

Operating manual

Solareg II VISION plus



Microcontroller-controlled temperature difference controller for solar thermal systems

Explanation of the graphic symbols



Attention!
Symbol indicates possible dangers and errors



Attention 230V~ voltage!
Symbol indicates risks posed by lethally high voltages.



List



Please note!



Information for handling / special features



Implementation / procedure



Test / check

Table of content

1	Application area / device features	3
1.1	Application area	3
1.2	Device features	3
2	Safety instructions	3
3	Mounting the device	4
3.1	Opening the device	4
3.2	Wall mounting	4
3.3	Connections	5
3.4	Temperature sensor connection	5
4	Short descriptions and device operation	5
4.1	Display layout	5
4.2	Operating the device	6
5	Menu structure	6
5.1	"Info" menu	6
5.2	"Programming" menu	7
5.3	"Manual operation" menu	8
5.4	"Basic Setup" menu	8
6	System diagrams	10
7	Controller functions	15
7.1	General controller functions	15
7.1.1	Dual storage tank systems (diagram 1 and 2)	15
7.1.2	RPM control	15
7.1.3	Independent controller	16
7.1.4	Tube collector or start function	18
7.2	Protective functions	18
7.2.1	Collector protection	18
7.2.2	Recooling (Holiday function)	18
7.2.3	System protection	19
7.2.4	Anti-freeze protection	19
7.3	Additional function	19
7.3.1	Energy yield measurement	19
8	System monitoring	20
8.1	Sensor monitoring	20
8.2	Flow monitoring	20
9	Troubleshooting	21
9.1	Faults with error messages	21
9.2	Faults without error messages	22
10	SOLAREG II Specifications	23
11	Resistance table PT1000	23
12	Warranty conditions	24
13	Declaration of conformity	24

1 Application area / device features

1.1 Application area

SOLAREG II VISION *plus* controllers are high-performance microprocessor-controlled units for controlling the functions of solar thermal systems. The SOLAREG II VISION *plus* perfectly controls solar power systems equipped with up to two collectors or two storage tanks and can be used for numerous system types. The controllers are designed for use in dry rooms as well as residential, business and commercial applications. Prior to commissioning the device, make sure to verify that the intended use complies with the applicable regulations.

1.2 Device features

The SOLAREG II generation of controllers is equipped with the following features:

- Intuitive operating menu with graphic symbols and four operating buttons
- Illuminated display
- Adjustable control values
- Solar circuit pump RPM control or switching control
- Start function for systems equipped with tube collectors
- Integrated operating hours counter for storage tank charging
- Extensive functions for system monitoring that display symbols to indicate errors and faults
- Integrated energy yield measurement (optional, only in conjunction with the yield measurement set)
- Storage of all values even during a prolonged mains power supply outage
- Various protective functions, such as system protection, collector protection, recooling and anti-freeze protection
- Individually operated independent controller that can be programmed with three time frames
- Generous wiring space
- Real-time clock function

Available accessories:

- Temperature sensor PT1000
- Yield measurement set (incl. tube sensor)
- Sensor connection box
- Immersion sleeves

2 Safety instructions

- Always completely disconnect the device from the operating voltage before performing installation or wiring work on the electrical equipment. Never mix up the connections of the protective low voltage areas (sensor, flow sensor) with the 230V connections. Otherwise, the device will be destroyed. The device and the connected sensors may carry deadly voltages.
- Solar power systems can reach high temperatures. Such temperatures pose a risk of burns! Exercise caution when installing the temperature sensors!
- Mount the SOLAREG II controller in a position where it will not be subjected to excessive operating temperatures ($> 50^{\circ}\text{C}$) by any external heat sources. For safety reasons, the system may only remain in manual operation for testing purposes. In this operating mode, the system does not monitor for maximum temperatures and sensor functions. If there is any recognisable damage to the controller, cables or the connected pumps and valves, the system must not be started.



All installation and wiring work must only be carried out on the controller when the device is disconnected from the power supply. The SOLAREG II must only be connected and commissioned by qualified personnel. In doing so, the applicable safety regulations must be observed.



The controller must only be installed in dry and non-explosive areas. Mounting the controller on an inflammable surface is prohibited



Prior to switching on or commissioning the device: make sure to close the cover until both sides securely lock into place!

3 Mounting the device

3.1 Opening the device

Prior to opening the device, make sure to disconnect the mains voltage and ensure that it cannot be switched back on again! The upper part of the housing is locked to the lower part using two latches. Pull the side pieces (cover plates) of the upper part of the housing outwards (see picture) to unlatch it and upwards until the cover plate is opened.



3.2 Wall mounting

The device is mounted on the marked points. A drilling template is provided with the device. Insert the "Quick Info" card provided with the device into the pocket provided on the back of the device. The "Quick Info" card provides the user with an overview of the functions to facilitate rapid device operation.



3.3 Connections

The following points must be followed for the 230V connections:

- In case of a fixed mains connection, there must be a switch installed outside the controller that can disconnect the device from the mains power supply. This switch is not required if the mains supply is connected using a cable and an earthed mains plug.
- The controllers are designed to operate using a 230V/50Hz mains supply. The pumps and valves to be connected must be designed for this voltage!
- All protective conductors must be connected to terminals marked with PE.
- The neutral conductor terminals (N) are electrically connected and are not switched!
- All switching outputs (A1/A2/A3) are electronic 230V~ N/O contacts. If potential-free contacts are required, the appropriate corresponding accessories are available



3.4 Temperature sensor connection

The SOLAREG II VISION PLUS devices use PT1000 precision platinum temperature sensors. Depending on the system type and functional scope, 2 to 6 sensors are required.

Mounting / wiring the temperature sensors:

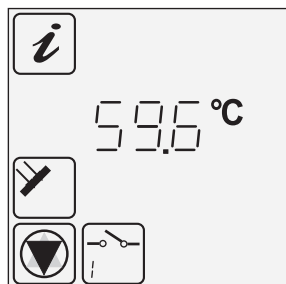
- Mount the sensors on the collector and the storage tank. Ensure proper heat transfer and use heat-conducting paste if necessary.
- Cross-sections for cable extensions (shielded):
 - up to 15m 2 x 0.5 mm²,
 - up to 50m 2 x 0.75 mm².The shield is connected to the earth (PE).
- Connect the temperature sensors according to the system diagram. The polarity of both conductors for the temperature sensors is irrelevant.
- Sensor cables must be laid separately from 230V wires.
- Sensor connection boxes equipped with surge protection should be used for collector sensors and cable extensions.



4 Short descriptions and device operation

4.1 Display layout

During actual operation, these symbols are **only displayed for selection** once depending on the menu position.



- ◀ Active menu in the menu levels
- ◀ Allocation of the current display
- ◀ Current measured values, times or controller states: here 59.6C°.
- ◀ Measuring point
- ◀ Controller state/messages

Display symbols

All possible display symbols are shown below.




4.2 Operating the device





The SOLAREG II controller is convenient and easy to operate using four operating buttons. Using the operating buttons, you can:

- Access display values
- Perform device settings

The graphic display symbols allow you to easily navigate through the operating structure.

The operating buttons have the following functions:


 The display illuminates when any button is pressed.











Operating buttons	Function	Description
	"Up" "+"	<ul style="list-style-type: none"> ■ Increase menu items Value change: increases the displayed value by 1; when the button is held longer, the value increases continuously
	"Scroll left" "Exit" "Cancel"	<ul style="list-style-type: none"> ■ Scroll left in the main menu ■ Exit a menu ■ Exit a menu item ■ Cancel a value change without storing it
	"Access" "Down" "-"	<ul style="list-style-type: none"> ■ Access a main menu, Decrease menu items ■ Change a value: decreases the displayed value by 1; when the button is held longer, the value decreases continuously
	"Scroll right" "Select" "Confirm"	<ul style="list-style-type: none"> ■ Scroll right in the main menu ■ Select a menu item ■ Confirm a value change and store it







5 Menu structure

5.1 "Info" menu

The following measured and yield values are displayed in the Info menu:


 The number of displayed values depends on the activated additional functions.












Display e.g.		Meaning	Can be reset
75°C		Displays current collector temperature (1/2)	No
min 12°C		Displays minimum collector temperature (1/2) can be reset to the current temperature	Yes
max 105°C		Displays maximum collector temperature (1/2) can be reset to the current temperature	Yes
52°C		Displays current storage tank temperature (1/2)	No
min 40°C		Displays minimum storage tank temperature (1/2) can be reset to the current temperature	Yes
max 67°C		Displays maximum storage tank temperature (1/2) can be reset to the current temperature	Yes
60°C		Displays current collector return temperature	No
60°C	 	Heating, cooling, temperature difference controller heat source sensor T1 – T6 are adjustable	No



Display e.g.		Meaning	Can be reset
35°C	 	Temperature difference controller for heat consumer	No
25°C		Anti-freeze protection sensor (T1 – T6 adjustable) Displays general temperature measuring point (T6) (hidden, if not connected)	No
1234 h		Operating hours for charging storage tank Can be reset to 0 h	Yes
927 kWh		Energy yield for storage tank Can be reset to 0 kWh	Yes


5.2 "Programming" menu

The operating parameters are displayed and can be changed, if necessary, in the Programming menu. The preset values generally ensure fault-free system operation.

 The number of displayed values depends on the activated additional functions.

Display e.g.		Meaning	Value range	Typical setting	Current setting
max 65°C		Storage tank 1/2: Maximum permissible temperature	15 – 95°C	65°C	
dT max 7K		Storage tank 1/2: Switch-on difference	3 – 40K	7K	
dT min 3K		Storage tank 1/2: Switch-off difference	2 – 35K	3K	
min 100	 	Set the minimum pump capacity using the RPM control 100% = RPM control off	30% – 100%	100%	
13:21		Time	0:00 – 23:59	12:00	
min 40°C		Switch-on temperature for the heating / cooling functions	20 – 90°C	40°C	
dT 10K		Hysteresis for the heating / cooling functions	1 – 30K	10K	
max 65°C		Difference controller: maximum temperature of the heat consumers Tmax	15 – 95°C	65°C	
min 15°C		Temperature difference controller: minimum temperature of the heat source Tmin	0 – 95°C	15°C	
dT max 7K		Temperature difference controller: Hysteresis dTmax	3 – 40K	7K	







Display e.g.		Meaning	Value range	Typical setting	Current setting
dT min 3K		Temperature difference controller: Hysteresis dTmin	2 – 35K	3K	
min 0:00 1(2,3)		Time frame 1(2,3): Start	0:00 – 23:59	0:00	
max 23:59 1(2,3)		Time frame 1(2,3): Stop	0:00 – 23:59	23:59	
min 6:00 4		Time frame 1(2,3): Start for tube collector function	0:00 – 23:59	6:00	
max 20:00 4		Time frame 1(2,3): Stop for tube collector function	0:00 – 23:59	20:00	


 Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

5.3 "Manual operation" menu

Automatic operation is switched off during manual operation. The outputs can be manually switched on and off for servicing and testing purposes.

Once the menu has been exited or after 8 hours, automatic operation is reactivated.

Display		Meaning	Value range
  1		Manually switching on / off the switching output A1 (pump 1)	0 = Off 1 = On
  2		Manually switching on / off the switching output A2 (pump 2 / valve 1)	0 = Off 1 = On
 3		Manually switching on / off the switching output A3 (cooling, thermostat or temperature difference controller function)	0 = Off 1 = On

 Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

5.4 "Basic Setup" menu

The hydraulic diagrams and additional functions are displayed in the Basic Setup menu. Settings must only be changed by a specialised technician. Settings may only be adjusted in the menu:

a) within one minute after the device has been switched on

or

b) after simultaneously pressing the buttons: 

Display Line	Value	Meaning	Value range	Factory setting	Current setting
0	0	Collector protection function	0 = Off 1 = On	0 = Off	
1	120°C	Collector protection function	110 – 150°C	120°C	
2	0	Recooling function (only if the collector protection is on)	0 = Off 1 = On	0 = Off	
3	40°C	Recooling storage tank temperature	30 – 90°C	40°C	

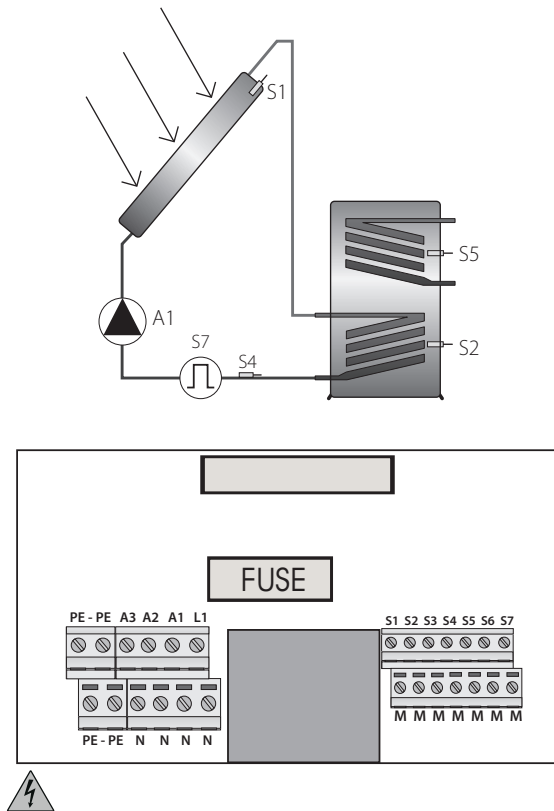
Display Line	Value	Meaning	Value range	Factory setting	Current setting
4	0	Tube collector function, time-controlled	0 = Off 1 = On	0 = Off	
5	0	Function Energy yield measurement	0 = Off 1 = On	0 = Off	
6	0	Energy yield measurement Sets glycol type	0 – 10	0	
7	50	Energy yield measurement Glycol mixture	0 – 100% 5% increments	50	
8	1.0	Energy yield measurement Litre/pulse, flow sensor	0.5 – 25 l/l 0.5l increments	1.0	
9	240	Multiple storage tank systems Controller response time in s	30 – 480	240	
10	1	First-priority storage tank selection	1 – 2	1	
11	0	Anti-freeze function	0 = Off 1 = On	0	
12	6	Anti-freeze function Reference sensor selection	1 – 6	6	
13	3	Anti-freeze function Start temperature	-20°C – +7°C	3	
14	0	Independent controller function	0 = Off 1 = Cooling 2 = Heating 3 = Temp. difference controller	0	
15	5	Independent controller Reference sensor	1 – 6	5	
16	0	System diagram	0 – 4	0	

Energy yield measurement (glycol type selection)

0	Anro	6	Tyfocor L5.5
1	Ilexan E, Glythermin	7	Dowcal 10
2	Antifrogen L	8	Dowcal 20
3	Antifrogen N	9	Dowcal N
4	Ilexan E	10	Tyfocor LS
5	Ilexan P		

6 System diagrams

6.1 Diagram 0: 1 collector, 1 storage tank



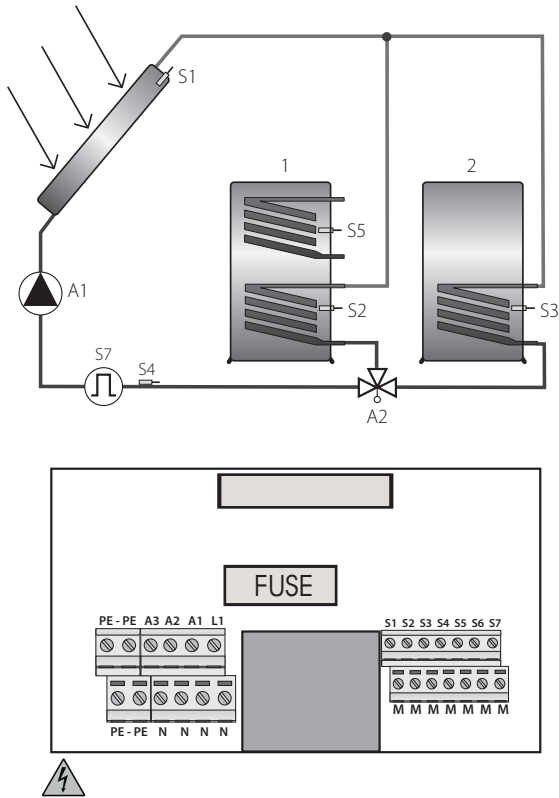
230V connections

L	Mains phase
N	Neutral conductor - mains and outputs
A1	Solar circuit pump (switching output 1)
A2	No function
A3	Independent controller (switching output 3)

Sensor connections

S1	Collector sensor
S2	Lower storage tank
S3	No function
S4	Collector return
S5	Optional: cooling or heating or temp. difference controller
S6	Option: independent controller; other temperature display
S7	Option: flow meter

6.2 Diagram 1: 1 collector, 2 storage tanks, pump valve



i Type 1: one collector, two storage tanks with a three-way valve:

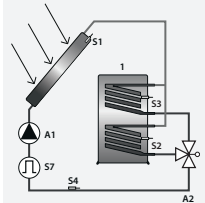
■ A2 = Off:

The valve must establish the connection between the collector and storage tank 1.

i Installation notes for type 1 and type 3 with a three-way valve:

The specified hydraulic diagrams are recommendations. The following applies, regardless of the valve type displayed.

i Alternative diagram:



230V connections

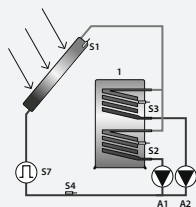
L	Mains phase
N	Neutral conductor - mains and outputs
A1	Solar circuit pump (switching output 1)
A2	Valve (switching output 2)
A3	Independent controller (switching output 3)

Sensor connections

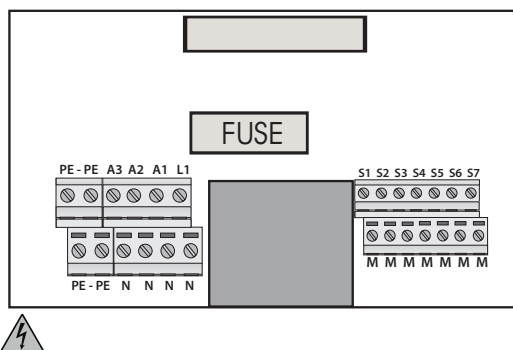
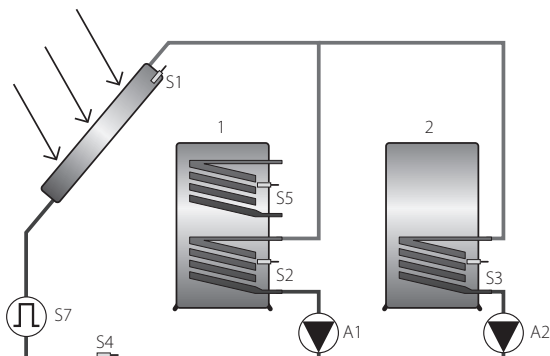
S1	Collector sensor
S2	Lower storage tank 1
S3	Lower storage tank 2
S4	Collector return
S5	Optional: cooling or heating or temp. difference controller
S6	Option: independent controller; other temperature display
S7	Option: flow meter



Alternative diagram:



6.3 Diagram 2: 1 collector, 2 storage tanks with 2 pumps



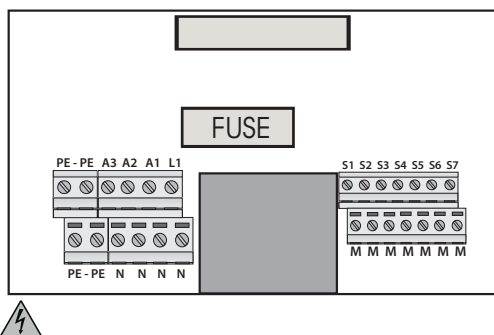
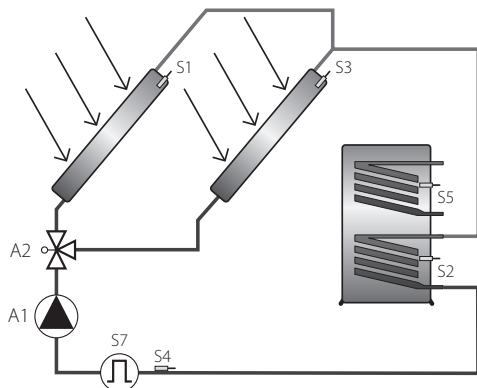
230V connections

L	Mains phase
N	Neutral conductor - mains and outputs
A1	Solar circuit pump (switching output 1)
A2	Pump (switching output 2)
A3	Independent controller (switching output 3)

Sensor connections

S1	Collector sensor
S2	Lower storage tank 1
S3	Lower storage tank 2
S4	Collector return
S5	Optional: cooling or heating or temp. difference controller
S6	Option: independent controller; other temperature display
S7	Option: flow meter

6.2 Diagram 3: 2 collectors, 1 storage tank, pump valve



i Type 3: two collectors, one storage tank with a three-way valve:

■ The valve must establish the connection between collector 1 and the storage tank.

i Installation notes for type 1 and type 3 with a three-way valve:

The specified hydraulic diagrams are recommendations. The following applies, regardless of the valve type displayed.

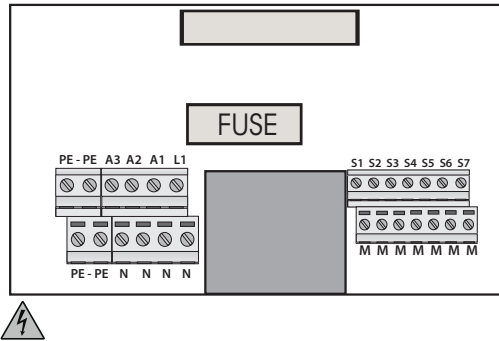
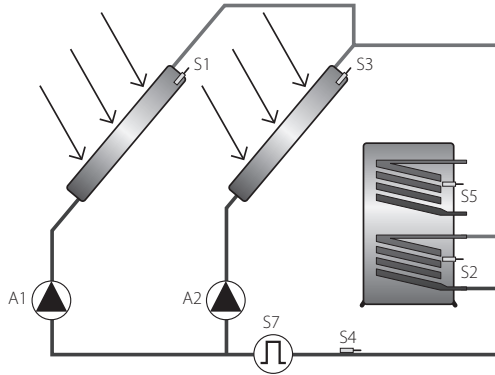
230V connections

L	Mains phase
N	Neutral conductor - mains and outputs
A1	Solar circuit pump (switching output 1)
A2	Valve (switching output 2)
A3	Independent controller (switching output 3)

Sensor connections

S1	Collector array 1
S2	Lower storage tank
S3	Collector array 2
S4	Collector return
S5	Optional: cooling or heating or temp. difference controller
S6	Option: independent controller; other temperature display
S7	Option: flow meter

6.5 Diagram 4: 2 collectors, 1 storage tank with 2 pumps



230V connections

L	Mains phase
N	Neutral conductor - mains and outputs
A1	Solar circuit pump 1 (switching output 1)
A2	Solar circuit pump 2 (switching output 2)
A3	Independent controller (switching output 3)

Sensor connections

S1	Collector array 1
S2	Lower storage tank
S3	Collector array 2
S4	Collector return
S5	Optional: cooling or heating or temp. difference controller
S6	Option: independent controller; other temperature display
S7	Option: flow meter

7 Controller functions

7.1 General controller functions


The controller compares the temperatures of the various measuring points and optimally charges the storage tank. If the collector temperature exceeds the storage tank temperature, the solar circuit pump is switched on. Monitoring and protection functions ensure safe operation.

7.1.1 Dual storage tank systems (diagram 1 and 2)

Examples of dual storage tank systems:

- two separate storage tanks
- one stratified storage tank
- one storage tank and a swimming pool, etc.

The controller detects the temperature changes in the collector and the storage media, determines the primary and secondary charging while, of course, taking into consideration the charging duration as well as an interruption of this function along with a waiting period to monitor the collector temperature.




"Basic Setup" menu 				
Display Line	Value	Meaning	Value range	Factory setting
9	240	Controller response time in s	30 – 480	240
10	1	First-priority storage tank selection	1 – 2	1



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

7.1.2 RPM control

The A1 and A2 outputs can be operated using an RPM control.

"Programming" menu 				
Display		Meaning	Value range	Typical setting
min 100	 	Set the minimum pump capacity using the RPM control 100% = RPM control off	30% – 100%	100%

7.1.3 Independent controller

This function is reserved for output 3 and can be allocated the following functions:

- Cooling
- Heating
- Difference controller


The temperature sensor for the temperature source can be selected as required.




Cooling

If the measured temperature exceeds the target value, output A3 is switched on until the measured temperature falls below the target value hysteresis.



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

"Basic Setup" menu 				
Display Line	Value	Meaning	Value range	Factory setting
14	1	The cooling function, thermostat function or the temperature difference controller function can also be selected.	0 = Off 1 = Cooling 2 = Heating 3 = Temperature difference controller	0
15	5	Sensor selection for the independent controller (source)	1 – 6	5


"Programming" menu 				
Display		Meaning	Value range	Typical setting
max 40°C		Switch-on temperature of the cooling function	20 – 90°C	40°C
dT 10K		Cooling function hysteresis	1 – 30K	10K
min 0:00 1(2,3)		Time frame 1(2,3): Start	0:00 – 23:59	0:00
max 23:59 1(2,3)		Time frame 1(2,3): Stop	0:00 – 23:59	23:59




Heating

If the measured temperature is below the target value, output A3 is switched on until the measured temperature reaches the target value hysteresis.



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

"Basic Setup" menu 				
Display Line	Value	Meaning	Value range	Factory setting
14	2	The cooling function, thermostat function or the temperature difference controller function can also be selected.	0 = Off 1 = Cooling 2 = Heating 3 = Temperature difference controller	0
15	5	Sensor selection for the independent controller (source)	1 – 6	5


"Programming" menu 				
Display		Meaning	Value range	Typical setting
min 40°C		Switch-on temperature of the heating function	20 – 90°C	40°C
dT 10K		Heating function hysteresis	1 – 30K	10K
min 0:00 1(2,3)		Time frame 1(2,3): Start	0:00 – 23:59	0:00
max 23:59 1(2,3)		Time frame 1(2,3): Stop	0:00 – 23:59	23:59

Temperature difference

A minimum temperature limit (e.g. solid fuel boiler) and maximum temperature limit can be set for the independent temperature difference controller.






If the difference between the measuring points exceeds the entered hysteresis, A3 is switched on.

A maximum temperature can also be defined for the energy load and a minimum temperature can be defined for the energy source.

"Basic Setup" menu 				
Display		Meaning	Value range	Factory setting
Line	Value			
14	3	The cooling function, thermostat function or the temperature difference controller function can also be selected.	0 = Off 1 = Cooling 2 = Heating 3 = Temperature difference controller	0
15	5	Sensor selection for the independent controller (source)	1 – 6	5



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.


"Programming" menu 				
Display		Meaning	Value range	Typical setting
max 65°C		Maximum temperature of the heat sink max in °C	15 – 95°C	65°C
min 15°C		Minimum temperature of the heat source in °C	0 – 95°C	15°C
dT max 7K		Hysteresis dT max in K	3 – 40K	7K
dT min 3K		Hysteresis dT min in K	2 – 35K	3K
min 0:00 1(2,3)		Time frame 1(2,3): Start time for the independent controller	0:00 – 23:59	0:00
max 23:59 1(2,3)		Time frame 1(2,3): Stop time for the independent controller	0:00 – 23:59	23:59


7.1.4 Tube collector or start function

If this function is activated, the solar circuit pump is started for the entered time frame regardless of the actual collector temperature. This allows the medium to reach the measuring point to determine the collector temperature.



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

"Basic Setup" menu 				
Display	Meaning		Value range	Factory setting
Line	Value			
4	1	Special function for the time-controlled circulation when operating tube collectors	0 = Off 1 = On	0 = Off

"Programming" menu 				
Display	Meaning		Value range	Typical setting
min 6:00	Time frame 1(2,3): Start for tube collector function		0:00 – 23:59	6:00
4				
max 20:00	Time frame 1(2,3): Stop for tube collector function		0:00 – 23:59	20:00
4				

7.2 Protective functions

The controller is equipped with the following protective functions.

7.2.1 Collector protection

If the storage tank has reached the set maximum temperature and the collector temperature exceeds the set collector protection temperature (line 1), the solar circuit pump is switched on. The solar circuit pump is switched off once the collector temperature is 10K below the maximum value.

In this case, the storage tank is charged up to 95°C regardless of the set maximum temperature.


7.2.2 Recooling (Holiday function)

The collector protection function is only effective if the storage tank temperature is below the temperature limit (95°). Therefore, during the holiday period, for example, the storage tank is discharged at night to the set recooling temperature.

Make sure not to activate this function together with the backup heating!



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

"Basic Setup" menu 				
Display	Meaning		Value range	Factory setting
Line	Value			
0	0	Switches on or off the collector protection function	0 = Off 1 = On	0 = Off
1	120°C	Temperature at which the collector protection function is activated	110 – 150°C	120°C
2	0	Switches on or off the recooling function (only if the collector protection is on)	0 = Off 1 = On	0 = Off
3	40°C	Temperature to which the storage tank is recoolled once the collector protection function is activated	30 – 90°C	40°C

7.2.3 System protection

If the collector temperature exceeds the collector protection temperature (see 7.2.2) by 10K, the solar circuit pump is switched off to protect the system components.


If the collector temperature drops below the collector protection temperature, the solar circuit pump is switched on.

The function is always activated.

7.2.4 Anti-freeze protection

This function must be activated if the water or glycol mixture can freeze.

If the temperature at the anti-freeze sensor (line 12) drops below the set value, the solar circuit pump is activated and heats the solar circuit using the heat exchanger in the storage tank.

"Basic Setup" menu 				
Display Line	Value	Meaning	Value range	Factory setting
11	0	Switches on or off the anti-freeze function	0 = Off 1 = On	0
12	6	Selects the sensor for the anti-freeze function	1 – 6	6
13	3	Temperature at which the anti-freeze function is activated	-20°C – +7°C	3



Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

7.3 Additional function


7.3.1 Energy yield measurement

The energy yield of the solar power system is calculated and displayed using the temperature difference between the collector and the collector return temperature and the measured flow rate.

Required accessories, **energy yield set** consists of:

Flow sensor

Tube sensor

"Basic Setup" menu 				
Display Line	Value	Meaning	Value range	Factory setting
5	0	Switches on or off the energy yield measurement function	0 = Off 1 = On	0 = Off




Settings and changes in this menu must only be carried out by a specialised technician. Incorrect settings can damage or adversely affect the function of the solar power system.

8 System monitoring




If an error occurs, the flashing  symbol is generally displayed.

8.1 Sensor monitoring

The connected sensors and sensor cables are monitored for interruptions and short-circuits. Errors are indicated by the  symbol. You can find the error source by scrolling up or down the Info menu.

8.2 Flow monitoring

The controller is programmed to display a message if the flow is interrupted, e.g. pump fault or if vapour is in the system. This message, however, does not switch off the pump.











"Basic Setup" menu 	
Display	Meaning
 + 	No circulation in the solar circuit

9 Troubleshooting

System faults are distinguished into two general categories:

- Faults that are automatically detected by the controller and therefore can be displayed using error messages
- Faults that the controller cannot detect

9.1 Faults with error messages

Error indication in the display	Possible causes	Measures
   Flashing	<ul style="list-style-type: none"> ■ Sensor cable is interrupted ■ Defective sensor 	<ul style="list-style-type: none"> 🔧 Check cable 🔧 Check sensor resistance and replace sensor if necessary
   Flashing	<ul style="list-style-type: none"> ■ Short-circuit in the sensor cable ■ Defective sensor 	<ul style="list-style-type: none"> 🔧 Check cable 🔧 Check sensor resistance and replace sensor if necessary
Circulation error: No flow  +  Flashing	<ul style="list-style-type: none"> ■ Error in the pump connection ■ Defective pump ■ Air in the system ■ Defective flow meter 	<ul style="list-style-type: none"> 🔧 Check wiring 🔧 Replace pump 🔧 Deaerate the system 🔧 Check whether the flow meter impeller moves freely when the system is running (if visible)
Additional display for energy yield measurement:  	<ul style="list-style-type: none"> ■ Defective connection to the flow meter ■ Sensor cable is interrupted ■ Defective sensor 	<ul style="list-style-type: none"> 🔧 Check cable 🔧 Check cable 🔧 Check sensor resistance and replace sensor if necessary



Faults that affect the 230V/A mains power supply must only be remedied by a specialist!

9.2 Faults without error messages

Faults and malfunctions that cannot be displayed as well as possible causes and their error source can be identified using the following table. If you cannot remedy the fault using the description below, contact the supplier or installer.

Problem	Possible causes	Measures
Display does not function 	■ 230V mains voltage not available	Switch on or connect controller Check the connection's main fuse
	■ Defective fuse inside the device	Check the fuse*, replace with a new type 2A/T, if necessary. Check the 230V components for short-circuits
	■ Defect device	Contact the supplier
	■ Controller is in manual operation	Exit "Manual" operation.
Outputs are not switched on	■ Switch-on condition is not satisfied.	Wait until switch-on condition is satisfied.
	■ Connection to the pump interrupted.	Check the cable leading to the pump
	■ Pump is blocked.	Free the pump
"Pump" symbol rotates, but the pump is not on 	■ No voltage present at the switching output.	Contact the supplier.
	■ Sensor cables are installed near the 230V cables	Relocate sensor cables, shield sensor cables
	■ Long sensor cables extended without shielding	Shield sensor cables
Temperature display strongly fluctuates at short intervals	■ Defect device	Contact the supplier

10 SOLAREG II Specifications



Subject to change in accordance with technical advances!

Housing	
Material	100% recyclable ABS housing for wall mounting
Dimensions L x W x D in mm, weight	175 x 134 x 56; approx. 360 g
Protection class	IP20 according to DIN 40050, IEC 529, VDE 0470, EN 60529
Electrical specifications	
Operating voltage	AC 230 Volts, 50 Hz, -10 – +15%
Radio interference level	N according to VDE 0875
Max. cable cross-section 230V connections	2.5 mm ² fine-wire/single wire
Temperature sensor / temperature range	PT1000 1 kΩ at 0°C, - 25°C - 200°C
Testing voltage	4 kV 1 min according to EN 60730/DIN, VDE 0631, IEC 60664/IEC
Wiring diagram	230V~/
Power of each switching output	1A / approx. 230VA for cos φ = 0.7-1.0
Total power of all outputs	2A / approx. 460VA maximum
Fuse protection	Fine-wire fuse 5 x 20mm, 2A/T (2 amperes, time lag fuse)
Miscellaneous	
Recommended flow sensor	PVM 1.5/90 1500l/h, Tmax >=90°C, 1l/pulse
Operating temperature	0 – 50°C
Storage temperature	-10 – +65°C
Humidity	max. 60 %

11 Resistance table PT1000

The temperature sensors can be checked for proper function using the following temperature resistance table and an ohmmeter:

Temperature in °C	Resistance in Ohm	Temperature in °C	Resistance in Ohm
-30	882	60	1232
-20	921	70	1271
-10	960	80	1309
0	1000	90	1347
10	1039	100	1385
20	1077	120	1461
30	1116	140	1535
40	1155	200	1758
50	1194		

12 Warranty conditions

The SOLAREG II controllers are carefully produced and tested on an automatic testing station. If any failures occur, first check if there are any operation / setting or system errors. Furthermore, check the pump and temperature sensor connections.

Oventrop GmbH & Co. KG provides a 2-year warranty starting at the date of purchase and according to the following conditions.

- a) The warranty comes into effect if the purchased good exhibits a material or quality defect. If the defect is caused by improper handling, by exceeding the permitted values stated in the specifications, improper wiring, invalid technical modifications to the device performed by the buyer or by another company other than Oventrop GmbH & Co. KG, the warranty shall be void.

- b) The warranty requires a written notice that describes the defect in detail as well as a copy of the customer invoice.

Oventrop GmbH & Co. KG can choose to fulfil the guarantee, at its own discretion, by one of the following measures

- Repair (reconditioning) or
- Delivery of a fully functional replacement product

The device shall be repaired within 1 month after Oventrop GmbH & Co. KG has received it.

If the device is not repaired within the two repairs attempts, the buyer is entitled to delivery of a fully functional replacement product.

If a replacement product is delivered, a new warranty that corresponds to these conditions shall come into effect.

- c) Any further warranty (redhibitory action, reduction of price) is excluded.

Warranty claims may only be submitted by the customer and are non-transferable.

If a defect occurs during the warranty period, please contact the supplier / installer. When returning the device for warranty service, please make sure to send a description of the error and, if possible, the system diagram along with the wiring diagram.

13 Declaration of conformity

We, Oventrop GmbH & Co. KG, declare under our sole responsibility that the SOLAREG type 1316 product complies with the following standards:

DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 12.2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC

Law on the electromagnetic compatibility of equipment (EMC) of 26 February 2008

DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the approximation of the laws of the Member States concerning electrical equipment for use within certain voltage limits

DIN EN 61326-1, VDE 0843-20-1:2006-10 Electrical measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2005); German version EN 61326 -1:2006

DIN EN 61326-2-2, VDE 0843-20-2-2:2006-10 Electrical measurement, control and laboratory use - EMC requirements - Part 2-2: Particular requirements - Test, operating conditions and performance requirements for portable test, measurement and monitoring equipment for use in low voltage power supply systems (IEC 61326-2-2:2005); German version EN 61326-2-2:2006