

An autonomic photovoltaic set for heating water

PVCWU.3

The electric energy produced by the PV modules set is converted into a thermal energy which heats the water in a tank. The system is fully automatic and optimized due to implementing the Intelligent Heater Controller (ISG-3). The ISG-3 locates the Maximum Power Point of the PV modules and adjusts it to the heating set's resistance in order to guarantee high efficiency.



Advantages:

- **Autonomic system** – it doesn't require utility power supply;
- **Simple assembly** – no hydraulic elements between the modules and the tank;
- **No glycol system** – doesn't require maintenance or replacing the heating medium;
- **Flexible application** – it can work with other energy sources (AC heater, gas boiler, etc.);
- **Wide operational range** – irradiance from 50 to 1200 [W/m²];
- **Big functionality** – it is possible to set time zones, temperature ranges or parameters for the specific elements of the set and remote control;
- **Easy adaptation to an existing installation** – most boilers have an additional space for the heating elements;
- **Safety** – safe voltage value, max 80V DC;
- **Long warranty period** – 25 years of warranty for the PV modules, 3 years for the ISG-3 with the possibility of extending the service.



No cost of heating



Reduction of the CO₂ emission



Constans access to the hot water



ISO 9001; ISO 14001; OHSAS 18001

POLISH MANUFACTURER OF THE PV MODULES

Inverters Distributor K A C O



Technical specification

Zestaw PVCWU.3

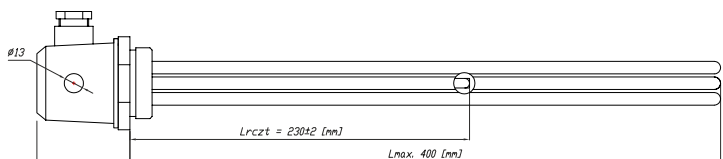
System components	Type		PVCWU.3-2	PVCWU.3-4	PVCWU.3-6	PVCWU.3-8
PV Modules	SV60P.4-260	[pcs]	2	4	6	8
Intelligent Heater Controller	ISG-3	[pcs]			1	
Heating Set	3 DC	[pcs]			1	
Wiring (between modules & ISG-3)	PV	[m]			20	

PV Modules Set		PVCWU.3-2	PVCWU.3-4	PVCWU.3-6	PVCWU.3-8
Number of SV60P.4-260 Modules	[pcs]	2	4	6	8
Nominal Power (-0;+5W)	[W]	520	1040	1560	2080
Total weight	[kg]	38	76	108	144
Modules area	[m ²]	3,4	6,8	10,2	13,6

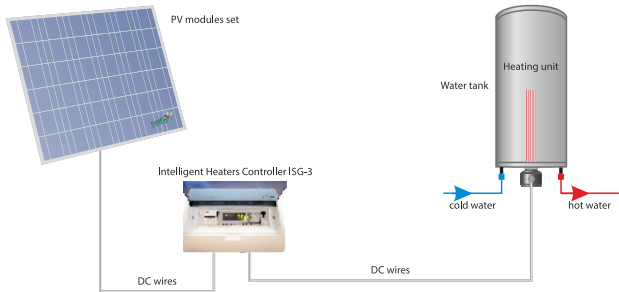
Intelligent Heater Controller	
Minimal DC modules starting voltage	[V] 30
DC Modules voltage range	[V] 9 – 78
Maximum heater energy AC 230V	[VA] 1600
Operational temperature	[°C] 0 - 30
Measurements	[mm] 303 x 212 x 98
Degree of protection	IP40
Communicative interface	RS485
Protection against reverse polarity	yes
DC Disconnecter	yes
AC Switch	yes
Connections	MC4, Cable glands
Signal outlets	- 3 contactless electrical transmitters DC NO - 1 transmitter AC
Signalization	- optical – a LED diode and an LCD screen
Parameters' visualization	- instantaneous power - energy produced daily* / total produced energy - voltage - water temperature - date and time - AC heater operation
Device functions	- sets maximum water temperature inside a tank (60-80)°C * - sets AC heater shut down and turn on temperature - sets the duration of the day phase (day/night) - manual AC heater turn on/off - resets energy counter - overview of the system operation graphs*

*from the PC trough a RS485 and an external software

Heating Set		PVCWU.3-2	PVCWU.3-4	PVCWU.3-6	PVCWU.3-8
Nominal DC power	[W]	520	1040	1560	2080
Maximum DC power	[W]	780	1560	2340	3120
Nominal DC voltage	[V]	30	60		
Length of the connecting wires	[m]	3			

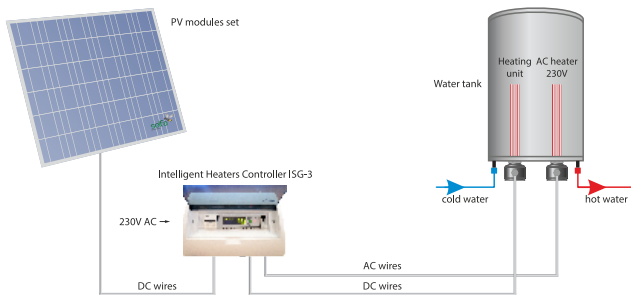
Measurements [mm] *there is a possibility to make a 5/4" or 2" thread or make the heating set adjusted to the client's personal requirements	
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The suggestions for the application of the autonomic set for heating water PVCWU.3



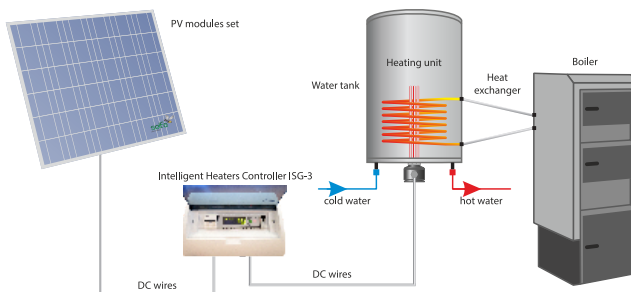
1. A fully automatic water heating

The kit is the easiest solution when the user has no access to the electric energy source (in the gardens, recreational plots, summer houses). Water is heated with the electric energy produced only by the PV modules set. Such solution guarantees access to the hot water almost all year round! Simple construction and easy handling help with assembling and using the set.



2. Heating water through two independent sources: PV + electric grid

There are two heaters placed inside the water boiler. One of them is the part of the autonomic set for heating water PVCWU.3, the other one is powered by the electric grid. The suggested solution guarantees that the water temperature will never fall below the setpoint temperature. The priorities for each source are set by the user. The set can be adjusted in every household to reduce electricity costs. Additional equipment enables the individual programming of the AC heater.

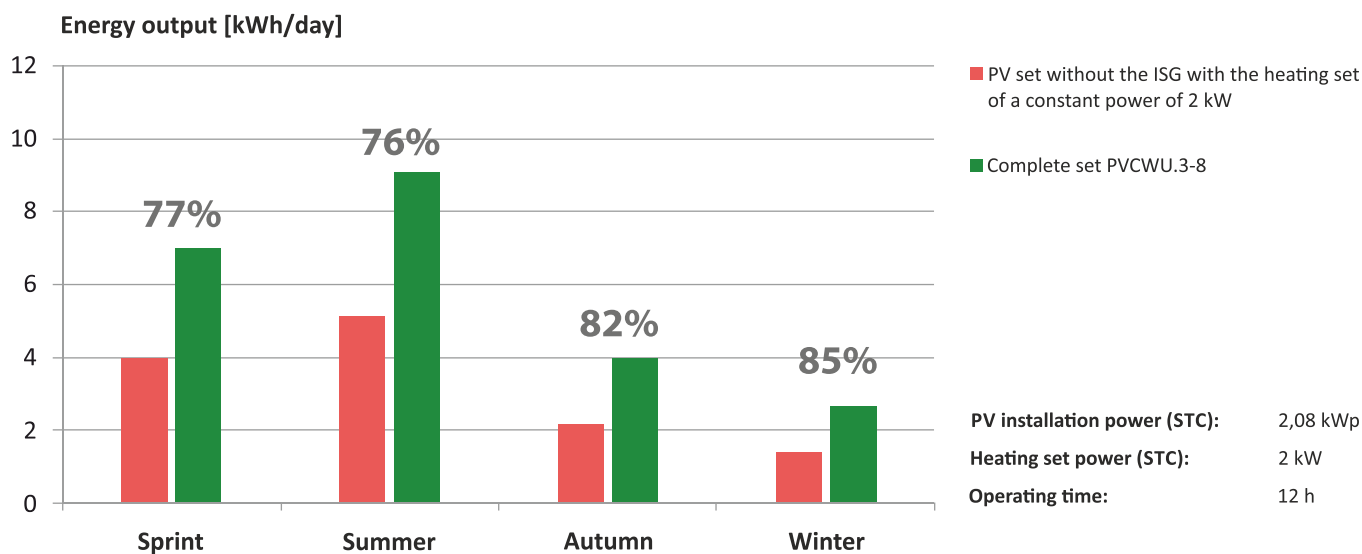


3. Heating water through two independent energy sources: PV + other source

There are two thermal energy sources placed inside the tank: the heating set – the part of the autonomic set for heating water PVCWU.3 and the heat exchanger. The adequate set programming allows for an independent operation of two energy sources which reduces the costs of the fuel media purchase and provides a constant access to the hot water. Adjusting the external controller allows to set priorities for each energy source.

The suggested solutions are only exemplary. It is possible to design a solution fitting to personal requirements.

Profits from having PV set with the ISG



The given values have the demonstration character and can differ from the real time profits made while using the systems. The research has been conducted on a chosen day of each season.

