

It has to be smart

The networking of solar controllers with the Internet is progressing. In addition, more and more specialists for solar thermal systems are showing interest in power-to-heat from PV systems.

In the future, you will be hard pressed to find a building that gets by without a smart home system. Solar systems will be operated and monitored via apps installed on mobile or stationary devices. Most manufacturers of solar controllers already offer communication modules that can be used to connect the solar system to the Internet. emz Hanauer has now launched a newly designed, more simple remote access module. It can be connected to the solar controller via a USB port and communicates with the on-site router either via WLAN or using an Ethernet cable.

When commissioning a solar controller from emz Hanauer, the technician can either use preset configurations or transfer a previously created system configuration to the controller using an SD card. The device can also be individually and directly configured. "We have optimised our startup configuration and introduced stricter plausibility checks", said Bernhard Stoiber, who is responsible for sales and product management for solar thermal at emz Hanauer. The solar controller's display can now also show other functions and components in the form of graphic

animations. These include valve positions or the status of the secondary heating. Another new feature is store sequence control for multiple storage systems that allows each to be set to its own maximum temperature.

RESOL – Elektronische Regelungen GmbH has also introduced a new communication module: the KM2. It can be connected to the solar controller via the VBus interface. The connection to the router uses either Ethernet or WLAN. The user does not need to understand network technology to be able to install the device because RESOL provides a simple tool for its customers: the visualisation portal www.Vbus.net. Using the 'Add Device' function, even persons who do not have an IT background can successfully connect the solar system via the KM2 module. Both the end user and the installation company can use the visualisation portal to monitor the solar system. RESOL's parameterisation tool RPT allows the solar system to be remotely parameterised. For OEM customers, the KM2 communication module is available with custom printing or in customised OEM versions.



The SC3.5 is the first controller from PAW in the compact solar station category that has a graphic display.

PHOTO: PAW



The newly designed remote access module from emz Hanauer can be connected to the solar controller via a USB port.

PHOTO: EMZ-HANAUER



RESOL has expanded and improved the functionality of its system controller DeltaSol MX as part of a firmware update.

PHOTOS (2): RESOL



For OEM customers, RESOL provides the KM2 communication module with custom printing or in customised OEM versions.

System controllers with heating circuit bonus on the ErP Label

Autonomous solar controllers have their place in the retrofitting of solar systems. If a completely new heating system is installed, then system controllers can monitor and coordinate all functions. The DeltaSol MX from RESOL is one such system controller. As part of a firmware update that was rolled out, the company expanded and enhanced the functionality of this system controller. One year ago, the device was able to fulfil the heating circuit requirements of ErP temperature controller classes I, III and VIII. In the latest version, a special heating circuit mode for ErP temperature controller classes VI and VII has been added.

Another new feature is the solid fuel boiler function, which now has a mixer and target temperature control. RESOL has also implemented some innovations in domestic water heating. If the user activates the 'Solar Off' setting, then secondary heating via the fossil fuel boiler is prevented as long as solar loading of the selected domestic hot water tank is in operation. 'FSK Off' is another new feature: it suppresses secondary heating via the fossil fuel boiler when a solid fuel boiler is active. To enable remote access to the heating circuits, the user can integrate one or more RESOL room control units into the heating system. In addition, the user can also access the system using the VBus Touch HC app.

The fittings specialist PAW offers its solar stations with an integrated solar controller, which is provided by RESOL. The solar controller models SC2.3 and SC3.5 are new. Both controllers can be monitored as well as parameterised remotely. Drain-back systems can also be easily and quickly put into operation with both models using predefined logical parameters. The SC3.5 is PAW's first controller in the compact solar station category that

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Overview of solar controllers

Manufacturer	Type of controller	Inputs	Outputs	Display	Menu languages	Standby consumption [W]	Number of hydraulic schemes	Freely definable function modules	Vacuum tube function
CONTROLLERS FOR SOLAR HOT WATER SYSTEMS									
Afriso	Solar Control	8	2	colour-LCD	3	n/a	1	no	yes
Dolder	Sora-W	8	5	graphics-LCD	3	n/a	17	yes	yes
Emz-Hanauer	Smart Sol Nano Special	3	3	graphics-LCD	n/a	0.93	3	yes	yes
Esaa	Sonja SR-5-PWM	4	n/a	LED	1	1.60	8	no	no
Hanazeder	FP2	7	2	text-LCD	3	1.60	20	no	yes
KT-Elektronik	SOL3-3	6	4	graphics-LCD	2	1.00	26	yes	yes
Meibes	Basic Pro	3	1	graphics-LCD	10	0.93	1	no	yes
Oventrop	Regtronic RC	5	5	graphics-LCD	6	0.62	10	no	yes
PAW	SC2.3 ³	5	3	text-LCD	n/a	1.00	10	no	no
Prozeda	Primos 600 SR	9	6	text-LCD	1	0.80	7	yes	yes
Resol	Deltasol CS Plus	6	4	graphics-LCD	5	0.59	10	no	yes
Seltron	Promatic SGC36HV	6	3	graphics-LCD	9	0.50	50	yes	yes
Sorel	LTDC Version 1	5	5	graphics-LCD	13	0.50	42	yes	yes
Steca	TR A502 TT	5	3	graphics-LCD	0 ¹	0.80	11	yes	yes
Technische Alternative	ESR31	3	2	graphics-LCD	2	0.70	6	yes	yes
TEM	ES 4801	3	2	text-LCD	n/a	2.00	6	no	yes
Watts	LCD Picto	4	3	graphics-LCD	n/a	n/a	1	no	yes
CONTROLLERS FOR SOLAR HEATING SUPPORT									
Dolder	Sora-WX	9	6	graphics-LCD	3	1.00	19	yes	yes
Emz-Hanauer	Smart Sol Prime Top	7	5	colour-LCD	n/a	1.74	24	yes	yes
Esaa	Sonja SR-5-Comfort-Plus	8	n/a	graphics-LCD	1	1.60	9	no	no
Hanazeder	FP6	12	6	text-LCD	n/a	1.60	10	no	yes
KT-Elektronik	SOL3-5	8	6	graphics-LCD	2	0.70	72	yes	yes
Meibes	Energy Pro	7	3	colour-LCD	13	1.74	24	yes	yes
Oventrop	Regtronic RC-P	7	6	text-LCD	13	0.69	10	yes	yes
PAW	SC3.5 ³	7	3	graphics-LCD	5	1.00	7	yes	yes
Prozeda	Grandis 600 SR	13	11	graphics-LCD	2	1.00	80	yes	yes
Resol	Deltasol SL	7	6	graphics-LCD	7	0.69	27	no	yes
Seltron	Promatic SGC67HV	7	6	graphics-LCD	9	0.50	63	yes	yes
Sorel	LTDC Version 1	5	5	graphics-LCD	13	0.50	42	yes	yes
Steca	TR A503 TTR	9	4	graphics-LCD	0 ¹	0.80	11	yes	yes
Technische Alternative	UVR63	6	5	graphics-LCD	2	1.30	88	yes	yes
TEM	ES 6520	7	4	graphics-LCD	n/a	3.00	14	no	yes
Watts	LCD Plus	8	3	text-LCD	8	n/a	8	no	yes
MULTI-FUNCTIONAL CONTROLLERS WITH SOLAR FUNCTIONS									
Dolder	WPC3-U	21	21	graphics-LCD	1	3.50	13	yes	yes
Emz-Hanauer	Smart Sol Plus Premium	12	5	colour-LCD	n/a	1.25	30	yes	yes
Esaa Böhlinger	Sonja Multi 05	22	16	LED	1	2.60	20	n/a	yes
Hanazeder	HLC10	20	14	text-LCD	n/a	5.70	n/a	yes	yes
KT-Elektronik	SOL3-7	10	8	graphics-LCD	2	0.70	117	yes	yes
Meibes	Maximal Pro	12	5	colour-LCD	13	1.25	30	yes	yes
Oventrop	Regtronic RM	20	18	graphics-LCD	17	0.91	29	yes	yes
Prozeda	Grandis 650 HK	15	11	graphics-LCD	2	1.00	15	yes	yes
Resol	Deltasol MX	21	18	graphics-LCD	17	0.84	freely programmable	yes	yes
Schuler	SC460	24	14	LED	n/a	n/a	12	yes	yes
Seltron	Promatic WXD20	12	10	graphics-LCD	9	0.50	52	no	no
Sorel	XHCC Version 1	16	16	graphics-LCD	10	0.50	13	yes	yes
Steca	TR 0603mc+ plus Module	8 ²	3 ²	graphics-LCD	9	2.00	40	yes	yes
Technische Alternative	UVR16x2	16	16	touch-LCD	7	1.9	freely programmable	no	yes
Thermic Energy	Controlling-Modul TE eco	26	31	touch-LCD	1	15	192	no	no
Watts	LCD-Multi	18	10	text-LCD	8	n/a	18	yes	yes

In addition to controller manufacturers, the overview also includes manufacturers of pump assemblies that integrate special solar controllers in their solar stations. Further models and detailed data on all controllers in our German-language database www.energie-datenbank.eu. Source: manufacturer's information

Drain-back function	Afterheating function	Heating circuit return preheating	Priority tank loading	Number of heat quantity measurements	Number of heating circuits	Data logger	Interfaces	Remote data transmission	Remote access	Gross list price [€]
no	no	no	no	1	0	yes	-	no	no	n/a
no	yes	no	yes	1	0	yes	-	no	no	n/a
no	yes	no	no	0	0	no	-	no	no	n/a
no	no	yes	yes	1	0	no	-	no	no	n/a
no	yes	no	yes	1	0	yes	RS232	yes	yes	n/a
no	yes	no	yes	1	0	yes	Modbus-RTU	yes	yes	250
no	no	no	no	1	0	no	-	no	no	189
yes	yes	yes	yes	1	0	no	S-Bus	no	no	n/a
yes	yes	yes	yes	2	n/a	yes	VBus	yes	yes	n/a
yes	yes	no	yes	1	0	yes	-	yes	yes	n/a
yes	yes	yes	yes	1	0	no	VBus	yes	yes	289
no	yes	no	yes	1	0	yes	USB	no	no	n/a
yes	yes	yes	yes	1	1	yes	CAN-Bus	yes	no	n/a
no	yes	no	yes	1	0	no	TTL-Interface	no	no	n/a
no	yes	yes	no	1	0	no	DL-Bus	yes	no	138
no	yes	no	no	0	0	no	-	no	no	n/a
no	yes	no	no	0	0	no	-	no	no	n/a
no	yes	no	yes	2	6	yes	-	no	no	n/a
no	yes	yes	yes	2	0	yes	SD, USB	yes	yes	n/a
no	no	yes	yes	1	0	no	-	no	no	n/a
no	yes	no	yes	1	1	yes	RS232	yes	yes	n/a
no	yes	yes	yes	1	1	yes	Modbus-RTU	yes	yes	330
no	yes	no	yes	2	0	yes	USB	yes	yes	281
yes	yes	yes	yes	2	0	no	S-Bus, MicroSD, Mini-USB	no	no	n/a
yes	yes	yes	yes	2	n/a	yes	VBus, Micro-SD, Mini-USB	yes	yes	n/a
yes	yes	yes	yes	2	1	yes	-	yes	yes	n/a
yes	yes	yes	yes	1	0	yes	VBus, Micro-SD	yes	yes	307
no	yes	no	yes	1	0	yes	USB	no	no	n/a
yes	yes	yes	yes	1	1	yes	CAN Bus	yes	no	n/a
no	yes	no	yes	1	0	yes	TTL-Interface, SD-card	yes	no	n/a
yes	yes	yes	yes	3	0	no	DL-Bus	yes	no	220
no	yes	no	yes	1	0	yes	eBUS	yes	yes	n/a
no	yes	no	yes	1	0	yes	SD-card	yes	yes	n/a
no	yes	yes	yes	10	4	yes	Ethernet	yes	yes	n/a
no	yes	yes	yes	4	0	yes	SD, USB	yes	yes	n/a
no	yes	yes	yes	1	2	no	n/a	no	no	772
no	yes	no	yes	4	3	yes	Ethernet, RS232, CAN-Bus, RS485	yes	yes	n/a
no	yes	yes	yes	1	1	yes	Modbus-RTU	yes	yes	400
no	yes	no	yes	3	0	yes	USB	yes	yes	495
yes	yes	yes	yes	7	2	yes	SD, S-Bus	no	no	n/a
yes	yes	yes	yes	2	2	yes	Probus X, Modbus	yes	yes	n/a
yes	yes	yes	yes	7	7	yes	Vbus, SD	yes	yes	572
no	yes	no	yes	4	3	yes	Ethernet	yes	yes	n/a
no	yes	no	no	0	2	yes	COM	yes	yes	n/a
yes	yes	yes	yes	3	2	yes	CAN-Bus	yes	no	n/a
no	yes	no	yes	3	3	yes	SD-card, RS232, RS485 für TPC1-Bus	yes	no	n/a
yes	yes	yes	yes	10	5	yes	DL-Bus, CAN-Bus	yes	yes	666
no	yes	yes	yes	0	4	yes	n/a	yes	yes	n/a
no	yes	no	yes	1	2	yes	SD-card	yes	yes	n/a

Table footers: 1) language-neutral; 2) can be expanded with up to three heating circuit modules TH A603 MS (each with six inputs and three outputs), expansion with up to three expansion modules TE A603 also possible (each with seven inputs and three outputs); 3) only available as part of a hydraulic station

The ability to connect a conductive probe enables the Solarcontrol SC from Afriso-Euro-Index to monitor the collection container for solar fluid.

PHOTO: AFRISO-EURO-INDEX



Thermic Energy's controlling module TE eco is a system controller for complex heating systems. PHOTO: THERMIC ENERGY

has a graphic display. In addition, the device has a data logger that can export data to a Micro SD card.

In many regions of the world, secondary heating of the solar storage tank using an electric heating element is the typical method of providing domestic hot water when the sun is not shining. Thermosiphonic systems, for example, are usually equipped with a heating element. The thermostat controller TC from Sorel Mikroelektronik is designed for this application. The device has inputs for three temperature sensors and a relay output (230 VAC, 16 amp, N.O. contact), which can be used to operate an electric heating element with a connected load of up to 3 kW. In addition to application scenarios in thermosiphonic systems, the TC is also suitable for use as an anti-Legionella heating system or as a thermostat for storage tank heating. It can even be used as a 3-fold storage temperature display.

Using surpluses from the photovoltaic system

In addition, a PV contact can be defined on the thermostat controller TC. This enables the device to provide surplus power from the PV system to generate heat for the heating circuit or domestic water heating. An electrical heating element does not necessarily need to be installed for this because a heat pump can also be used. Whenever PV surpluses are available, the PV contact is closed. This switches either the heating circuit or the domestic hot water heating into comfort mode, and they heat up to the set comfort temperature, even outside of comfort time periods. Sorel has also included this PV contact function in its system controllers LHCC and XHCC.

The room controller Caleon is another new product from Sorel. It is equipped with a CAN bus and can be integrated in a network with Sorel heating controllers. Up to eight Caleons can be connected per heating circuit. "The models MHCC, LHCC and XHCC now qualify for the highest ErP class, which requires at least three room sensors to be connected", said Sorel Managing Director Jonas Bicher.

The controlling module TE eco from Thermic Energy RZ GmbH can also detect energy surpluses of the photovoltaic system. This requires the optional energy detection module to be connected. If there are surpluses available, the controller can switch on mains sockets or a PV heating element. With 23 digital and 6 analogue outputs as well as 8 digital and 27 analogue inputs, the controlling module can also control complex heating systems that are equipped with heat pumps or condensing boilers, storage systems and solar collectors from the manufacturer.

esaa Böhlinger GmbH has introduced two system controllers that feature self-optimising solar control: the Sonja multi 05 and Sonja multi 02. Both controllers can control up to two weather-compensated heating circuits with up to two heat generators and include features such as circulation control and buffer logic. They are equipped with four variable-speed pump outputs that can be switched from standard pumps to high-efficiency pumps. To facilitate maintenance and repair, the relay board has plug-in connections.

Dolder Electronic AG from Root, Switzerland, has not introduced new solar controllers this year, but it has further developed the universal controllers Sora-W and Sora-WX. "The controllers have a new feature that allows you to change the storage tank setpoint depending on the date", said Martin Schönfeld, who is responsible for



The Thermostat Controller TC from Sorel can also use the surpluses of a PV system to prepare hot water using an electric heating element.

PHOTO: SOREL



esaa Bohringer has released the Sonja multi 05 with four variable-speed pump outputs that can be switched from standard pumps to high-efficiency pumps.

PHOTO: ESAA

technical sales, marketing and development. He cites the example of the storage tank setpoint temperature of the heating buffer. The user can now set that value higher in the winter than in the summer. This enables the solar system to generate the greatest possible solar yield during the cold months of the year. In summer, on the other hand, the lower setpoint temperature in conjunction with night recooling ensures optimal surplus management.

System controllers are the future

The more house technology moves towards smart home control, the less useful it becomes to use independent solar controllers. "In our product range, solar control will soon only be a small part of a comprehensive product concept", said Kurt Fichtenbauer, Managing Director of Technische Alternative – Elektronische Steuerungsgerätegesellschaft from Austria. "On our PC platform TAPPS2, you simply call up the module 'Solar controller', link it to the desired inputs and outputs, and then parameterise it. In addition to being a heating controller and an awning controller, the device is also a solar controller."

Technische Alternative has programmed a proprietary operating system that is not only implemented in the largest all-purpose controller UVR16x2 but also in the smallest single-circuit controller. This means that the entire product range has identical operating concepts and control technology properties as well as identical technical specifications of inputs and outputs. "An operating system also provides an extreme advantage: in order to fulfil customer-specific product requirements, the electronics mainly just needs to combine tried-and-

tested circuit cells", Fichtenbauer explained. "That means short development cycles of a few days up to several man weeks. Lengthy software development is almost never necessary."

For networking the controllers, Technische Alternative uses a CAN bus, which is commonly found in district heating and comprehensive building automation. It allows up to 63 different devices to be combined. In addition, the devices include the sensor bus DL bus. "Sensors for different physical measurements, such as humidity or CO₂, have different specifications regarding supply and data signal", said Fichtenbauer. "Using small adapter units, we can connect almost any sensor to the DL bus and integrate it as a control value in the device within a few days." In the future, Technische Alternative is looking to link thermal energy management with photovoltaics. In addition, the alarm system and lighting control will be included in the controller design.

Jens-Peter Meyer

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