

ADVANCED SOLAR CONTROLLER



USER GUIDE

GB

Advanced Solar controller **1-18**

MAIN CHARACTERISTICS

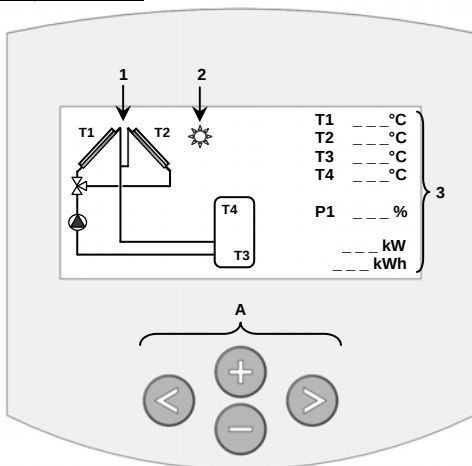
- Large graphic display with backlight.
- Easy use interface (4 keys with scroll menu).
- Several languages available.
- Energy measuring with PC interface to save the recorded statistics (Temperatures, Power, Energy, Time operation...)
- Graphic view for Temperature, power, energy...
- 5 working systems with several extra functions possibility.
- 5 Temperature sensors (PT1000 type)
- 1 Flow meter input (for energy measurement).
- 2 Pump outputs (0 to 100% drive).
- Pump exercise function.
- 1 Extra output (to control additional heat, cooling system...)
- Automatic, Off or Manual Test mode.
- Sensors Auto checks (Short circuit and breaks)
- Collector type choice (Tube or panel).
- Collector protection (Freeze and over heat)
- Permanent memory storage.

TECHNICALS CHARACTERISTICS

Operating temperature	0°C - 50°C
Electrical Protection Fusible	IP42 4A 250Vac (5x20mm)
Power supply	230Vac +/- 10% 50Hz
<u>Outputs:</u> P1 (Main pump with speed regulation): P2 (Pump with speed regulation or valve): P3 (Extra, Additionnal heat, cooling...)	Triac 0,5A 230VAC. Triac 0,5A 230VAC Relay 2A 250VAC
<u>Inputs:</u> T1 (Collector1): T2 (Collector2 or collector return): T3 (Tank1): T4 (To control extra output): T5 (Tank2 or collector return): T6 (Flow meter for energy measurement):	PT 1000 type PT 1000 type PT 1000 type PT 1000 type PT 1000 type Impulse type (low voltage 5V)
<u>Sensors delivered:</u> 1 Collector sensor 1 Tank 1 Extra	PT1000 (1.5M 180°C) PT1000 (3M 105°C) PT1000 (3M 105°C)
Software version	Displayed during the init Version xxxxxx

PRESENTATION (Display, keys, and menus)

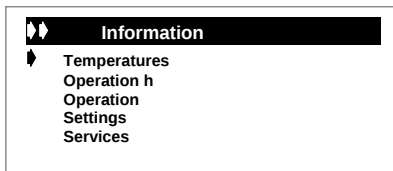
Product presentation



- 1: Simplified drawing of the installation.
- 2: The solar storage is working.
- 3: Temperature of different sensors, Pumps speed indications, Power and Energy quantity stored.

A: Navigation keys

Main menu:



First of all press to enter on the navigation menu.
(The title of the active menu is over lined in black on the top of the display)

When you enter on the navigation menu you can choose another submenu by moving the selection cursor "◆" with the keys or , then you can enter this submenu with .

From all menus you can press to return to the previous menu.

1/ Temperatures Menu:

Temperatures	
T1 – Collector1	__ °C
T2 – Collector1	__ °C
Tank1 bottom	__ °C
Tank top	__ °C

- On this menu you can see the instantaneous values of all sensors connected.

- With  or  you can select a sensor and see its time graph by pressing the .



- Move the time cursor with  or  to view the complete scale. When you reach the end of the first window, the graph will change to show another 100 points.

- You can change the scale of these graphs on the "**Service**" menu (part 5.9)

Service	
Tube collectors	no
Protection func.	10
Flow meter	yes
Liter / impulse	10
Factory setting	no
Reset op time	no
 Time graf temp	5m

- With  or  select the line "**Time graf temp**" and press  to highlight the line.

- Now you can change the scale with  or 
(Adjustable 1 to 60 minutes with factory value 5m)

- Press  repeatedly to return to the main menu.

2/ Operation h Menu:

Operation h	
Operation	__ h
dT	__ °C
Power	__ kW
Energy	__ kWh
Send PC	

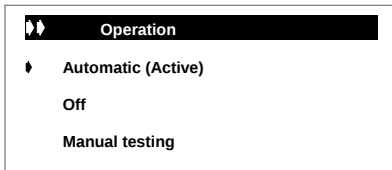
On this menu you can see the graph for operation, dT, Power and Energy
You can also transfer the Energy data on your PC
(for this you need a special cable ref: xxxxxx)



- Move the time cursor with or to view the complete scale.
- You can change the scale of these graphs on the **"Service"** menu (part 5.10)

Service	
Protection func.	10
Flow meter	yes
Liter / impulse	10
Factory setting	no
Reset op time	no
Time graf temp	5m
Time graf op	1h

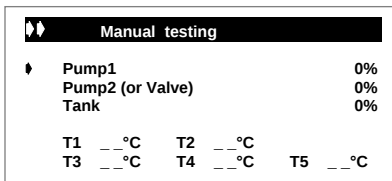
- With or select the line **"Time graf op"** and press to put in brightness the line.
- Now you can change the scale with or
(Adjustable 1 to 48 hours with factory value 1h)
- Press repeatedly to return to the main menu.



3.1/ Automatic and Off operation:

- To put your system in Automatic operation, press or to select the "Automatic" line and press to active this working mode.
- To put your system in Off mode repeat the same sequence of above.

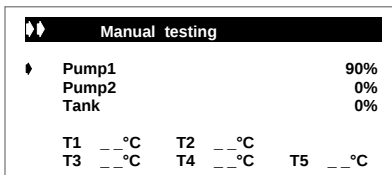
3.2/ Manual testing operation:



- In this mode you can check the working of Pump1, Pump2/Valve and extra outputs. You can also check the values of all sensors inputs. (re: the sensor input not used are noted with the maximum value)

- To activate the output select the desired line with or and press to highlight this line. Now with or you can active the different outputs.

- The pumps activation start with the minimum value xx% adjusted on the "Setting" menu (see below part 4.7) and you can increase this value up to 100% by 5% steps with key.



- Remarks: when you exit this menu all outputs are turned off.

- Press repeatedly to return to the main menu.

4/ Setting Menu:

On this menu you have all adjustable parameters of your system.
Several parameters are not available with all systems.

4.1/ Maxtemp tank1:

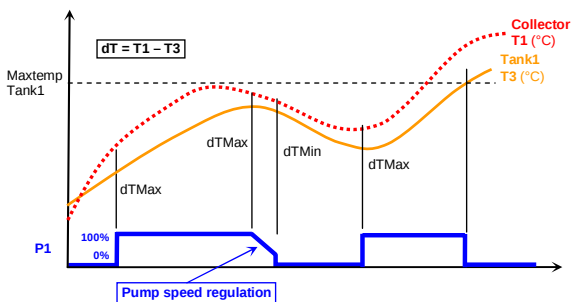
- Maximum value of desired water temperature on the tank1 during normal operation. (Adjustable 15 to 95°C with factory value 65°C)

4.2/ dTMax tank1:

- Difference between collector temperature (**T1**) and Tank1 temperature (**T3**) to start the main pump1. (Adjustable 3 to 40°C with factory value 7°C)

4.3/ dTMin tank1:

- Difference between collector temperature (**T1**) and Tank1 temperature (**T3**) to stop the main pump1.
(Adjustable 2 to (dTMax tank1 -2°C) with factory value 3°C)



4.4/ Maxtemp tank2: (Available only with system with two tanks (2 and 3))

- Maximum value of desired water temperature on the tank2.
(Adjustable 15 to 95°C with factory value 65°C)

4.5/ dTMax tank2: (Available only with system with two tanks (2 and 3))

- Difference between collector temperature (**T1**) and Tank2 temperature (**T5**) to start the main pump1 with system2 or pump2 with system3.
(Adjustable 3 to 40°C with factory value 7°C)

4.6/ dTMin tank2: (Available only with system with two tanks (2 and 3))

- Difference between collector temperature (**T1**) and Tank2 temperature (**T5**) to stop the main pump1 with system2 or pump2 with system3.
(Adjustable 2 to (dTMax tank2 -2°C) with factory value 3°C)

Remarks:

With a system with two tanks the working of the second tank is the same that to explain (graph) above except the used sensors for the measuring. The tank loadings priority is chosen on the "Service" menu (part 5.12 page 17).

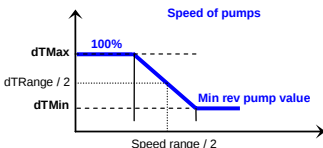
4.7/ Min rev pump:

Settings	
Maxtemp tank1	65°C
dT Max tank1	7°C
dT Min tank1	3°C
Maxtemp tank2	65°C
dT Max tank2	7°C
dT Min tank2	3°C
Min rev pump	100%

- With **+** or **-** select the line **"Min rev pump"** and press **>** to put in brightness the line.

- Now you can choose the minimum speed of the pumps with **+** or **-** (Adjustable 30 to 100% with factory value 100%)

The speed of the pump start to decrease when the **dT** value is under **dTMax** and the **"min rev pump"** value will be effective at **dTmin**.

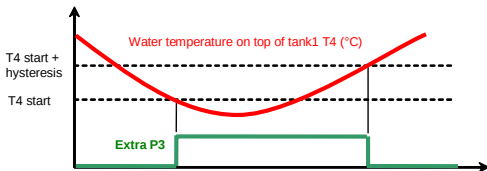


Careful: The speed regulation is done by TRIAC (phase control) please check before changing the value:

- If your pump can works with this type of speed regulation.
- The minimum speed rating of the pump.
- The speed selector on your pump must be put on the maximum position

Thermostat Function:

(Available only if extra function **"thermostat"** is selected on submenu 5.3 Extra)



4.8 Start:

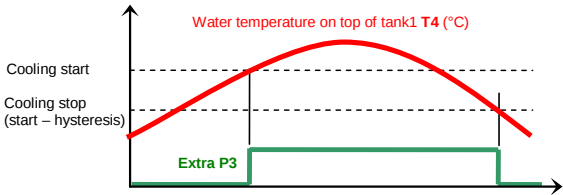
- setting level to start the additional heat (**P3**) when the water temperature on the top of tank (**T4**) decrease under this setting level. (Adjustable 20 to 90°C with factory value 40°C)

4.9/ Hysteresis:

- Value of the hysteresis to stop the additional heat (**P3**) when the water temperature on the top of tank (**T4**) is more than **start** temperature plus hysteresis value. (Adjustable 2 to 30°C with factory value 10°C)

Cooling Function:

(Available only if extra function "cooling" is selected on submenu 5.3 Extra)



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4.10/ Cooling start:

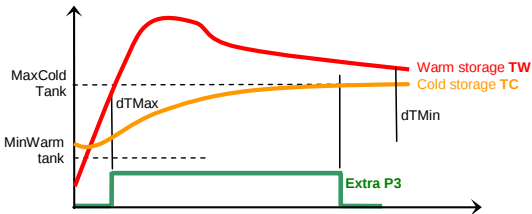
- setting level to start cooling the tank1 (by activating P3 output) to another heat storage for example when the water temperature in the top of tank1 (T_4) is above this setting level. (Adjustable 20 to 90°C with factory value 40°C)

4.11/ Cooling hyst:

- Value of the hysteresis to stop cooling the tank1 when the water temperature on the top of tank (T_4) is under **Cooling start** temperature minus hysteresis value. (Adjustable 1 to 30°C with factory value 10°C)

Diffcontrol Function:

(Available only if extra function "diffcontrol" is selected on submenu 5.3 Extra)



4.12/ Max cold tank:

- Maximum level on tank1 to stop the exchange function ($T_4 = TC$). (Adjustable 15 to 95°C with factory value 65°C)

4.13/ Min warm tank:

- Minimum level on external tank to start the exchange function ($T_5 = TW$). (Adjustable 0 to 95°C with factory value 15°C)

4.14/ dTMax:

- value of the difference between cold and warm storage to start the exchange function. (Adjustable 3 to 40°C with factory value 10°C)

4.15/ dTMin:

- value of the difference between cold and warm storage to stop the exchange function. (Adjustable 2 to 30°C with factory value 5°C)

Service	
English	
System	
Extra	off
Tubes collectors	no
Protection func.	
Flow meter	no
Flow (l/min)	10

5.1/ Language:

- With  or  select the line "**English**" and press  to highlight the line.

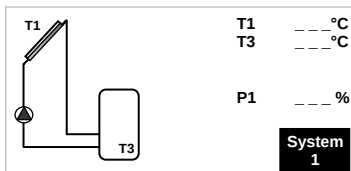
- Now you can change the language with  or , you have the choice between: English, Deutsch, Français, Svenska.

5.2/ System:

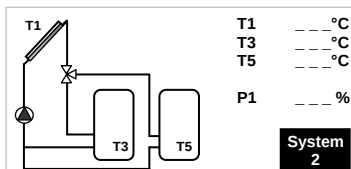
When the line is selected, press  to enter the submenu.
You have the choice between 5 systems with possibility to add an extra function. (see the part 5.3 for more explanations)

5.2.1/ System 1

Basic system, with 1 tank, 1 pump, 1 collectors array and 2 sensors.
With this system you can add an extra function with 1 or 2 sensors (Thermostat, Cooling or Diffcontrol function).

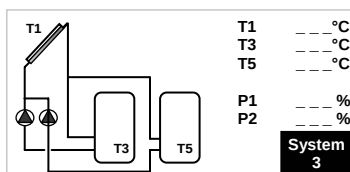
**5.2.2/ System 2**

System with 2 tanks, 1 pump, 1 valve, 1 collectors array and 3 sensors.



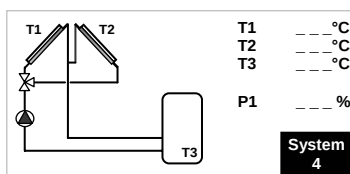
5.2.3/ System 3

System with 2 tanks, 2 pumps, 1 collectors array and 3 sensors.



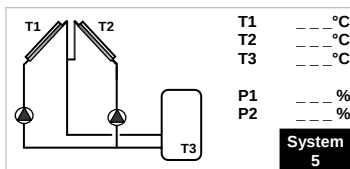
5.2.4/ System 4

System with 1 tank, 1 pump, 1 valve, 2 collectors arrays with 2 different cardinals direction (East / West) and 3 sensors. With this system you can add an extra function with 1 sensor (Thermostat or Cooling function).



5.2.5/ System 5

System with 1 tank, 2 pump, 2 collectors arrays with 2 different cardinals direction (East / West) and 3 sensors. With this system you can add an extra function with 1 sensor (Thermostat or Cooling function).



5.3/ Extra:

When the line is selected, press  to highlight the line.
You have the choice between 3 extra functions
(The choice it's not the same with all systems, see the previous part)
The extra functions are deactivated by factory setting.

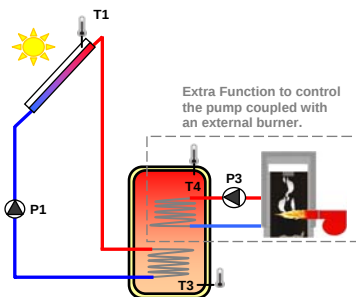
Thermostat Function

This function is generally used to associate with your system, an additional heat to warm up your primary solar tank in case of the solar energy is lacking.

Suggestions:

- Pump controls for Fuel or Gas burner...
- Electrical resistor inside the solar tank. (Careful in this case you must relayed the output)

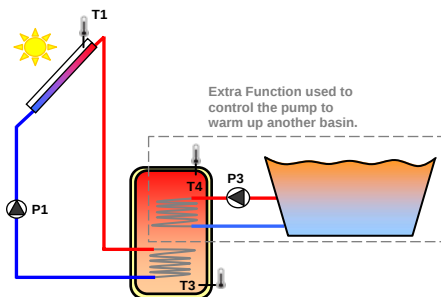
Example:



Cooling Function

The cooling function is generally used for cooling down the primary solar tank at high solar irradiation. With this function you could cumulate excess energy on another heat storage. (Swimming pool or other basin per example)
See the part 4.8 on page 8 how to use this function.

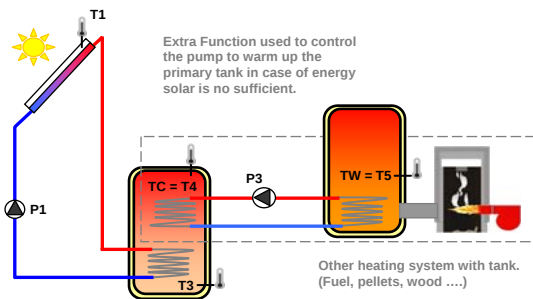
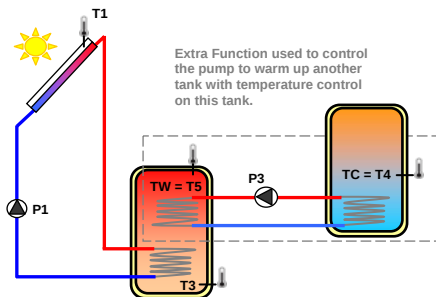
Example:



Diffcontrol Function

The **Diffcontrol** function can be used to transfer heat energy of one tank to another tank separately to the solar loading function. With this extra function you could control the temperature on both tanks and you can choose the different setting levels to adapt this function at your needs.
(See the part 4.12 on page 9 how to use this function).

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5.4/ Tubes Collectors:

Service		
English		
System		
Extra	off	
♦ Tubes collectors		no
Protection func.		
Flow meter		no
Flow (l/min)		10

Select the lines "**Tubes collectors**" and press  to highlight the line.

- Now select with  or  "yes" if you want to use this type of collectors (Vacuum tubes collector).
- This function could be used if the collector sensor is not directly mounted on the collector. This function works in the following way.
Each 30 minutes the pump will be activated 30 seconds to measure the correct value on the collector to avoid short charge cycle.

5.5/ Protection func. :

Service		
English		
System		
Extra	off	
♦ Tubes collectors		no
♦ Protection func.		
Flow meter		no
Flow (l/min)		

- Once the line selected press  to enter the submenu.

Protection func.		
Collector		
♦ Max temp		120°C
Cooling		no
Freeze prot		no

5.5.1/ Max temp:

- Setting level to start the overheat protection for the collector array.
(Adjustable 110 to 150°C with factory value 120°C)

The overheat collector protection is always active.

This function active the pump circulation when the collector temperature is above "**Maxtemp**" plus 10°C

(The pumps will be stopped when the water temperature in the tank will reach 95°C).

5.5.2/ Cooling:

- When the "cooling" function is active "Yes", it is also possible to activate the "Recooling" function.

Protection func.	
Collector	
Max temp	120°C
Cooling	yes
Recooling	no
Freeze prot	no

Cooling

This option is used to protect the collector liquid and works in the following way. It activates the solar pump **P1** or **P2** if temperature on the collector arrays **T1** or **T2** exceeds the "Max temp" value even if the set maximum temperature in the tank is exceeded. The circulation stops when temperature has dropped 10°C.

(The pumps will be stopped if the water temperature in the tank reaches 95°C).

5.5.3/ Recooling:

When the water temperature inside the tank is above the setting level (4.1) and the collector temperature is 10°C under the pump is activated to cool the tank through the collector array.

The pump will be stopped off when the water temperature inside the tank has dropped to the setting level (4.1) or when the difference between the tank and collector array temperature is below 2°C

5.5.4/ Freeze prot:

This option will keep the solar panel temperature **T1** or **T2** above the Freeze setting level (see below) by activating the pump **P1** or **P2**.

This option could be used to reduce snow accumulation on the panel and increases the efficiency during the day or to avoid the solar liquid damages.

Careful: it is preferable not to use this function in the too cold regions in order not to use too much the energy stored in the tank

Protection func.	
Collector	
Max temp	120°C
Cooling	yes
Recooling	yes
Freeze prot	yes
Freeze prot temp	3°C

- To activate the freeze and snow protection, press  or  to select the "Freeze prot" line and press  to active "yes" this function with  or .

- Now you have the possibility to adjust the Freeze setting level (Adjustable -20°C to + 7°C with factory value 3°C)

5.6/ Flow meter:

The flow meter is used for energy measuring and supervision.

- If no flow meter is installed (factory setting) You must enter with  or  the flow of the pumps in Liters/minute. (generally marked on the pump)
(Adjustable 1 to 100 L/min with factory value 10 L/min)

Service	
English	
System	
Extra	off
Tubes collectors	no
Protection func.	
Flow meter	no
Flow (L/min)	10

- If flow meter is installed select "yes", then you must enter with  or  the flow meter characteristics in liter / impulsion. (See the flow meter leaflet).
(Adjustable 1 to 25 L/imp with factory value 10 L/imp)

Service	
English	
System	
Extra	off
Tubes collectors	no
Protection func.	
Flow meter	yes
Liter / impulse	10

Flow Supervision

The flow in the system is supervised whether a flow meter is installed or not. If no flow meter is installed, the difference between collector temperature and tank temperature is used as indication of error in the flow. If the difference is above 60°C for more than 30 minutes, this is interpreted as an error. When a flow meter is installed and no flow has been measured for ten minutes after the pump has started, an error is indicated. When an error is detected, an error message is shown in the display.

5.7/ Factory setting:

Service	
System	
Extra	off
Tubes collectors	no
Protection func.	
Flow meter	yes
Liter / impulse	10
Factory setting	no

- If you want to reload all parameters with factory value select press  to highlight the line. Then select "yes" with  key.
- Now press  repeatedly to return to the main menu.

5.8/ Reset op time:

Service		
Extra	off	
Tubes collectors		no
Protection func.		
Flow meter		yes
Liter / impulse		10
Factory setting		no
Reset op time		no

- If you want to reset the all operation hours press  to highlight the line.
- Then select "yes" with  key.
- Now press more time on  to return to the main menu.

Careful:

This function reset all data memorised (Power, Energy, temperature...)

5.9/ Time graph temp:

See page 4 "**Temperatures**" menu for more explanations.

5.10/ Time graph op:

See page 5 "**Operation h**" menu for more explanations.

5.11/ Calib sensors:

Calib sensors		
Sensor T1		0°C
Sensor T2		0°C
Sensor T3		0°C
Sensor T4		0°C
Sensor T5		0°C

On this submenu you can calibrated all temperature sensors connected on your system.

Careful: Check the reel value of the sensors with calibrated thermometer before adjusting.

(Calibration range -3°C to +3°C with factory value 0°C)

5.12/ Prio Tank: (Available only with system with two tank (2 and 3))

- On this menu you must choose the primary tank, **1** or **2**. The primary tank will be loaded in priority. The second tank will be loaded when the primary tank will reach the "**Maxtemp tank1**" value adjusted on "**setting**" menu or when the collector temperature is under the primary tank temperature. In this case the tank2 will be loaded up the "**Maxtemp tank2**".

 Service	
Flow (l/min)	10
Factory setting	no
Reset op time	no
Time graf temp	5m
Time graf op	1h
Calib sensors	
 Prio tank	1

6/ Special Functions:

6.1/ Pump exercise function:

To avoid the jamming of pumps, if they were not activated during the last 48 hours, they will be activated during 15 seconds.

6.2/ Dimmer function:

To avoid current consumption, if no keys has been pressed during 10 minutes the backlight is dimmed.

7/ Others:

Corresponding value for sensor PT1000: (To be check with an Ohmmeter)

-10°C 960 ohms	60°C	1232 ohms
0°C 1000 ohms	70°C	1271 ohms
10°C 1039 ohms	80°C	1309 ohms
20°C 1077 ohms	90°C	1347 ohms
30°C 1116 ohms	100°C	1385 ohms
40°C 1155 ohms	120°C	1461 ohms
50°C 1194 ohms	140°C	1535 ohms