



Solar stations with integrated solar controllers, like this one by Resol, facilitate the installation of the solar thermal system. PHOTO: RESOL



The Sunny solar station from Herz Energietechnik is a closed-loop system with plate heat exchanger. PHOTO: HERZ ENERGIETECHNIK



OEG also offers its Compact solar station without a solar pump to give installers free choice to use their preferred components. PHOTO: OEG

All in one box

Solar stations with integrated solar controllers ease installation of the solar thermal system and can display solar yield to homeowners on an app. Some call it a market trend, while others say it is little more than an exotic outlier.

Over the past few years, the switch to high efficiency pumps mandated by the ErP Directive has driven solar station development. Because pump manufacturers are constantly launching new generations of their pumps for solar thermal systems, the providers of solar systems now have a dizzying array of choices. Gasokol of Austria now uses Wilo's Yonos Para RSTG in its solar stations. Erich Temper of Gasokol's technology division sees the advantage of this pump in its four selectable operating modes. It can be set to PWM1 or PWM2 mode. But it can also operate at a constant speed or enable variable differential pressure control. If the control signal is interrupted by a broken cable, the pump will accelerate to its maximum speed. That makes sense for a heating circuit because it prevents the house from cooling down in the event of a fault. In solar circuits, however, there is a danger

that temperature-sensitive components will overheat and sustain damage, which is where the PWM2 mode comes in; it stops the pump as soon as control signal is lost.

Fabian Schröer, a Product Manager at the system provider Wagner Solar, has a positive view of modern high efficiency pumps because they, "saves considerable amounts of energy." Initially, however, seemingly trivial things like the PWM signal for the speed control have created problems for users. "Possible errors and troubleshooting is also more difficult as complexity increases in this area," says Schröer. That may be the reason why high efficiency pumps with PWM-inputs are usually not speed controlled at all in practice, but rather run at a constant speed, as Bernd Willi Milkereit observes. Milkereit works as a Product Manager at Meibes, a manufacturer of solar stations for the OEM market.

Modern pumps communicate

For about the past two years, pump manufacturers have been offering so-called bidirectional high efficiency pumps that not only have a PWM input but also send a PWM feedback signal to the solar controller or a higher-level smart home controller. The feedback signal can transmit power consumption and the operational status and send an alarm in the event of a fault in the pump. The pump electronics can also transmit the current flow rate in the system to the controller. Schröder says that these options are in vogue for monitoring solar thermal systems to identify potential faults. "This technology is ideal for simple function monitoring in small installations without additional sensors," the Product Manager explains.

Swiss solar station manufacturer Taconova recently started offering its OEM customers the Grundfos UPM3 pump. The device can send a PWM feedback signal. The Auroflow VMS 70 solar station launched last year by Vaillant (see S&WE 5/2016, page 50) uses the feedback signal from the pump to determine solar yield. Another feature of the station is that the safety valve is tucked away in the insulated housing. That prevents users from accidentally touching the component, which can get hot during idling.

The station is also very compact

But users have to compromise on the accuracy of the flow rate signal of the bidirectional pumps. The signal is of limited use, says Jochen Form of the Solvis R&D department. Precise solar yield data still requires separate flow rate sensors. The extent to which these intelligent pumps will play a role in smart home systems is still a matter of some disagreement. Bernd Milkereit still sees them as "exotic outliers." But Wilfried Grießhaber, the Product Manager at Paradigma, sees precise heat measurement as a current trend. With the solar controller integrated into its solar station, Paradigma has an app that provides a visual display of thermal yield.

The Polish manufacturer Sunex revamped the housing of its solar stations this year. It

is now easier to assemble the two halves of the housing and, thanks to larger openings in the covering, it is now easier to install the pump. The newly designed thermal insulation housing of the 10 and 20 pump assemblies made by solar thermal system provider Wolf, now enable the integration of the new SM1-2 and SM2-2 solar controller modules into the solar station.

The 2-string Compact solar station from OEG also offers variants with built-in OEG solar controllers. "The Compact solar station aims consistently at enabling installers to commission solar thermal systems as easily as

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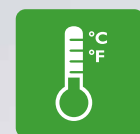
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Selection of solar stations

Manufacturer	Model	Manu- facturing	Number of strings	Nominal size DN	Max. flow rate [L/min]	Max. collector area [m ²]	Max. admissible pressure [bar]	Safety valve [bar]
Afriso	Primosol 130-2	own	2	n/a	38	50	6	6
AkoTec	Sen Con Basic	OEM	2	20	15	60	10	6
Bosch	AGS10-2	OEM	2	20	12	25	6	6
Brötje	SPS 2.7	OEM	2	25	15	30	10	6
Buderus	Logasol KS0110/2	OEM	2	20	12	25	6	6
Capito	Regusol L-130	OEM	2	25	6	n/a	n/a	6
Estec	Profi Line 2 Strang	OEM	2	20	14	15	6	6
FK Solar	FK ZS 20-6HE	OEM	2	22 ²	16	50 ⁴	8	6
Gasokol	Solo Star	OEM	1	22 ²	15	30	6	6
Kingspan Solar	KSP0681	OEM	2	22 ²	12	12	10	6
Meibes	Solarstation S	own	2	20	13	31	10	6
OEG	Compact	OEM	2	20	12	variable	6	6
Oventrop	Regusol ELH-130-RC-P	own	2	25	15	25	6	6
Paradigma	Solarstation STAqua II	OEM ¹	2	15 ^{2,3}	15	30	10	4
PAW	Solarbloc midi Basic	own	2	20	20	60	10	6
Phönix	Sen Con-HE 15/7	OEM	2	20	15	40	6	6
Prozeda	Hydrocon Sol 250	own	2	20	10	10	10	6
Resol	Flow Sol B HE	own	2	15	13	24	6	6
SferaTec	96500	own	2	20	23	20	10	6
Solarfocus	Pumpengruppenset PGSHL-ID-33	OEM	2	25	15	13	6	6
Sonnenkraft	PSKR18HE	OEM	2	20	12	25	6	6
STI	Sol Box	own	2	20	30	30	6	6
Sunex	GPS PWM	own	2	20	12	24	10	6
Taconova	Taco Sol Circ ER HE	own	1	20	6	-	8	6
Tuxhorn	Tubra-PGS-C multi	own	2	20	13	43	10	6
Vaillant	Auroflow VMS 70	own	2	20	25	70	6	6
Wagner Solar	Circo 7	OEM	2	25	33	29	10	6
Watts	FBS8180-HE	own	2	20	16	25	10	6
Weishaupt	WHI pump-sol 20-7 FM ¹	OEM	2	20	7	16	6	6
Wikora	WIK-PG 25/16 HE	OEM	2	25	16	20	10	6
Windhager	SWZ STHE, 3/4" 2-Strang	OEM	2	20	15	60	6	6
Wolf	Solarpumpengruppe 10	OEM	2	25	10	23	10	6

Footnotes: 1) in-house development by Paradigma, manufactured by OEM company; 2) pipe dimension; 3) reducible to 12 mm; 4) with vacuum-tube collectors 36 m²; 5) data for supply, return 110 °C only due to pump; 6) supply side; 7) aqua system bled via buffer tank; 8) drainback system 9) motorised two-way zone valve; 9) optional; 10) others on request; 11) also available without a controller on request

possible according to their individual wishes," says Maik Berger, the Manager of the Solar and Tank Technology business unit at OEG. The solar station comes standard both without a controller and in a range of extension levels with high-efficiency solar pumps and OEG controllers from the KSW series. This gives installers free choice to use the components they wish. According to Berger, installers increasingly place a high premium on high functional stability. That is why OEG offers an on-site warranty 36 months from the date of purchase, for all of its products labelled with the warranty. "If any problem crops up with the installed component during this period, the OEG

factory customer service team handles the inspection and, if necessary, the repair or replacement," adds Berger. "If it is a valid warranty claim, neither the installer nor the retail customer is charged."

New closed-loop systems

The new Sunny solar station by Herz Energietechnik of Austria is a closed-loop system. In the station there is plate heat exchanger which separates the solar circuit containing a glycol solution from the hot water in the buffer

	Max. temperature [°C]	Max. temperature shorttime [°C]	Flow sensor integrated	Type of flow sensor	Air stop	Check valve	Pump type	Solar controller integrated	List price [€]
	120	160	no	-	optional	brass	Grundfos Solar	optional	n/a
	120	160	no	-	yes	brass	Yonos Para ST 15/7,5	optional	n/a
	130 ⁵	n/a	no	-	yes	plastics	Yonos Para 15/7	optional	707
	95 to 120	130	no	-	yes	n/a	UPM3 Solar	no	n/a
	130 ⁵	n/a	no	-	yes	plastics	Yonos Para 15/7	optional	891
	120	160	no	-	yes	n/a	UPM 3 Solar	no	n/a
	100	130	no	-	yes	metall	UPM Solar 15-75	no	507
	95	160	yes	Vortex	yes	brass	Grundfos	no	471
	120	120	no	-	no	brass	HE-Pump	no	399
	120	120	no	-	no	n/a	UPM3 Solar 25-75	no	494
	120	140	no	-	optional	not required ⁸	UPM3 Hybrid	optional	416
	120	160	no	-	yes	brass	CPA-E 55/15 S, PWM ⁹	optional	from 199
	120	160	yes	Vortex	yes	plastics	Yonos Para 25/7 PWM	yes	n/a
	95	160 ⁶	yes	Vortex	not required ⁷	none ⁹	UPM3 Solar	yes	n/a
	120	160	no	-	yes	brass	Yonos Para ST 15/7.0	no	408
	120	120	no	-	yes	brass	Yonos Para ST 15/7	no	n/a
	120	130	no	-	yes	plastics	UPM3	yes	n/a
	95	120	no	-	yes	brass	Yonos Para ST 15/7.0-PWM2 ¹⁰	yes ¹¹	
	120	150	no	-	yes	plastics	UPM3 Solar	optional	430 to 1,800
	120	160	no	-	yes	brass/plastics	Stratos Para 25/1-9	no	n/a
	140	n/a	yes	Vortex	yes	n/a	Grundfos PM3	n/a	1,065
	110	150	no	-	no	not required ⁸	HE-Pump	yes	1,348
	110	140	optional	n/a	yes	n/a	Yonos Para ST 15/7.0 PWM2 ¹⁰	optional	n/a
	95	120	no	-	no	brass	PM2 15-105	optional	272
	120	140	optional	Vortex	yes	metall	Yonos Para 15/7.0	yes	710
	130	130	yes	PWM Signal	yes	n/a	HE-Pump	no	529
	120	n/a	no	-	yes	metall	Yonos Para 25 / 7.0 PWM2	optional	460
	120	160	no	-	yes	metall	HE-Pump	optional	n/a
	110	n/a	no	-	yes	metall	UPM3 Solar 15-75	no	n/a
	120	n/a	no	-	yes	metall	HE-Pump	no	630
	120	160	no	-	yes	brass	HE-Pump	no	606
	120	160	no	-	yes	brass	Yonos Para ST 25/6	optional	n/a

Only stations without plate heat exchangers are listed.

SOURCE: MANUFACTURERS' INFORMATION

tank. This makes it possible to use the station not only with new installations but also as an upgrade for existing buffer tanks. "The size of the plate heat exchanger has been designed to achieve a very high solar yield," reports Product Manager Kevin Gratzl. A two-circuit controller is pre-installed in the Sunny to make the installation of the solar thermal system as quick and easy as possible. The system provider Herz Energietechnik does not produce the solar station itself, but instead uses an OEM product from Kioto Solar.

Other OEM manufacturers like Kamo and Pewo, as well as solar system suppliers like Varmeco and Solvis



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Solvis uses a pressure sensor to monitor the system in its new closed-loop system.

PHOTO: SOLVIS



Paradigma uses a two-way zone valve in its solar thermal stations, rather than gravity brakes to counteract gravity circulation.

PHOTO: PARADIGMA



STI's Solbox drainback system can be extended to include two pumps to increase the pump head.

PHOTO: STI

specialise in closed-loop systems. That is why these companies are also not included in the tabular overview (see page 38), which is limited to solar stations without plate heat exchangers.

This year, Solvis launched the SÜS Max closed-loop system designed as an upgrade for solar thermal systems with up to 20 m² of collector area with the Solvis Max 7 combi system. In September of this year the SÜS 5.5 closed-loop system will be available, which is designed for use with solar thermal systems of up to 5.5 m² collector area in conjunction with the new Solvis Ben boiler. In both stations, Solvis uses new plate heat exchangers with a micro-plate structure, which the company says has a particularly high thermal conductivity, while at the same time having very compact dimensions and low pressure loss. Both closed-loop systems have an integrated solar yield recorder and a pressure sensor to monitor the solar pressure.

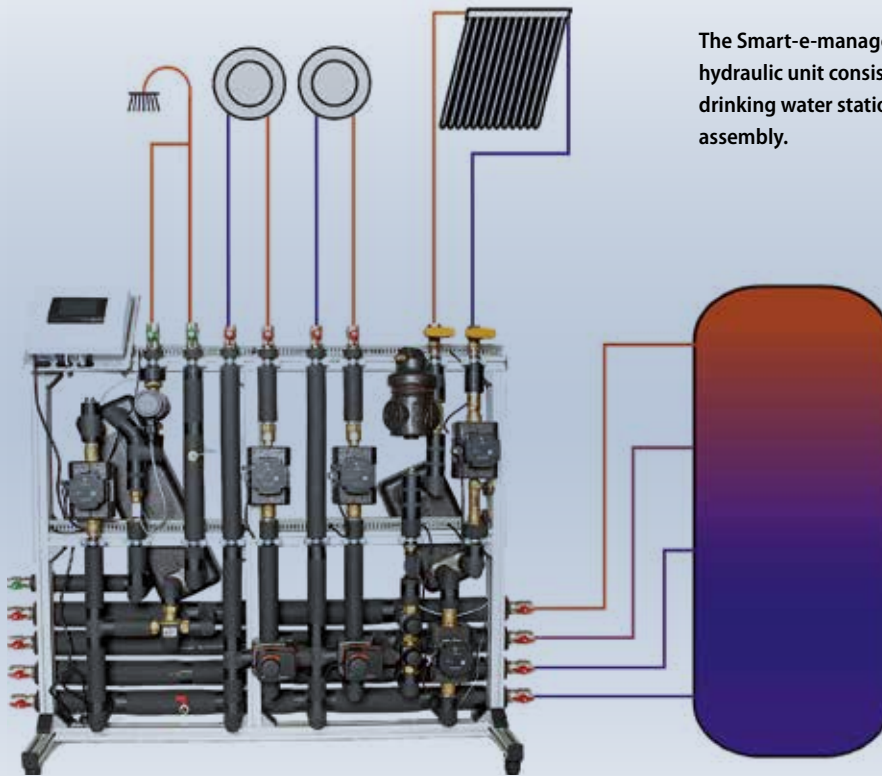
Solarfocus, a solar thermal system provider from Austria, has also launched new closed-loop systems. The stratifying storage modules, which the company manufactures in house, are suitable for 20 to 120 m² of collector area and clad in an attractive looking EPP housing. In addition to generously dimensioned heat exchangers,

the closed-loop systems have controller equipment for high efficiency pumps, which their company has adapted to enable stratified boiler heating via motorised switching valves.

Niche products on the rise

Drainback solar thermal systems, which self-empty when idle are rarely installed in Germany. Yet, for a number of years STI has been offering a solar station for this type of system, the modularly expandable SOLBOX. It now offers a new option to install a second pump, if needed, to increase static head. Also new is the integrated solar controller, which offers more functions than the previous model. "We have seen rising sales of our Solbox, which we sell as a fully pre-assembled plug & play device," says Etienne Sauppe from the STI sales department.

AkoTec, known up to now as a specialist in vacuum tube collectors, has launched a complex hydraulic unit this year, which in addition to the solar station, also connects the drinking water station and the heating circuit assembly in a single unit. The Smart-e-manager



The Smart-e-manager by AkoTec is a complex hydraulic unit consisting of a solar station, drinking water station, and a heating circuit assembly.

PHOTO: AKOTEC

also contains a controller for the entire heating system. Users can access every part of their plant – the solar thermal system, the heating circuits, and the drinking water station – with an app. “We offer two years of free

monitoring, which allows us to determine if the solar thermal system is running optimally. If not, the customer or installer is notified,” says Sandy Klink of marketing at AkoTec.

Jens-Peter Meyer

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