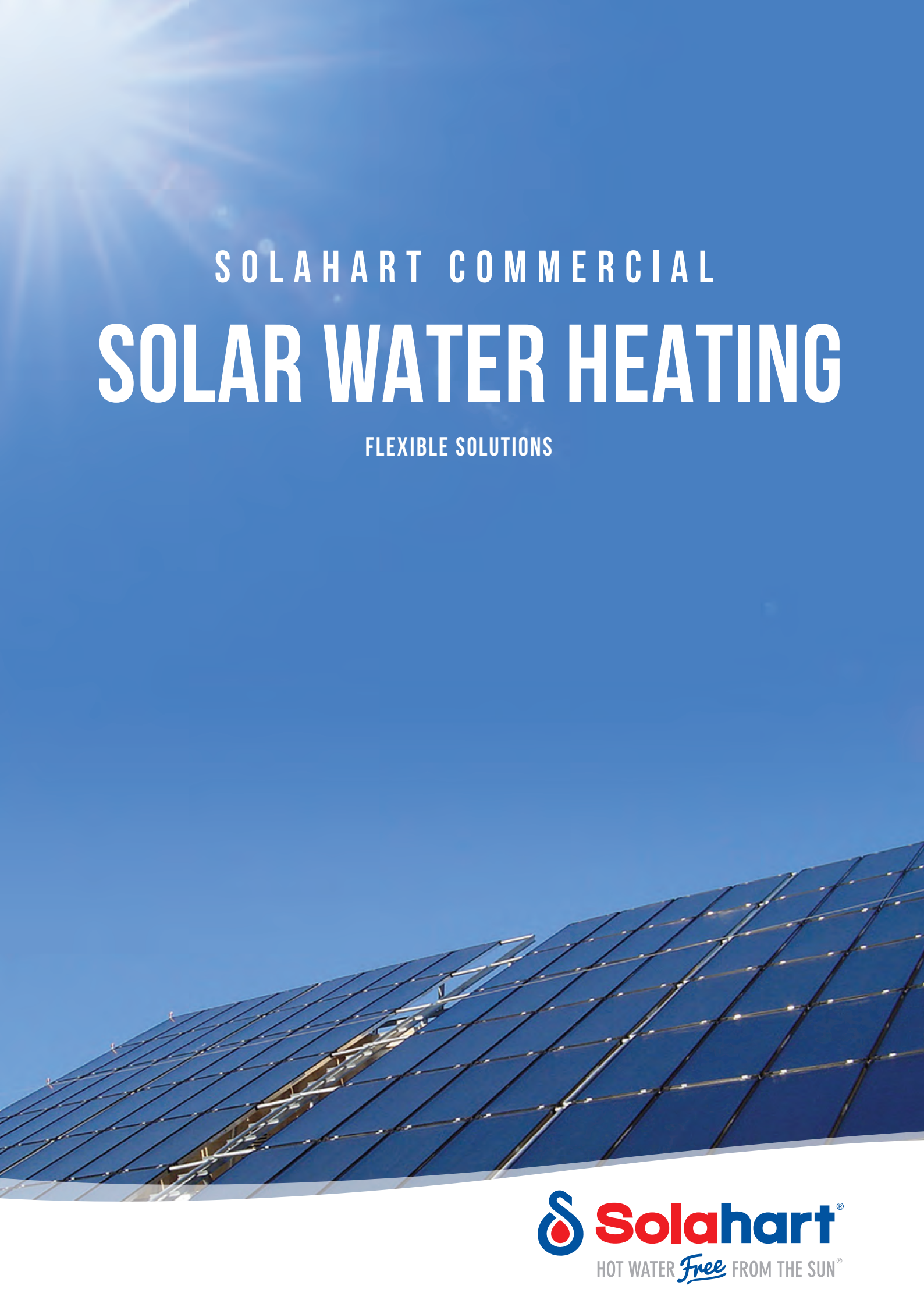
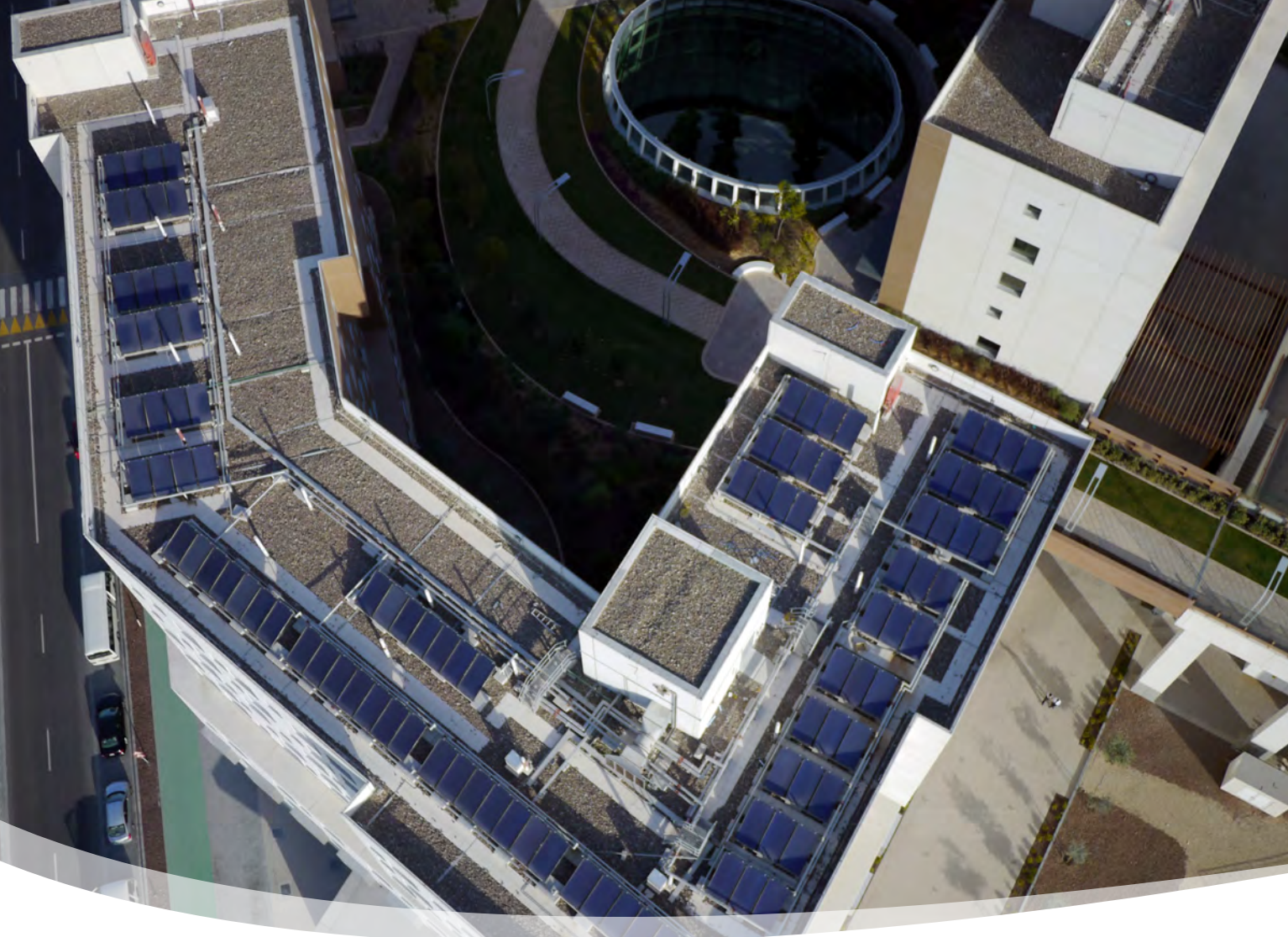




SOLAHART COMMERCIAL

# SOLAR WATER HEATING

FLEXIBLE SOLUTIONS



## 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.



## 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





## 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 dissipation 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 providing duty/standby functionality for redundancy. Standard models provide a lower cost alternative.

## Booster Options

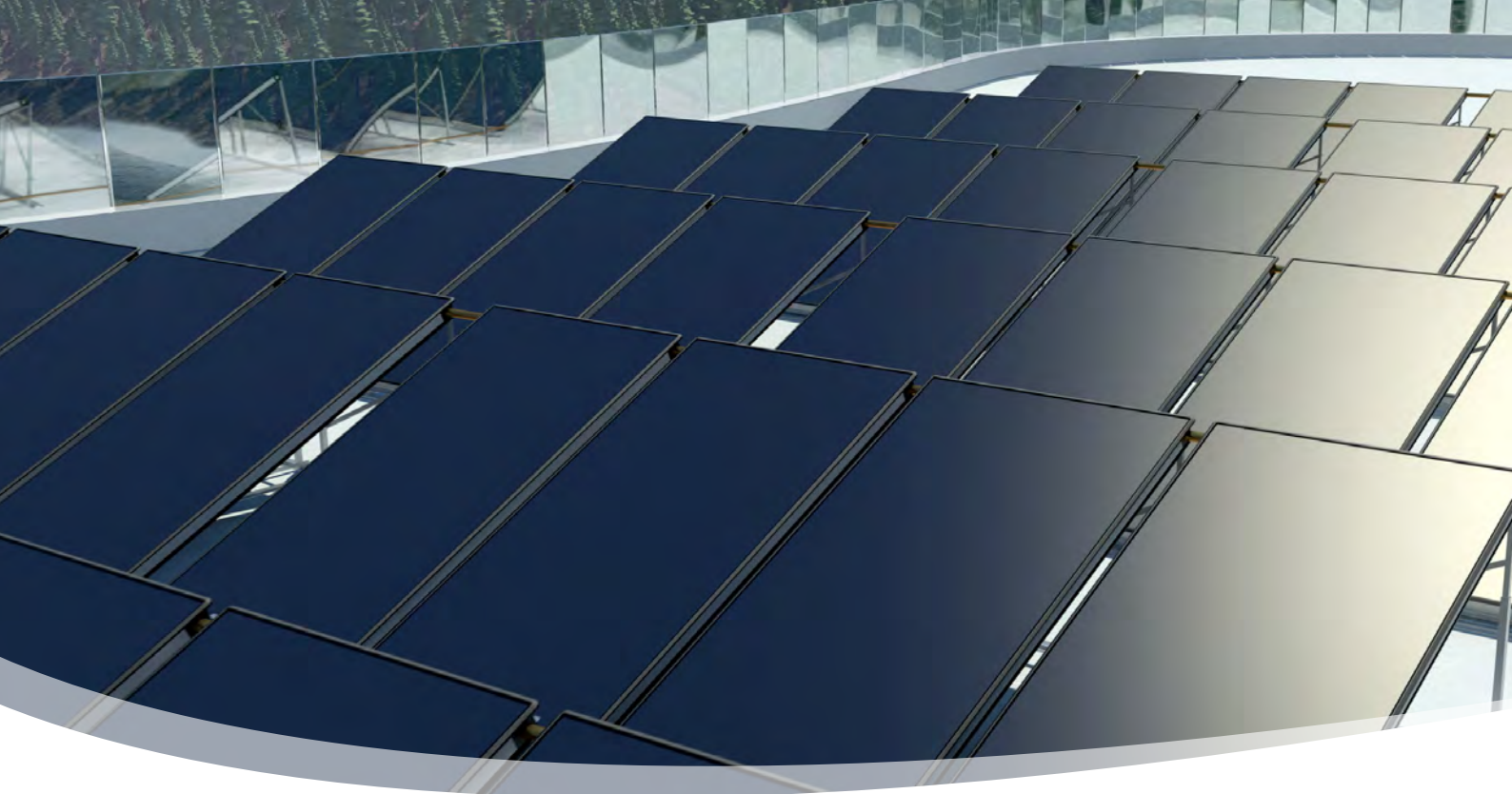
A variety of options exist to ensure constant hot water supply at times of low solar radiation or high hot water demand.

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 20°C Ambient 60% RH and 40°C 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.



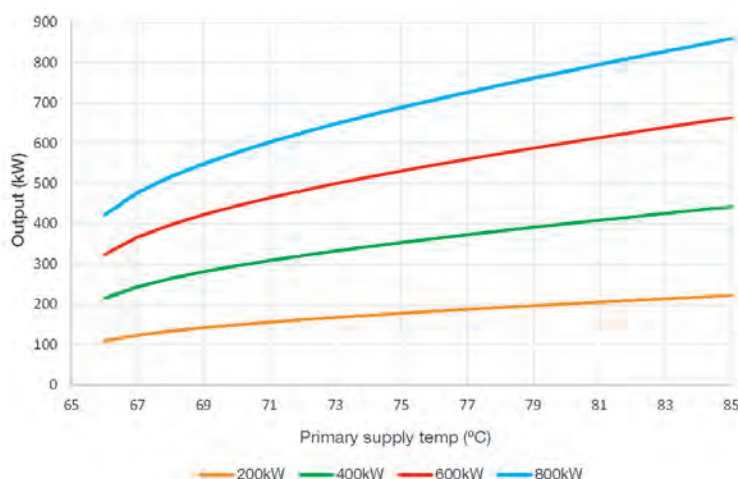
## Delivery Skid Specifications

| Model                                                                                                                                                 |                            |                                            | SD200            | SD400 | SD600 | SD800 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------------|------------------|-------|-------|-------|
| Nominal Capacity                                                                                                                                      |                            | kW                                         | 200              | 400   | 600   | 800   |
| Parameters for Nominal Capacity Rating<br><br>Capacity is dependent on the difference between primary side temperature and secondary side temperature | Primary Side (non-potable) |                                            |                  |       |       |       |
|                                                                                                                                                       | Inlet Temp                 | °C                                         | 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          | °C                                         | 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                       | RP1½                                       |                  |       |       |       |
| 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                   |                  |       |       |       |

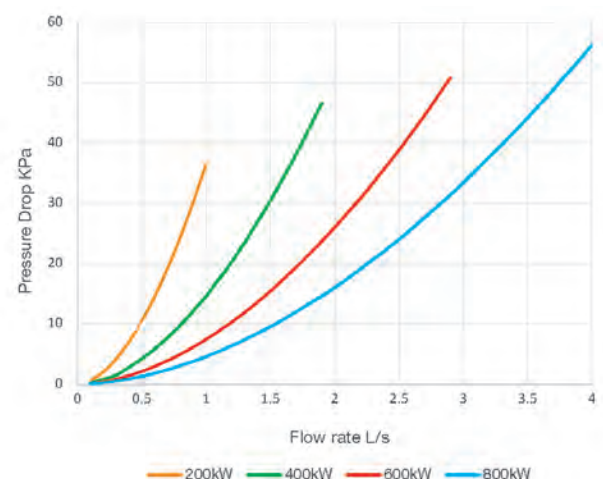
\*The maximum working pressure of each side of the system will be governed by the lowest operating appliance connected to it.  
The potable water side (secondary side pressure) must be higher than the non-potable side (primary side pressure).

| Delivery Skid Model Numbering | S        | D             | 200                                       | D                                          | 65                           | 0          |
|-------------------------------|----------|---------------|-------------------------------------------|--------------------------------------------|------------------------------|------------|
|                               | Solahart | Delivery Skid | Nominal output<br>200, 400, 600,<br>800kW | D = Dual head pump<br>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<br>Carbon Steel                      | 316 Stainless steel<br>Carbon Steel - Exterior with rust-protection coating<br>- Interior with corrosion inhibitor |            |                                                                |                                                       |            |
| Insulation (supplied loose) –<br>Indoor installation<br>Outdoor installation |          |      |                                                      | 100mm Polyethylene insulation w/ PVC outer cover<br>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                                                    |          |      | m²                                                   | 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<br>C = Carbon Steel (6 bar)<br>N = Stainless Steel (9 bar)                                           |            | Max operating Pressure (of tank)<br><br>6 = 6 bar<br>9 = 9 bar | Cladding type<br><br>ALU = Aluminium<br><br>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<br>Dimensions H x W x D | m    | 20                                            | 40     | 20      | 40      | 40                                            | 40      | 40       |
|                                        | 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                |      | RP1 ¼                                         |        |         |         |                                               | RP2     |          |
| Enclosure Rating                       |      | IP55                                          |        |         |         |                                               |         |          |
| Electrical Supply                      |      | 230-240V 50/60Hz<br>Hard Wired by Electrician |        |         |         | 380-480V 50/60Hz<br>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<br>C = Cast Iron | D = Deluxe with data logging and BMS<br>S = Standard | 1 = 1 Phase<br>3 = 3 Phase | No meaning |

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