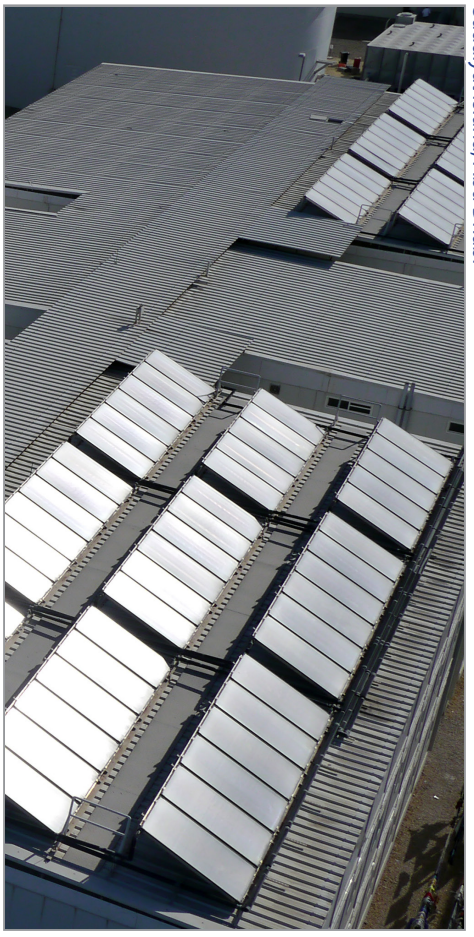
Solahart recognised the environmental benefits and financial savings of harnessing the sun's free energy to heat water over 60 years ago. Through years of experience, constant innovation and product development, we have built a reputation around the world for engineering and manufacturing high quality commercial solar water heating solutions.

Because innovation drives performance, Solahart has built a strong R&D network to meet customer expectations. We have proven our ability to develop new designs and materials to improve efficiency, prolong product life, and ensure reliability and safety.

Solahart maintains its leading edge in the worldwide solar market through a total dedication to the design and manufacture of high quality solar water heating solutions. We have multi-million dollar investments in Research and Development, and manufacturing facilities, dedicated to the production of solar collectors and hot water storage vessels.

We have been at the forefront of employing solar and heat pump systems for commercial use and today we are one of the most experienced providers of commercial solar thermal applications in the world. Our technical support teams work closely with architects and consultants throughout the specification process to custom design solar water heating systems for a remarkable range of commercial applications.

Our solar water heaters are reducing power consumption and infrastructure costs for large scale businesses across Europe, the Middle East, Africa and Asia and are helping the United Nations deliver sanitary conditions to emergency areas anywhere in the world.



Saddiyat Island, Abu Dhabi

Solahart Commercial Solar Water Heating

Solahart's Commercial Solar Water Heating range means that we are able to support a project from design stage to occupancy and beyond and in the process address the needs of architects, developers, builders, selling agents and consumers. We have successfully completed many commercial scale projects, working alongside our clients to share our expertise and to function as an integral part of their team.

The Solahart Commercial Water Heating range of centralised solar thermal solutions is the latest result of our commitment to continuing product improvement and innovation. It has been developed to provide large volumes of low cost hot water that can be tailored to meet the specific needs of hotels, hospitals, apartment buildings, factories, mining villages, caravan parks, etc. where hot water usage requirements exceed 1,000 litres per day.

System Overview

Solahart Commercial Solar Water Heaters combine our proven solar collectors with a centralised heat store to extract the sun's free energy and hold it ready for use. Highly efficient heat exchangers transfer the stored energy to the water supply to meet your hot water requirements on demand. A range of booster options ensures a continuous hot water supply regardless of the demand or weather.

This combination of storage and controlled heat transfer allows the system to quickly deliver large volumes of water at a consistent supply temperature. Each system is specifically customised to best meet your requirements and existing infrastructure.

Flexible Configurations

The flexibility of the Solahart HS Series ensures it can be connected as a solar pre-heater to immediately reduce the running costs of almost any existing hot water plant with minimal disruption to the installation. Alternatively, the system can be tailored for new building projects or as a complete replacement for old, inefficient water heaters.

The modular nature of the system helps to simplify the design, allowing the flexibility to work within the constraints of existing plant room layouts. It can also be tailored to provide the most cost effective solution for your application. The system is scalable and expandable, further modules can simply be added to the existing system to cater for growth in hot water demand.

System Benefits

- Complete over-temperature protection
- Engineered specifically for your requirements
- Highly efficient use of available solar energy
- Low running costs
- Instantaneous hot water supply
- Precise temperature control
- Total freeze protection
- Scalable and Expandable to meet demands of over 1,000 l/day
- Flexible storage to meet any existing space constraints
- Range of boosting options

Solahart

Central Heat Store

The New Solahart HS Series storage tanks offer the perfect combination of performance, long life and flexibility. The tanks are available in multiple sizes of 1000, 2000, 3000, 4000 and 5000 litres and can be supplied with 100mm insulation with either a PVC jacket for indoor installations or bonded aluminium cladding suitable for outdoor installation. The tanks are available in carbon steel with 5 bar operating pressure for indirect heating (supplied with corrosion inhibitor) or 316L stainless steel with 8.5 bar operating pressure for potable water applications.

Multiple tanks can be interconnected to meet demands exceeding 5000 litres or utilise banks of smaller tanks instead of one larger tank to better utilise available plant room space and provide redundancy.

Solar Pump Skid

The fully engineered Solar Pump Skid controls all solar functions as well as other functions such as 3 way valves and booster operation.

Deluxe models also incorporate BMS run/fail and data logging capability whilst standard models provide a lower cost alternative where data logging is not required. All switch gear is located within an IP55 powder coated enclosure and the frame is fully welded steel construction and hot dip galvanised for superior corrosion resistance.

A pair of Grundfos CME variable speed cast iron pumps are incorporated to provide duty/standby redundancy. The controller regulates the speed of the solar pump to optimise the flow rate through the solar collectors. This helps to optimise system efficiency, reduce energy use, and also reduce possible frequent starting and stopping of the pump.

Drain Back for Energy Efficiency and Over Temperature and Frost Protection

To optimise performance, the Solahart Commercial Solar Water Heaters use the proven drain back principle where the heat transfer fluid drains back into the heat store at times when there is insufficient solar gain, or when the fluid is at its maximum set service temperature, to prevent overheating. This also provides protection against freezing.

The system incorporates an automatically controlled pump, which is activated by a smart controller that can be integrated into most building management systems. Drain back is effected by a patented automatic diverter valve which dramatically increases system reliability. Drain back negates the need for heat dissipitation equipment which is typically required for fully flooded solar systems.

Heat Exchange Delivery Skid

To precisely regulate the hot water outlet temperature to the building, the Delivery Skid's intelligent control system varies the rate of energy transfer from the central heat store. This means the fluid in the storage tanks can be stored at a higher temperature than the required potable water temperature allowing for an increase in energy storage density and efficiency. On days when available solar energy input exceeds the hot water demand, surplus energy can be banked for later use rather than be wasted.

The Delivery Skid features a pair of completely integrated high-efficiency stainless steel plate heat exchangers. This allows for a high energy transfer with low pressure drop and a low temperature difference between the transfer fluid and the potable water circuits.

The efficiency of the Delivery Skid design makes it ideally suited for solar thermal applications and/or other low-temperature heating systems (a transfer fluid temperature of 50°C is sufficient to heat the fresh water up to 45°C).

The Delivery Skids are available in sizes with instantaneous output of 200, 400, 600 and 800kW. Multiple units can be manifolded together to provide greater output if required. Any sized Delivery Skid can be paired with any storage tank capacity combination for maximum flexibility and system optimisation.

Each heat exchanger can be individually isolated and removed for cleaning with no interruption to the hot water supply.

The Delivery Skid is available with dual head circulators proving duty/standby functionality for redundancy. Standard models provide a lower cost alternative.

Booster Options

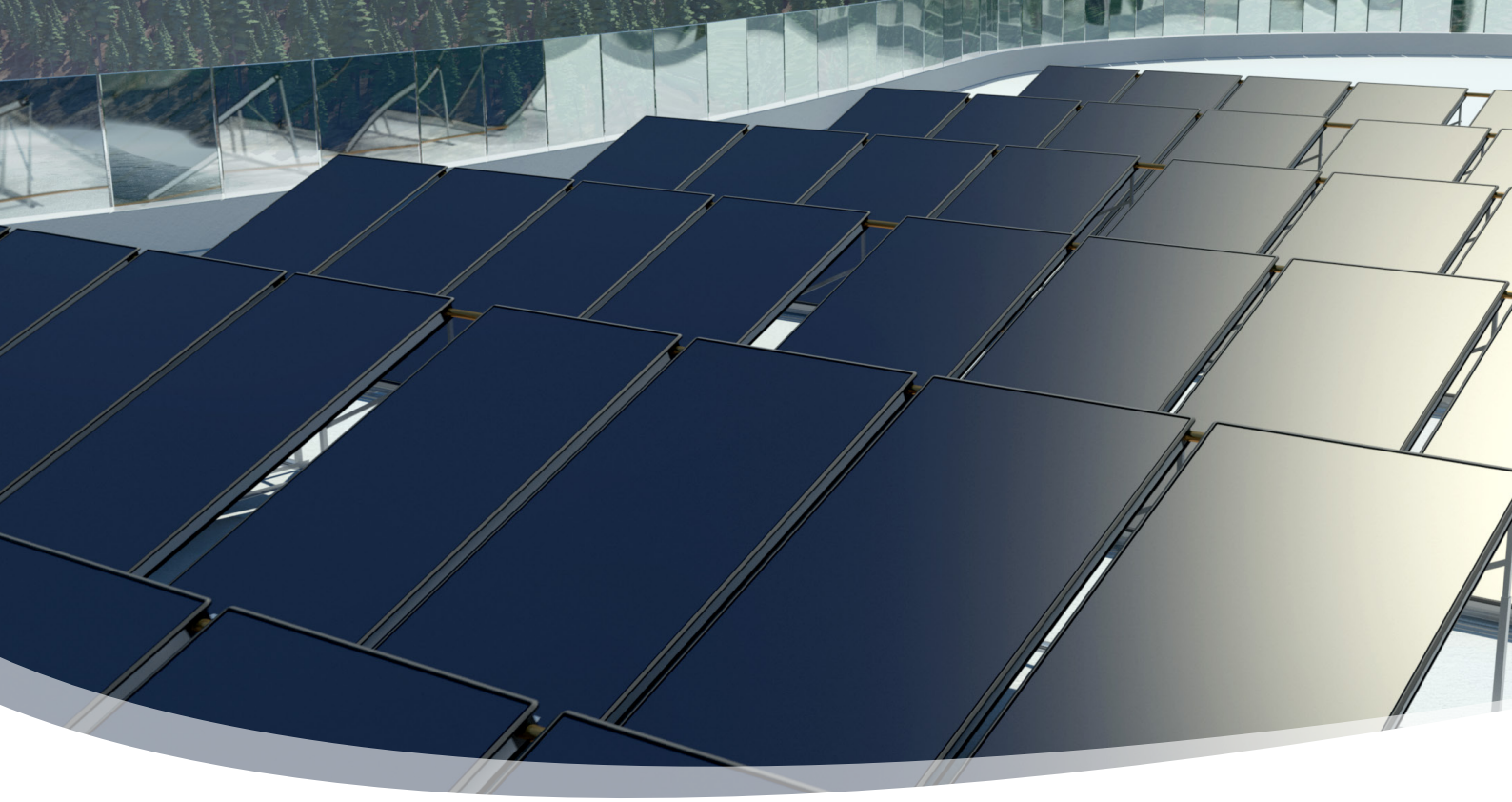
A variety of options exist to ensure constant hot water supply at times of low solar radiation or high hot water demand.

We can supply and incorporate boosting solutions with electric, gas, or heat pump options, by either boost-heating the fluid in the central heat store, or boosting the potable water output from the heat exchanger modules to the required service temperature.

Using our highly efficient Heat Pumps as a booster option complements the operating cost savings and environmental benefits of the solar collector system. By combining Heat Pump technology in conjunction with solar collectors (a hybrid solution) some powerful synergies can be gained.

Solahart's Commercial Heat Pump range is designed with the volume user in mind. Up to 300kW output means almost any demand can be met. Our commercial Heat Pumps typically have an average Co-efficient of Performance (COP) of around 4.0*, which means that more than 75% of the energy used to produce hot water is energy free from the sun. Naturally, the hotter the conditions the better the performance.

* COP of 4.0 is achieved at 20ºC Ambient 60% RH and 40ºC entering water



Solar Collectors

The driving energy source for the system are the market-leading Solahart solar collectors. The range ensures there is a collector type suitable for almost every location on the planet. Each collector is constructed with an aluminium outer casing, lined with dense insulation to minimise heat losses. Low iron, tempered glass maximises the solar energy received by the absorber.

LCS Collector

The LCS collector features an aluminium absorber plate with all copper header and risers. The LCS collector absorber plate is coated with the Mirotherm® sputtered selective surface, widely used throughout the solar hot water markets in Europe. The Mirotherm® absorption and anti-reflection layers provide high solar absorption and an infrared reflecting layer ensures low thermal emission, making the most of the available solar radiation.

BT Collector

The BT collector is designed to generate maximum solar performance in all climatic conditions. The ultra-high efficiency copper absorber with its sputtered selective surface maximises heat absorption. Heat loss is minimised with the use of glass wool insulation. The copper risers are laser welded to the copper absorber sheet, ensuring maximum heat transfer. The BT collector is suitable for use in low solar radiation areas and will provide exceptional performance in areas with medium to high solar radiation.

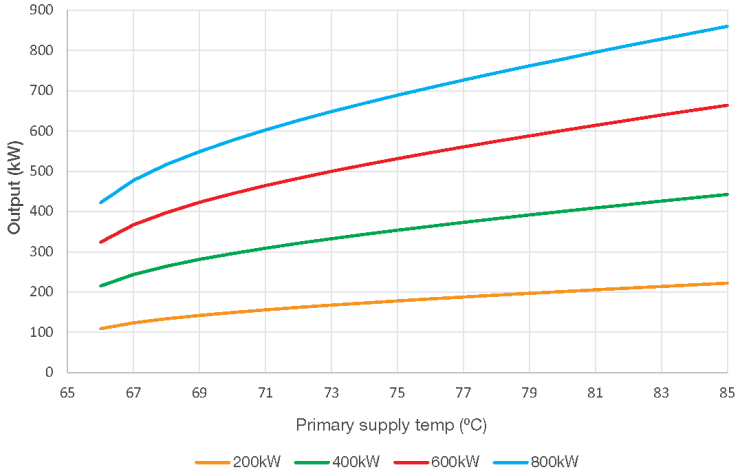
Delivery Skid Specifications

Model			SD200	SD400	SD600	SD800
Nominal Capacity		kW	200	400	600	800
Parameters for Nominal Capacity Rating Capacity is dependent on the difference between primary side temperature and secondary side temperature	Primary Side (non-potable)					
	Inlet Temp	ºC	80	80	80	80
	Flow Rate	L/min	48	114	144	186
	Pressure Drop	kPa	24	47	36	36
	Secondary Side (potable)					
	Inlet/Outlet Temp	ºC	15/65	15/65	15/65	15/65
	Flow Rate	L/min	57	115	172	223
	Pressure Drop	kPa	37	47	51	48
Dimensions	H x W x D	mm	1364 x 761 x 700			
Weight		Kg	130	138	147	156
Pipe Connections Primary Circuit		BSPF	RP1¼			
Pipe Connections Secondary Circuit			50mm Flange Type E			
Max Operating Pressure Primary Circuit		kPa	1400*			
Max Operating Pressure Secondary Circuit		kPa	1400*			
Electrical Supply			230-240V 50/60Hz Hard Wired By Electrician			
Min Circuit Size		Amps	10			
Options			Dual or Single Head Pump			

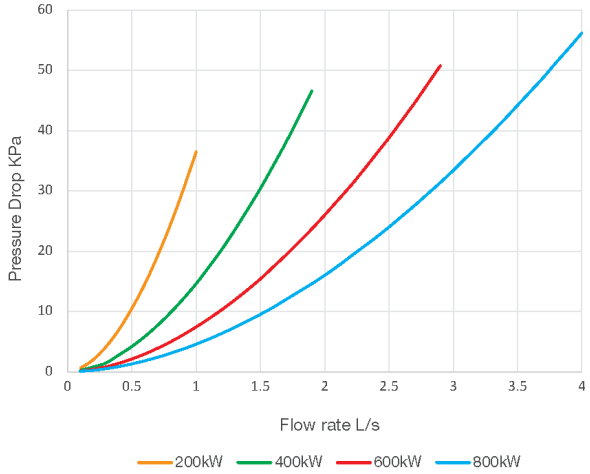
*The maximum working pressure of each side of the system will be governed by the lowest operating appliance connected to it.
The potable water side (secondary side pressure) must be higher than the non-potable side (primary side pressure).

Delivery Skid Model Numbering	S	D	200	D	65	0
	Solahart	Delivery Skid	Nominal output 200, 400, 600, 800kW	D = Dual head pump S = Single head pump	Maximum delivery temperature	No meaning

Solahart Delivery Skid Maximum Output
(T in 15°C - T out 65°C) vs Primary Supply Temp



Solahart Delivery Skid
Secondary Side Pressure Drop vs Flow Rate



Storage Tank Dimensions and Technical Data Carbon and Stainless Steel

Model		ST1000	ST2000	ST3000	ST4000	ST5000
Construction		Stainless Steel / Carbon Steel				
Corrosion Protection	Stainless Steel	316 Stainless steel				
	Carbon Steel	Carbon Steel - Exterior with rust-protection coating - Interior with corrosion inhibitor				
Insulation (supplied loose) –						
Indoor installation		100mm Polyethylene insulation w/ PVC outer cover				
Outdoor installation		100mm Polythylene insulation w/bonded aluminium cladding				
Storage Volume	Litres	920	2055	2960	3820	5180
Top Element Flange Boost Volume	Litres	304	678	977	1261	1709
Diameter (without insulation)	mm	800	1100	1250	1400	1600
Diameter (with insulation)	mm	1000	1300	1450	1600	1800
Height (without insulation)	mm	2200	2565	2845	2918	3128
Height (with insulation)	mm	2200	2565	2845	2918	3128
Dry Weight (without insulation) SS/carbon steel	kg	136 /115	245 /245	330/334	455 /455	660 /535
Wet Weight (without insulation) SS/carbon steel	kg	1056 /1035	2300 /2300	3290/3294	4275/4275	6022 /5715
T&PR Valve Setting SS/carbon steel	kPa	850/500	850/500	850/500	850/500	850/500
Expansion Control Valve (ECV) setting SS/carbon steel	kPa	700/NA	700/NA	700/NA	700/NA	700/NA
Maximum Water Supply Pressure						
without ECV fitted SS/carbon steel	kPa	680/400	680/400	680/400	680/400	680/400
with ECV fitted SS/carbon steel	kPa	550/NA	550/NA	550/NA	550/NA	550/NA
Max Operating Temperature	°C	90	90	90	90	90
Quantity of Solahart Solar Collectors		8-12	12-24	24-36	30-48	36-60
Solar Collector Apperture	m^2	15.2-22.8	22.8-45.6	45.6-68.4	57-91.2	68.4-114
Gasket Material		EPDM				

Storage Tank Model Numbering	S	T	1000	C	6	ALU
	Solahart	Tank	Nominal capacity 1000, 2000, 3000, 4000, 5000 litres	Tank Material C = Carbon Steel (6 bar) N = Stainless Steel (9 bar)	Max operating Pressure (of tank) 6 = 6 bar 9 = 9 bar	Cladding type ALU = Aluminium PVC = PVC

Solar Pump Skid Specifications

Model			SP013	SP015	SP033	SP035	SP055	SP103	SP153
Number of Collectors		BT	Up to 8	8 - 16	16 - 24	16 - 24	28 - 40	40 - 90	90 - 150
Maximum Height		m	20	40	20	40	40	40	40
Dimensions	H x W x D	mm	941 x 684 x 700						
Weight		kg	75	75	80	80	90	182	189
Pipe Connections Inlet		BSPF	RP1 ¼					RP2	
Pipe Connections Outlet		BSPF	RP1 ¼					RP2	
Enclosure Rating			IP55						
Electrical Supply			230-240V 50/60Hz Hard Wired by Electrician				380-480V 50/60Hz Hard Wired by Electrician		
Max Current		Amps	10				15		
Min Circuit Size		Amps	16				20		

Solar Pump Skid Model Numbering	S	P	013	C	D	1	0
	Solahart	Pump Skid	Pump Model eg Grundfos CME1-3	Pump Body C = Cast Iron	D = Deluxe with data logging and BMS S = Standard	1 = 1 Phase 3 = 3 Phase	No meaning

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