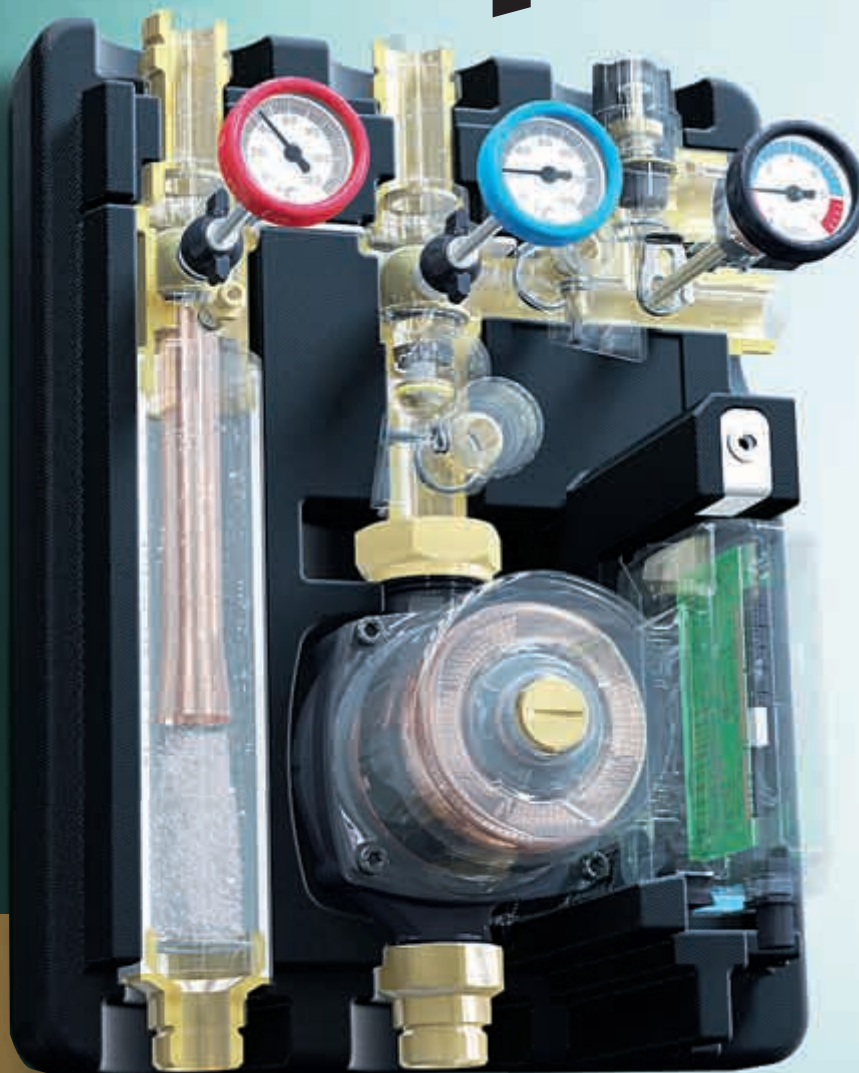


A question of **the pump**



The solar system supplier Vaillant is now manufacturing its solar stations itself.

Photo: Vaillant

Solar stations bring together all the necessary valves and fittings of the solar loop in one unit. For products with an integrated controller the controls are set up optimally for the pump. Bidirectional pumps make new functions possible.

The latest generation of circulation pumps for heating technology communicate with the control system. Until now the controller has merely set what the pump should do. Bidirectional pumps now also inform the controller on their operation status. This principle had already entered the solar technology field a year ago. The fittings specialist Watts Industries Deutschland presented a project study of a solar station with a bidirectional pump at the ISH in Frankfurt, Germany. Resol even brought out a version of its solar station Flowsol B HE, fitted out with the bidirectional Resol controller Deltasol CS and the bidirectional Wilo pump Yonos Para ST 15/7.0 iPWM2 (see S&WE 3/2015, page 48).

Meanwhile a solar systems supplier is also using a bidirectional pump in its solar station. Vaillant had for years sourced an OEM station from a fittings specialist, just like most system suppliers. The new solar station Auroflow VMS 70 is now being made by the heating technology specialist itself. Compared to the previous model the station is considerably smaller. Previously the safety valve protruded sideways through the insulation. Now the safety group has been completely integrated into the solar station. This should make the installation easier and additionally makes the unit visually appealing.

A circuit control valve, as built into most solar stations, is not required with the Auroflow VMS 70 as the controller automatically sets the optimum flow. The solar station can thus easily adjust to any setting. Vaillant does not, however, do away with the inspection glass which is normally built into the circuit control valve, and the installer can see at a glance from a yellow mark whether the system is functioning correctly. By using a bidirectional pump, the controller can calculate the solar yield without requiring an expensive flow volume sensor. Additionally, a newly patented microbubble air separator has been built into the unit. As in other solar stations the Auroflow VMS 70 contains a filling and emptying device as well as a thermometer and a manometer. Thanks to its strong pump the solar station can be used for collector areas of up to 70 m².

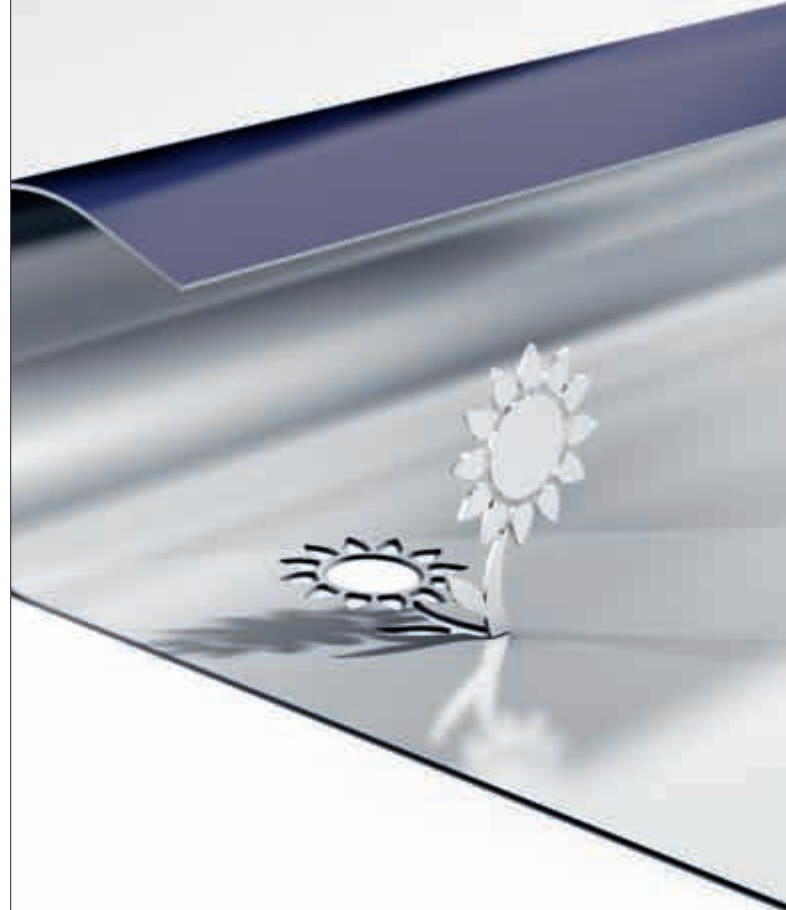
It is disputed in the sector just how accurate heat quantity measurements with a bidirectional pump can be. However, as it is mainly about controlling operation and not making heat quantity measurements, the accuracy should not play much of a role for most users. Other suppliers, such as Resol, still prefer to integrate a volume flow sensor, though. In the FlowSol B HE WMZ, the Grundfos Direct Sensor VFS ensures a precise heat quantity metering.

A high-efficiency pump is a must

Choosing a pump has always been a very conscious decision. While solar technology had to make do with normal heating loop pumps in its early days, which were not designed for high temperatures and glycol additives, there are now specialised solar pumps these days. Meanwhile, solar stations in the EU may only use high-efficiency pumps. Ivar from

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Solar stations without a heat exchanger

Manufacturer	Model	Number of strings	Nominal size DN	Max. flow rate [litre/min]	Max. collector area [m ²]	Max. admissible pressure [bar]	Safety valve [bar]	Max. temperature [°C]	Max. temperature shorttime [°C]
Afriso	Primosol 130-2	2	n/a	38	50	6	6	120	160
BRV	S2SOLAR30L	2	20/25	38	40	10	n/a	100	120
Ivar	GP 8000E	2	32	40	70	6	6	95	110
Meibes	Solar S	2	20	13	24	6	6	110	130
	Solaventec II	2	20	30	75	6	6	110	110
Oventrop	Regusol LH-130	2	25	15	25	10	6	120	160
	Regusol ELH-130-RC-P	2	25	15	25	6	6	120	160
PAW	SolarBloc midi Premium	2	20	30	60	10	6	120	160
	SolarBloc midi Basic	2	20	20	60	10	6	120	160
Prozeda	HydroCon Sol 250	2	20	10	10	10	6	120	130
Resol	FlowSol S HE	1	20	13	43	6	6	120	n/a
	FlowSol B HE	2	20	13	43	6	6	120	n/a
Sferatec	96500	2	20	23	20	10	6	120	150
Solarhot	SV-GSP	1	20	22	20	5	5.5	120	150
STI	Solbox ¹³	2	20	40	35	6	6	55	110
Sunex	GPSN PWM	2	20	12	26	6	6	110	140
	GPSN PWM Grundfos	2	20	12	26	6	6	110	130
Taconova	Tacosol CIRC ER HE ⁵	1	25	28	25	6	6	110	110
	Tacosol CIRC ZR HE ⁵	2	25	28	25	6	6	110	160
Tuxhorn	Tubra-PGS-C multi	2	20	13	43	10	6	120	140
Vaillant	Auroflow VMS 70	2	20	25	70	6	6	95	130
Watts	FBS8180-HE	2	20	16	25	10	6	120	160

Footnotes: HE pump = high-efficiency pump; conventional = thermometer, manometer, mechanical flow meter; Vortex = thermometer, manometer, Vortex flowmeter; Flow Rotor = thermometer, manometer, Flow Rotor; bidirectional = thermometer, manometer, bidirectional pump

Source: manufacturers' specifications

Italy has thus equipped its GP 8000E with a high-efficiency pump. This solar station is designed for collector fields of up to 50 m² of collector area. For larger fields, several units of the GP 8000EK may be connected in parallel. Ivar provides a suitable connection set for this.

Meibes has taken up new high-efficiency pumps in its range this year. As an OEM supplier the company flexibly supplies its stations with the pumps which the customer desires. Additionally, Meibes has improved the solar controller Energy Pro. Instead of four fixed inputs there are now six, and up to three HE pumps can be controlled. Previously it was just one. Sunex from Poland has also integrated new high-efficiency pumps into the solar stations GPS PWM, GPS PWM Grundfos and GPS RKC. The GPS PWM contains a Wilo Yonos Para PWM, the GPS PWM Grundfos a UPM3 Solar 15-75 from Grundfos, and the GPS RKC a Wilo Yonos Para RKC.

STI Solar has developed the Solbox, a completely pre-assembled compact unit for drainback systems. The head of the high-efficiency pump is 11 m, which can be extended to 22 m if required. Compared to a conventional pressure system the Solbox aims to save up to four hours of installation time. For up to 35 m² of collector area the manufacturer claims that no adjustments need to be made to the system. The Solbox additionally enables a simple start of

operation and may be monitored by the user via a smartphone app.

New solar station from a controller specialist

A new supplier of solar stations is Prozeda. The company, previously known as a manufacturer of control units, has now taken up the Hydrocon Sol 250 in its range. The pre-wired two-string pump group contains the Regula Primos 250 SR solar controller. Here too, the manufacturer has paid attention to a compact design. The pipe separation between the flow and the return lines is 125 mm; the whole station is 245 mm wide and 445 mm high, with a depth of 130 mm.


The Hydrocon Sol 250 is equipped with a class A high-efficiency pump, which is controlled via a PWM signal. The head of the unit is 7 m. As with other solar stations, the flow and return ball valves are each equipped with a thermometer which covers from 0 to 160 °C. The return ball valve is additionally equipped with an adjustable gravity brake. There is an automatic permanent degasser on the solar flow side. Just as with the lockable filling and flushing tap and the circuit control valve on the return, this comes as standard. The solar station is also Internet-enabled via the solar controller and a web module.

	Sensors	Air stop	Check valve	Closing pressure check valve [mmWS]	Pump type	Solar controller	List price [€]
	conventional	optional	brass	n/a	Grundfos Solar	optional SR1	n/a
	Vortex	yes	n/a	102	Yonos Para ST25/7.0	MODVSOL L (L3S)	641
	conventional ¹¹	yes	plastics and stainless steel	n/a	Stratos Para 25/1-11 180 (T11)	optional MTDC	2,191
	conventional	yes	brass	300	UPM 3 Hybrid 15-70 PWM ⁶	optional Basic Pro	439
	conventional	yes	none ¹⁰	n/a	Stratos Para 25 1-11 PWM ⁹	no	820
	conventional	yes	plastics	n/a	Yonos Para ST 25/7 PWM	no	n/a
	Vortex	yes	plastics	n/a	Yonos Para 25/7 PWM	Regtronic RC-P	n/a
	Flow Rotor	yes	brass	2 x 200	UPM3 Solar 15-75	SC3.6	802
	conventional	yes	brass	2 x 200	Yonos Para ST 15/7.0	no	408
	conventional	yes	plastics	n/a	UPM3	Primos 250 SR	n/a
	conventional	no	brass	400	Yonos Para ST15/7.0-PWM2 ⁴	optional ²	starting from 604
	conventional	yes	brass	200	Yonos Para ST15/7.0-PWM ⁴	optional ¹	starting from 681
	conventional	yes	plastics	n/a	UPM3 Solar	optional	430 up to 1,800
	conventional	yes	Noryl	140	Grundfos	Steca 0301	666 ¹²
	conventional	no	not required	-	HE-pump	MTDC	n/a
	conventional	yes	brass	n/a	Yonos Para PWM	optional	n/a
	conventional	yes	brass	n/a	UPM3 Solar 15-75	optional	n/a
	conventional	no	brass and stainless steel	n/a	PM2 15-105/130	optional ³	267 up to 295
	conventional	yes	brass and stainless steel	n/a	PM2 15-105/130	optional ³	330
	conventional ⁸	yes	metal	200	Yonos Para 15/7.0	Deltasol Csplus ⁷	710
	bidirectional	yes	PPS	n/a	HE-pump	no	506
	conventional	yes	metal	200	HE-pump	optional current types	n/a


¹ Deltasol SLL, SL, SLT, BX, BX L, BX Plus, CS/2, CS/4 or CS Plus; ² Deltasol CS/2, CS/4 or CS Plus; ³ TDC4 or Deltasol BS Pro; ⁴ also with Grundfos pump available; ⁵ expansion vessel on suction side of the pump; ⁶ also with Yonos Para ST 15/7 PWM; ⁷ also with other current controllers; ⁸ Vortex flowmeter optional; ⁹ also with Yonos Para ST 25/1-7 PWM; ¹⁰ siphon in flow delivery and electric stop valve in return flow; ¹¹ types GP 8000FE und GP8000FKE with flowmeter; ¹² converted from US\$; ¹³ system for drainback

Apart from the solar station, Prozeda has also launched two transfer stations: the Hydrocon Solt 15-650 and the Hydrocon Solt 25-650. Transfer stations contain a plate heat exchanger to separate the solar loop and the storage water. They are designed to charge up storage which does not contain its own internal solar heat exchanger. While storage with just one solar heat exchanger in the lower area must be heated up from below until a useable temperature is available for hot water provision in the upper area, transfer stations can feed into the upper storage layer


directly. The Regula Grandis 650 HK controller built into the transfer station has a speed controller which enables maximum flow temperatures to always be obtained. Prozeda says the “optimum fine-tuning of the controller with the pumps used” is one of the special features of its solar and transfer stations. The Grandis 650 HK can control more than just one solar system. It can also control the heating loops. Up to four heating loop groups may be connected via a bus connector. As with the solar stations, the Prozeda transfer stations are also Internet-enabled.



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Further information see: www.paw.eu

Solar transfer stations (with plate heat exchanger)

Manufacturer	Name of the pumping station model	Nominal size DN	Max. collector area [m ²]	Max. heat transfer [kW]	Max. flow rate [litre/min]	Max. pressure [bar] ¹	Safety valve [bar]	Max. temperature [°C] ²	Sensors
Heat transfer stations for small and medium solar systems									
BRV	Modvsol Solo	20	70	35	40	10/3	6	120 (160) / 110	Vortex
Ivar	GP 9000HXE	32	65	80	30	6/3	6	95 (110) / 100	conventional
Kamo	Solar X Perfekt 45	25	45	22.5	13	6/6	6	95 (110) / 95	conventional
Meibes	Solar XL	25	45	27	30	6/3	6	110 (110) / 110	conventional
Oventrop	Regusol X-Duo 25-B	25	55	25	40	6/10	6	120 (160) / 120	Vortex
PAW	SolexMini HZ	15	36	18	20	10/6	6	120 (160)/95	Flow Rotor
Prozeda	HydroCon SOLT 15-650	25	25	n/a	8.5	6/3	6	90 (90) / n/a	Vortex
Sferatec	98100	20	20	16	23	10/10	6	120 (150) / 110	conventional
Solarhot	Solvelex Glycol	20	40	20	22	5/10	5.5	120 (150) / 95	n/a
Taconova	Tacosol Load Tera L ³	25	60	30	35	6/3	6	110 (140) / 110	Vortex
Tuxhorn	tubra-ÜSTA-mat 30	20	52	26	16	10/3	6	120 (140) / 110	conventional
Watts	SU8040	20	50	25	20	10/3	6	120 (160) / 110	Vortex
Heat transfer stations for large solar systems									
Kamo	Solar X Maxi 2-250	40	250	125	52	6/6	6	95 (110) / 95	conventional
LME	LME-500M2	50	750	300	200	6/3	10	95 (170) / 95	conventional
Meibes	Solar XXL	32	150	110	50	6/3	6	110 (110) / 110	conventional
PAW	SolexMega-Kaskade HZ ⁴	50	400	200	160	10/3	6	120 (160) / 95	Flow Rotor
Taconova	Taocosol Load Exa L ³	50	160	120	120	8/3	8	110 (140) / 110	Vortex
Tuxhorn	Tubra-ÜSTA-mat XL 100 K2	25	230	116	70	10/3	6	120 (140) / 110	conventional

Footnotes: HE pump = high-efficiency pump; conventional = thermometer, manometer, mechanical flow meter; Vortex= thermometer, manometer, Vortex flowmeter; Flow Rotor = thermometer, manometer, Flow Rotor
 Source: manufacturers' specifications



The cascadable Solex Mega is the largest transfer station by PAW. The integrated solar controller SC5.14 is new.

Photo: PAW

A transfer station with a plate heat exchanger is another new addition by Prozeda – shown here is the smaller Hydrocon Solt 15-650.

Photo: Prozeda



With the Hydrocon Sol 250, Prozeda has added a solar station to its product range.

Photo: Prozeda



	Air stop	Check valve primary circuit	Check valve secondary circuit	Closing pressure check valve [mmWs]	Pump type primary circuit	Pump type secondary circuit	Switching valve	Solar controller	List price [€]
	n/a	n/a	none	102	Stratos Para 25/1-8	Stratos Para 25/1-7	yes	Sorel	n/a
	yes	plastics and stainless steel	plastics and stainless steel	n/a	Stratos Para 25/1-11-180 T11	Stratos Para 25/1-8-180 T10	yes	optional LTDC	5,310
	optional	brass	brass	n/a	Stratos Para 15 1-11	Stratos Para 15 1-11	optional	Novatec Solar MD	2,167
	yes	none	brass	200	Yonos Para ST 15/7 PWM	Yonos Para ST 15/7 PWM	no	Energy Pro	2,072
	no	plastics	none	n/a	Yonos ST PWM 15/7	Yonos RS PWM 15/7	yes	Regtronix RX-B	n/a
	yes	brass	brass	2 x 200	UPM3 Solar 15-145	UPM3 Solar 15-75	optional	SC5.14	1,753
	no	plastics	plastics	n/a	Yonos Para HU 25/7.0	Yonos Para HU 25/7.0	no	Grandis 650 HK	n/a
	yes	plastics	n/a	n/a	UPM3 Solar	UPM3	optional	optional	430 up to 1,800
	yes	n/a	n/a	140	Grundfos	Grundfos	no	Steca 0301	1,065 ⁵
	yes	brass and stainless steel	brass and stainless steel	n/a	Stratos Para 15/1-7	Yonos Para 15/7.5 PWM	yes	TSL Tera	2,294
	no	metal	none	200	Yonos Para 15/7.0	Yonos Para 15/7.0	yes	DeltaSol BXplus	2,400
	optional	metal	plastics	200	various manufacturers	various manufacturers	optional	LCD Plus	n/a
	optional	brass	brass	n/a	Stratos 1-12	Stratos 1-12	optional	Novatec Solar MD	11,200
	optional	stainless steel	stainless steel	200	Stratos 40/1-12	Stratos Para 30/1-12	yes	UVR1611	15,780
	yes	brass	plastics	200	Stratos Para 30 / 1-12	Stratos Para 30 / 1-12	optional	no	6,253
	yes	brass	brass	8 x 200	UPM XL 25-125	UPML 25-105	optional	SC5.14	15,054
	yes	brass and stainless steel	brass and stainless steel	n/a	Stratos Para 30/1-12	Stratos Para 30/1-12	yes	TSL Exa	10,537 up to 11,304
	yes	metal	metal	200	Yonos Para 15/7.5	Yonos Para 15/7.0	optional	DeltaSol BXplus	8,940

¹ primary circuit / secondary circuit; ² primary circuit / secondary circuit (short-term load in brackets); ³ expansion vessel on suction side of the pump; ⁴ cascade of two stations; ⁵ converted from US\$

The Hydrocon Solt 15-650 is equipped with a 15 kW plate heat exchanger and can be used with systems having up to 25 m² of collector area. The Hydrocon Solt 25-650 has a 25 kW plate heat exchanger which can manage up to 50 m² of collector area.

Integrated controller optimised for hydraulics

PAW has developed a wide range of transfer stations in the last few years. This starts with the Solex Mini (up to 36 m² of collector area) and goes up to the Solex Mega Kaskade (up to 400 m²). The company also offers two versions of each model. The HZ model is designed for storage water and the TW model can transfer the solar heat directly to hot tap water. What is new is that the stations in the Solex HZ range are now fitted with the SC5.14 controller. The controller has pre-programmed systems available and is suitable for solar systems with up to two storage tanks. At PAW, the preset control systems have also been optimised for the accompanying PAW hydraulics. The Solex transfer stations can not only measure

temperatures, but can also determine heat quantities.

Solarhot from the USA also transfers solar heat to hot tap water with its Solvelox Glycol transfer station. The station is the connection required to combine a conventional electric or gas-heated hot water system with solar collectors. With electrically heated storage the cold water infeed is diverted through the Solvelox when there is a solar yield. The tap water is heated in the station and then fed into the upper area of the storage. The pump speed controller makes sure that the layering in the storage is not affected by this. With a conventional gas water heater the transfer station is connected to a pre-heating storage. A particle filter prevents impurities from clogging up the plate heat exchanger in the station. New on the Solvelox is now a storage side flow check valve to provide additional protection against thermo-siphoning. With the Solvelox Drainback, Solarhot additionally has a version available for drainback systems.

Ivar also has transfer stations on offer. Their GP 9000HXE model is new, and here the company has

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For larger solar collector fields, several GP 8000EK units from Ivar may be linked in parallel.

Photo: Jens-Peter Meyer



Meibes manufactures individually configured modular solar stations for each project.

Photo: Meibes

replaced the conventional solar pump on the primary side with a PWM-controlled high-efficiency pump.

Meibes has newly implemented a speed control of the secondary pump in its transfer stations. For very large solar systems of up to approx. 25,000 m² of collector area with a specific flow of 20 l/m²h, Meibes manufactures individual products for each project according to customers' wishes. All sensors and actuators are wired up on terminal strips in a

switch cabinet and the customer receives an electrical connection plan for this. The solar station is checked at the factory to ensure all electrical components are working and that the sealing is sound. For insulation the customer can choose between soft EPDM insulation which can withstand permanent temperatures of up to 150 °C, and EPP hard insulation which can withstand 250 °C.

Jens-Peter Meyer



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