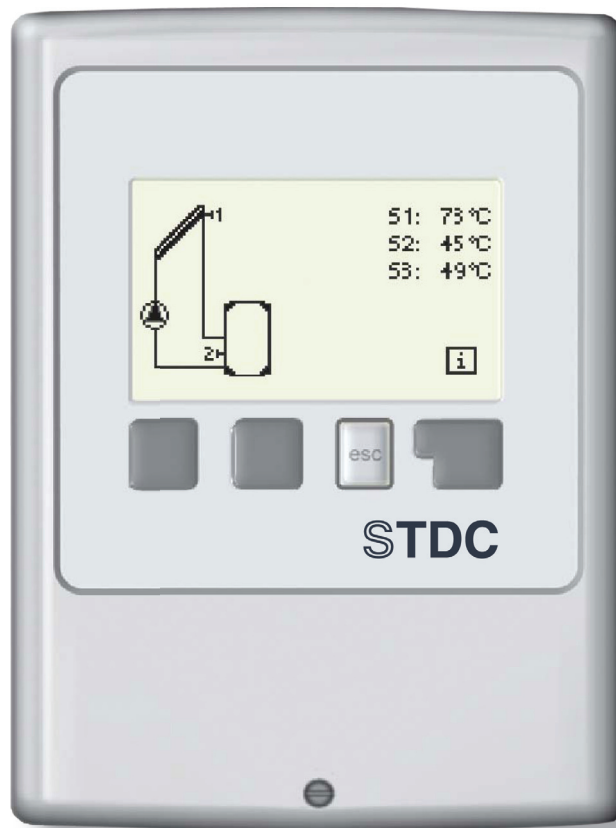


Instruction Manual

## STDC Controller



CE

EN  
v 1.1

**Regulus**<sup>®</sup>

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# A - DESCRIPTION AND INSTALLATION

## A 1 - Specification

### Electric specification:

Mains voltage	230 V ~ ±10 %
Mains frequency	50-60Hz
Power consumption	cca 1,5 VA
Switched power - mechanical relay	460 VA for AC1 / 185W for AC3 (AC1 - resistive load, AC3 - inductive load)
Internal fuse	2 A slow-blow, 250 V
El. protection	IP40
Protection class	II
Sensor inputs	3× Pt1000
Measuring range	-40 to 300 °C

### Permissible ambient conditions:

#### Ambient temperature

- for controller operation	0-40 °C
- for transport/storage	0-60 °C

#### Air humidity

- for controller operation	max. 85 % rel. humidity at 25 °C
- for transport/storage	no moisture condensation permitted

### Other specifications and dimensions:

Housing design	2-part, ABS plastic
Installation methods	wall installation
Overall dimensions	115 × 86 × 45 mm
Display	Fully graphical display, 128 × 64 bodů
Operation	4 entry keys

### Optional temperature sensors:

Immersion sensor	Pt1000, with lead TT/S2 up to 180 °C
Immersion sensor	Pt1000, with lead TT/P4 up to 95 °C
Pipe-mounted sensor	Pt1000, pipe-mounted sensor TR/P4 up to 95 °C
Sensor leads	2× 0,75 mm <sup>2</sup> extendable up to 30m max.

### Temperature resistance table for Pt1000 sensors:

°C	0	10	20	30	40	50	60	70	80	90	100
Ω	1000	1039	1077	1116	1155	1194	1232	1270	1308	1347	1385

## A 2 - About the controller

The STDC controller is designed to control automatic operation of solar systems with solar collectors for heating fluids. This type is intended for use in solar systems with one collector field and one heat-consuming circuit. This can be e.g. a storage water heater, a pool heat exchanger, or an accumulation tank for heating. The controller can be also used as a universal differential controller or as a thermostat switched by temperatures or time.

- both graphics and texts on a backlit display
- simple viewing of the current measurement values
- analysis and monitoring of the system also by means of statistical graphics
- extensive setting menus with explanations
- menu lock can be activated to prevent unintentional setting changes
- usual preset parameters in factory setting

## A 3 - Scope of supply

- STDC Controller
- 2 Pt1000 temperature sensors for immersion sleeves
- 2 screws 3.5 × 35 mm and 2 plugs 6 mm for wall installation
- 4 strain relief clips with 8 screws
- replacement fuse 2A slow-blow
- Instruction Manual

## A 4 - Explanation of symbols



**Danger**

*Failure to observe these instructions can result in danger to life from electric voltage.*



**Danger**

*Failure to observe these instructions can result in serious damage to health such as scalding, or even life-threatening injuries.*



**Danger**

*Failure to observe these instructions can result in destruction of the unit or the system, or damage to the environment.*

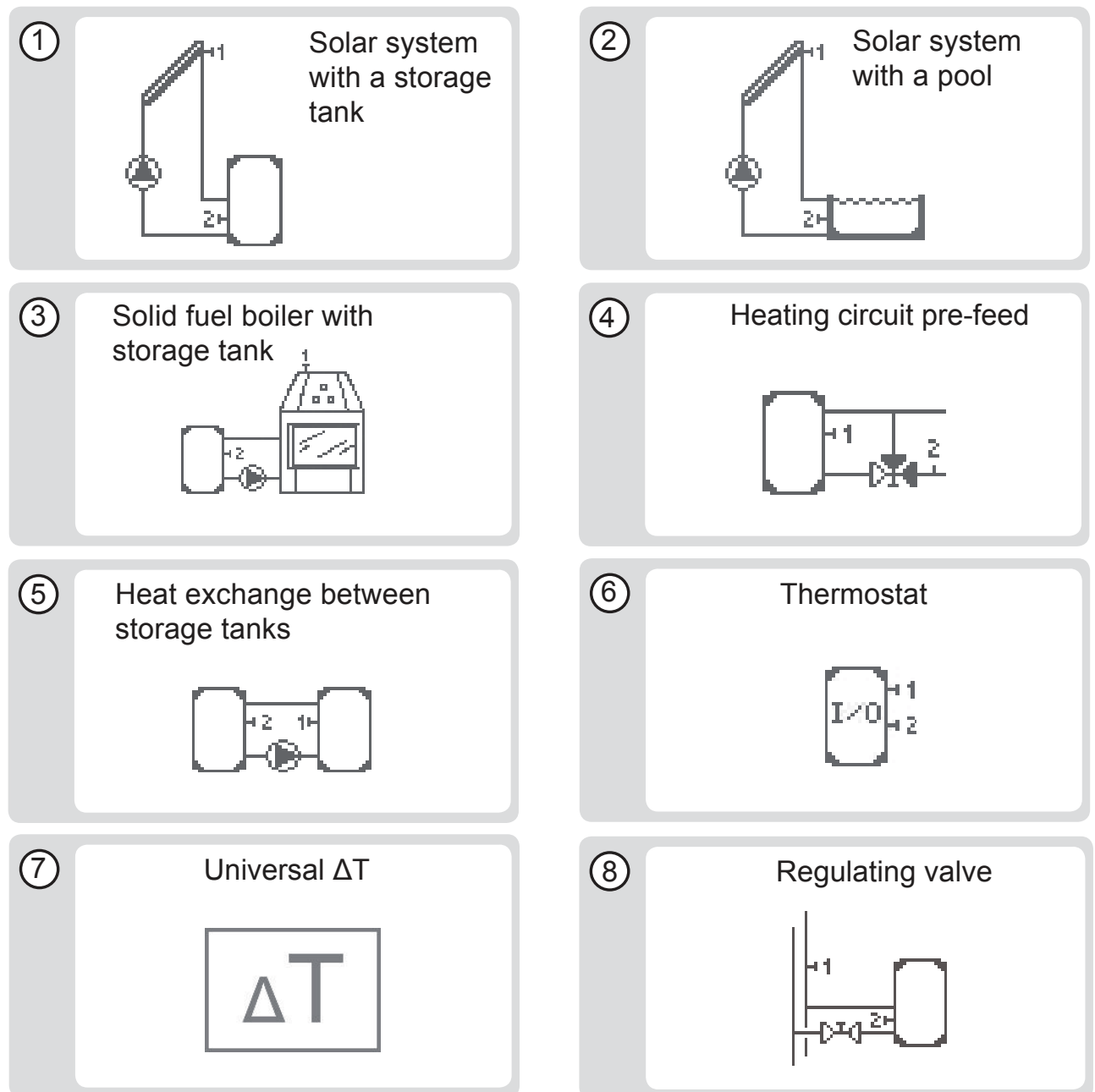


**Caution**

*Information especially important for the function and optimal use of the unit and the system.*

## B - Hydraulic variants

The following pictures represent possible hydraulic variants of solar systems controlled by STDC controller.



1. B 1 - Solar system with a storage tank
2. B 2 - Solar system with a pool
3. B 3 - Solid fuel boiler with storage tank
4. B 4 - Heating circuit pre-feed
5. B 5 - Heat exchange between storage tanks
6. B 6 - Thermostat
7. B 7 - Universal  $\Delta T$
8. B 8 - Regulating valve

## C - Installation and wiring

### C 1 - Wall installation

Install the controller only in dry areas.

#### Installation instructions:

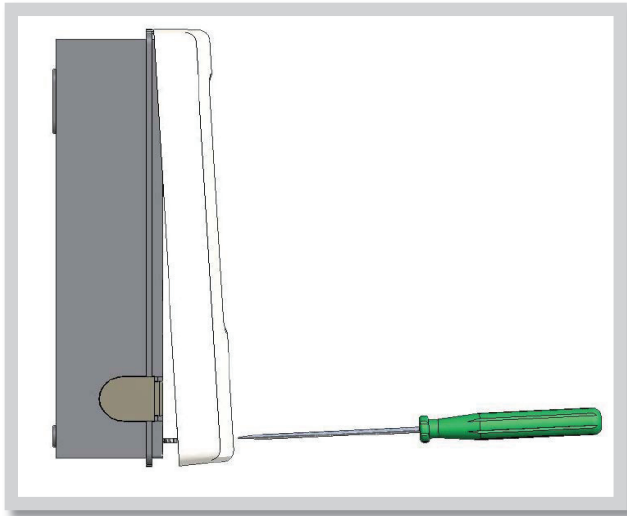


Fig. C 1.1

1. Unscrew cover screw completely.
2. Carefully pull upper part of housing from lower part.
3. Set upper part of housing aside, being sure not to touch the electronics when doing so.
4. Hold the lower part of the housing up to the selected position and mark the 3 mounting holes. Make sure that the wall surface is as even as possible so that the housing does not become distorted when it is screwed on.

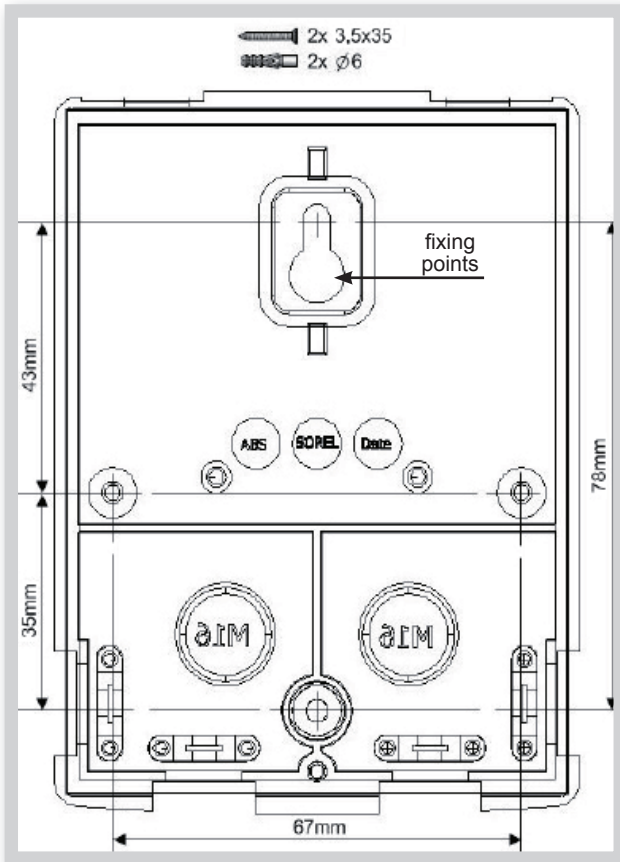


Fig. C 1.2

5. Mark the position on the wall. Using a drill and size 6 bit, drill 2 holes at the points marked on the wall and push in the plugs. 4 holes can be used alternatively.
6. Insert the upper screw and screw it in slightly.
7. Fit the upper part of the housing and insert the other two screws.
8. Align the housing and tighten the three screws.

## C 2 - Electrical wiring



Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.



The controller is not equipped with a mains switch. For this purpose please use e.g. a circuit breaker. The cables being connected to the unit must not be stripped by more than 65mm, and the cable jacket must reach into the housing just to the other side of the strain relief.

Relay R1 is only suitable for standard pumps (20-120VA) which are speed-controlled via the controller. The internal wiring of the controller is such that residual currents flow over relay R1 even in the rest condition. Therefore under no circumstances may valves, contactors or other consumers with low power consumption be operated on this output.

### Wiring instructions:

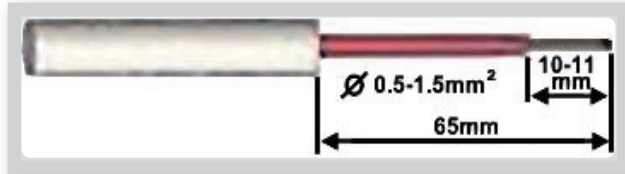


Fig. C 2.1 a

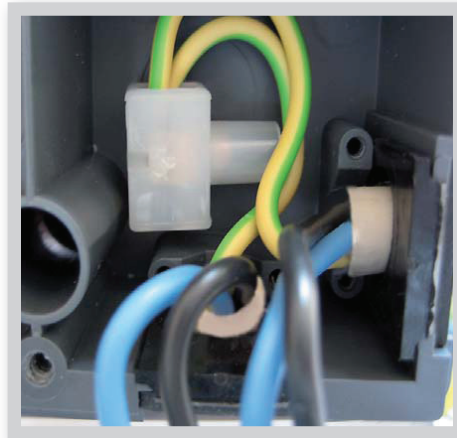


Fig. C 2.1



Fig. C 2.1 b

REGULUS - STDC Controller - [www.regulus.eu](http://www.regulus.eu)

1. Make sure the circuit breaker is in off position and power supply is off.
2. Select a suitable hydraulic scheme (Chapters D1 to D7).

3. Open the controller.
4. Strip the cable in max. length of 65 mm, insert and fit the cable strain relief. Strip the last 10-11 mm of all the wires (Fig. C 2.1 a).

5. Fix the PE terminal (see Fig. C 2.1 a).



**Warning!** In order to prevent unintentional pressing the clamps during the box closing, the PE terminal shall be placed horizontal.

6. Hold the box as shown in Fig. C 2.1 b

7. Press the terminal e.g. with your thumb (Fig. C 2.1 b) or with a suitable screwdriver (Fig. C2.1 d) and wire the cables as shown in diagrams in section D.

8. Lock the housing lid onto the top margin of its bottom counterpart, push the cables inside and close the housing gently (Fig. C 2.1 c and C 2.1 e).



**Warning!** Mind the cables in order to prevent unintentional pressing the clamps (Fig. C 2.1 a, C 2.1 c and C 2.1 e).

9. Secure using a screw.

10. Switch on mains voltage and place controller in operation.

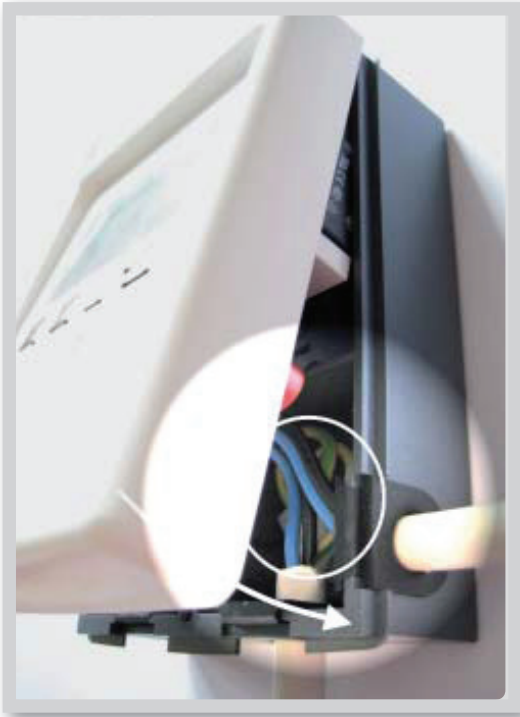


Fig. C 2.1 c



Fig. C 2.1 d

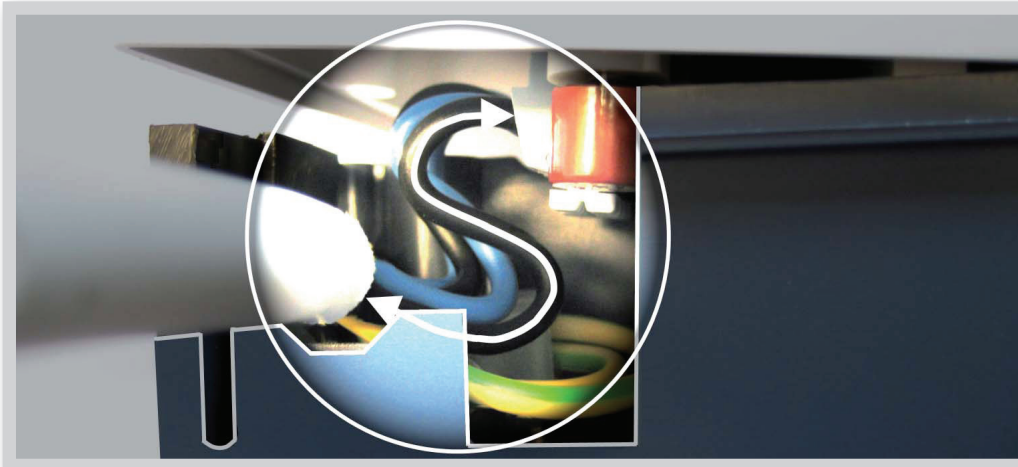


Fig. C 2.1 e



**Caution**

*Mind the cables in order to prevent unintentional pressing the clamps. (Fig. C 2.1 e, lateral view).*

### **C 3 - Installing the temperature sensors**



**Caution**

*The controller operates with Pt1000 temperature sensors.  
 Max. sensor lead length is 30 m and its cross section at least 0.75 mm<sup>2</sup>.  
 No contact resistance is permitted in the conductive connection to sensors. Use only immersion or pipe-mounted sensors. The temperature sensor cables must be routed separately from mains voltage cables!*



## D - Electric wiring

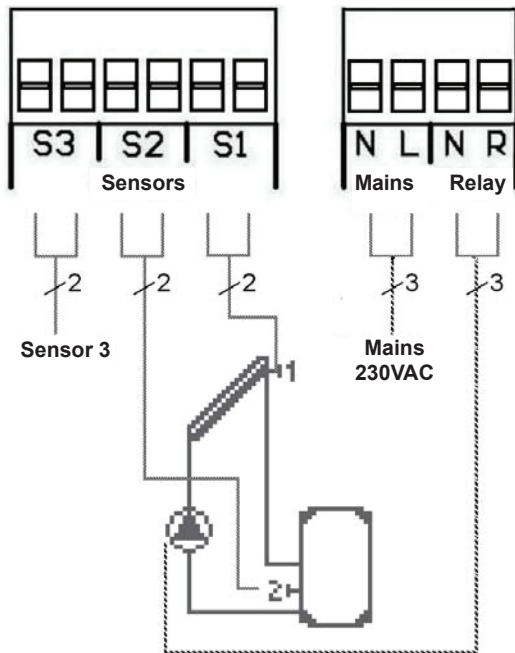
### D 1 - Solar system with storage tank



Sensor side  
max. 12V



Mains voltage  
230VAC



#### Sensor connection - max 12V

Terminal: connection for:  
S1 (2×) sensor 1 collector  
S2 (2×) sensor 2 storage tank  
S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

#### Mains voltage - 230V 50Hz

Terminal: connection for:  
L mains phase conductor L  
N mains neutral conductor N  
R pump L  
N pump N  
PE protective conductor (green-yellow)

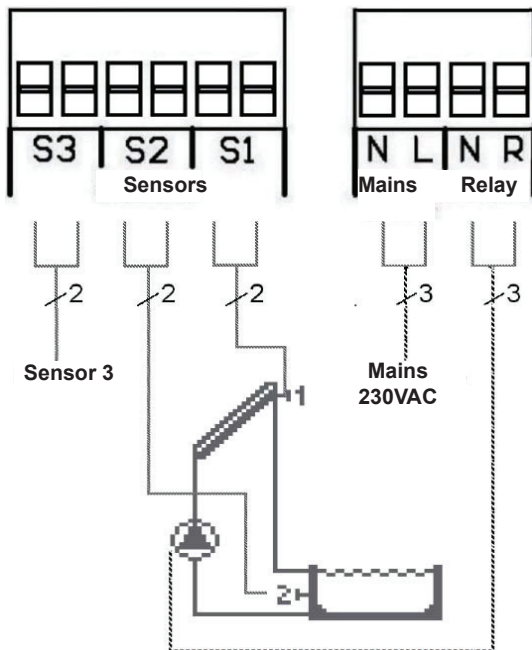
### D 2 - Solar system with pool



Sensor side  
max. 12V



Mains voltage  
230VAC



#### Sensor connection - max 12V

Terminal: connection for:  
S1 (2×) sensor 1 collector  
S2 (2×) sensor 2 pool  
S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

#### Mains voltage - 230V 50Hz

Terminal: connection for:  
L mains phase conductor L  
N mains neutral conductor N  
R pump L  
N pump N  
PE protective conductor (green-yellow)

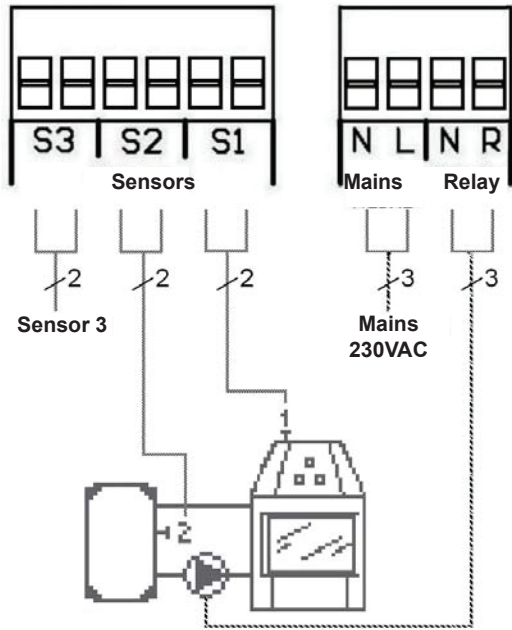
### D 3 - Solid fuel boiler with storage tank



Sensor side  
max. 12V



Mains voltage  
230VAC



#### Sensor connection - max 12V

Terminal: connection for:

- S1 (2×) sensor 1 solid-fuel boiler
- S2 (2×) sensor 2 storage tank
- S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

#### Mains voltage - 230V 50Hz

Terminal: connection for:

- L mains phase conductor L
- N mains neutral conductor N
- R pump L
- N pump N
- PE protective conductor (green-yellow)

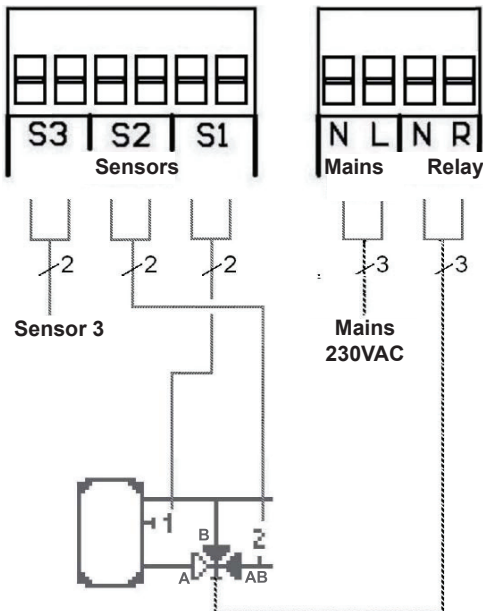
### D 4 - Heating circuit pre-feed



Sensor side  
max. 12V



Mains voltage  
230VAC



#### Sensor connection - max 12V

Terminal: connection for:

- S1 (2×) sensor 1 storage tank
- S2 (2×) sensor 2 return line
- S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

#### Mains voltage - 230V 50Hz

Terminal: connection for:

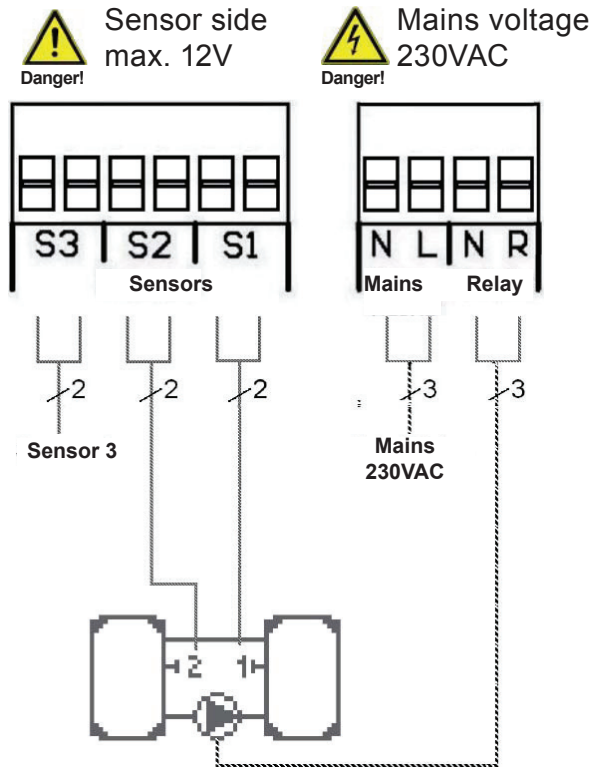
- L mains phase conductor L
- N mains neutral conductor N
- R pump L
- N pump N
- PE protective conductor (green-yellow)

Actuating direction of the 3-way valve on the return line:



- relay R off = valve closed = flow direction B-AB = no backup heating
- relay R on = valve open = flow direction A-AB = flow through the storage tank

## D 5 - Heat exchange between storage tanks



### Sensor connection - max 12V

Terminal: connection for:

- S1 (2×) sensor 1 storage tank
- S2 (2×) sensor 2 storage tank
- S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

### Mains voltage - 230V 50Hz

Terminal: connection for:

- L mains phase conductor L
- N mains neutral conductor N
- R pump L
- N pump N
- PE protective conductor (green-yellow)

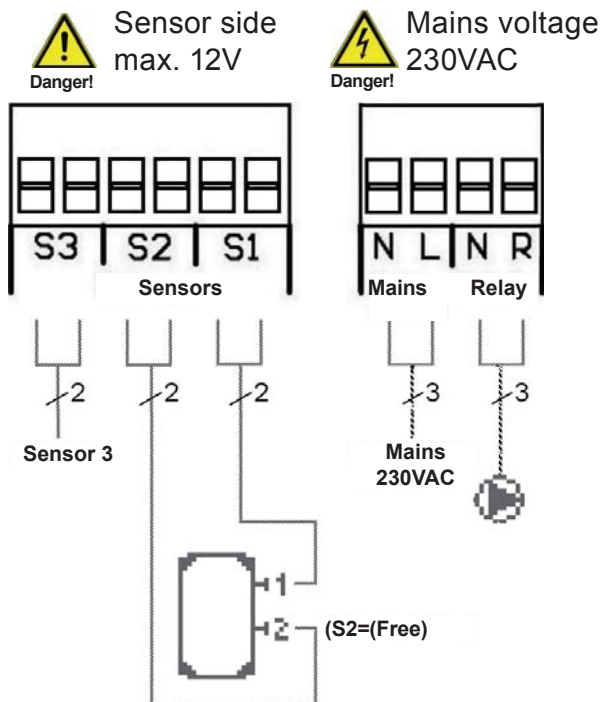
Sensor wiring - 12V max. Mains - 230V

Low voltage max. 12 V~/= in the left part of the terminal board!



Heat is flowing from storage tank 1 to storage tank 2.

## D 6 - Thermostat



### Sensor connection - max 12V

Terminal: connection for:

- S1 (2×) sensor 1 storage tank
- S2 (2×) sensor 2 (free)
- S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

### Mains voltage - 230V 50Hz

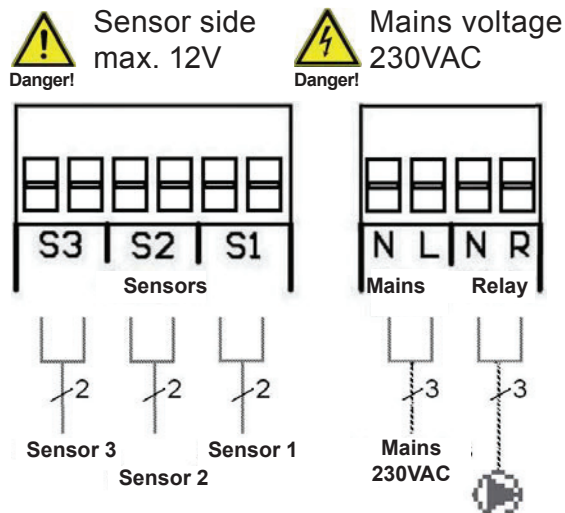
Terminal: connection for:

- L mains phase conductor L
- N mains neutral conductor N
- R pump L
- N pump N
- PE protective conductor (green-yellow)



If S2 is installed, then S1 acts as a switch-on sensor and S2 as a switch-off sensor.

## D 7 - Universal ΔT



### Sensor connection - max 12V

Terminal: connection for:  
 S1 (2×) sensor 1 storage tank  
 S2 (2×) sensor 2 (free)  
 S3 (2×) sensor 3 (free)

The polarity of the sensors is freely selectable.

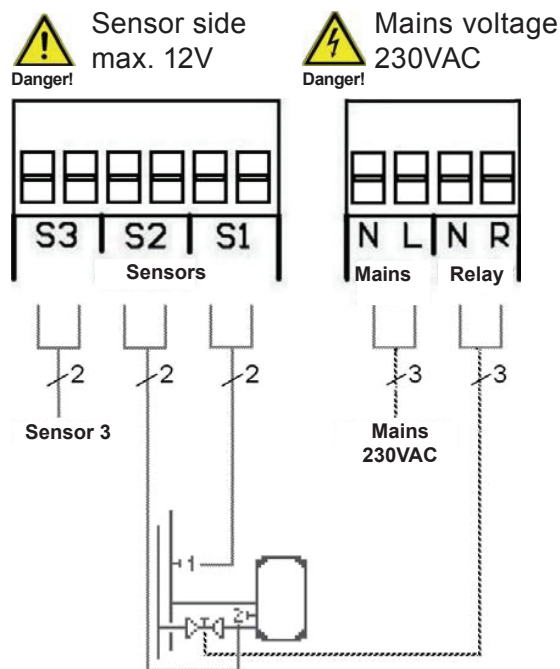
### Mains voltage - 230V 50Hz

Terminal: connection for:  
 L mains phase conductor L  
 N mains neutral conductor N  
 R pump L  
 N pump N  
 PE protective conductor (green-yellow)



A brief description of switching function ΔT:  
 If the temperature at sensor 1 > temperature at sensor 2, relay R switches, turning pump on.

## D 8 - Regulating valve



### Sensor connection - max. 12V

Terminal: connection for:  
 S1 (2×) sensor 1 hot water  
 S2 (2×) sensor 2 storage tank  
 S3 (2×) sensor 3 (free)

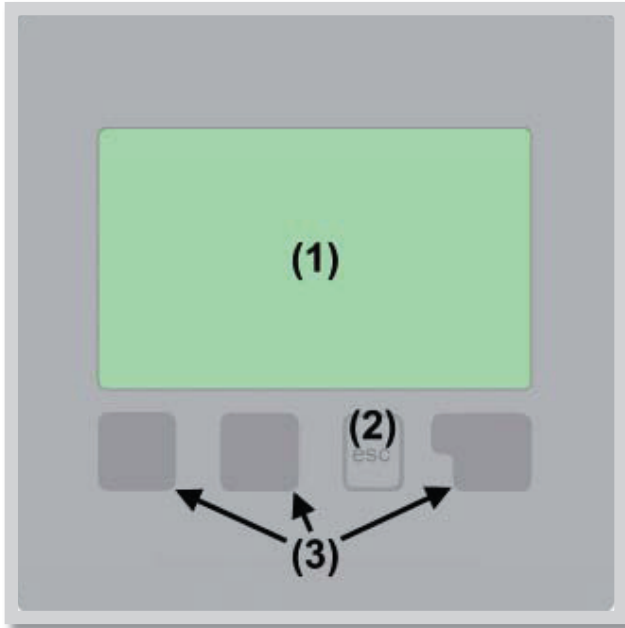
The polarity of the sensors is freely selectable.

### Mains voltage - 230V 50Hz

Terminal: connection for:  
 L mains phase conductor L  
 N mains neutral conductor N  
 R regulating valve L  
 N regulating valve N  
 PE protective conductor (green-yellow)

## E - Controller Use

### E 1 - Display and input



The display **(1)** shows graphic and text info on the hydraulic variant, set and measured values and other text info.

Entries are made using four keys **(2+3)**, which are assigned to different functions depending on the situation.

The „**esc**” key **(2)** is used to cancel an entry or to exit a menu.

If applicable there will be a request for confirmation as to whether the changes which have been made should be saved.

The function of each of the other three keys **(3)** is shown in the display line directly above the keys; the right-hand key generally has a confirmation and selection function.

#### Examples of key functions:

+/-	increase/decrease values
▼/▲	scroll menu up/down
YES/NO	confirm/reject
Details	additional information
Back	to previous screen
ok	selection confirmation
Confirm	setting confirmation

Display symbols:

	pump (rotates in operation)
	valve (direction of flow black)
	collector
	storage tank
	Solid-fuel boiler
	pool
	temperature sensor
	thermostat on/off
	warning/error message
	new information available

## E 2 - Commissioning help - setup wizard



The first time the controller is turned on and after the language and time are set, a query appears as to whether you want to parameterize the controller using the commissioning help or not. The commissioning help can also be terminated or called up again at any time in the special functions menu. The commissioning help guides you through the necessary basic settings in the correct order, and provides brief descriptions of each parameter in the display.

Pressing the „**esc**“ key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the „**esc**“ more than once takes you back step by step to the selection mode, thus cancelling the commissioning help. Finally, under

operating mode menu 4.2 „**Manual**“ should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



**Caution**

*Read the explanations for the individual parameters on the following pages, and check whether further settings are necessary for your application.*

## E 3 - Free commissioning

If you decide not to use the commissioning help, you should do the necessary settings in the following sequence:

- Menu 10      Language (see F 10)
- Menu 7.2    Time and date (see F 7.2)
- Menu 7.1    Program selection (see F 7.1)
- Menu 5      Settings, all values (see F 5)
- Menu 6      Protective functions if adaptations are necessary (see F 6)
- Menu 7      Special functions if additional changes are necessary (see F 7)

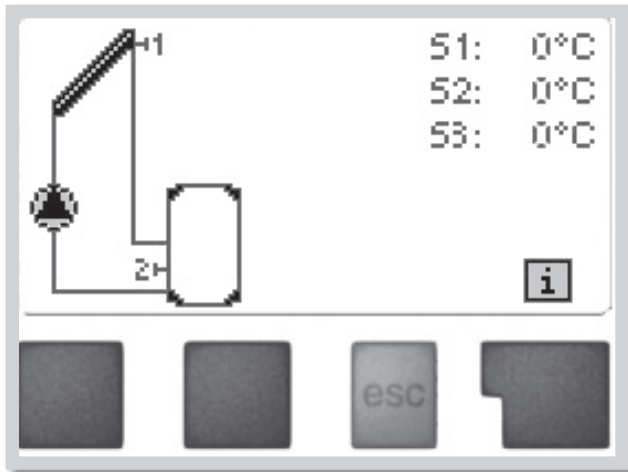
Finally, menu 4.2 under operating mode „**Manual**“ should be used to test the switch outputs with the consumers connected, and to check the sensor values for plausibility. Then switch on automatic mode.



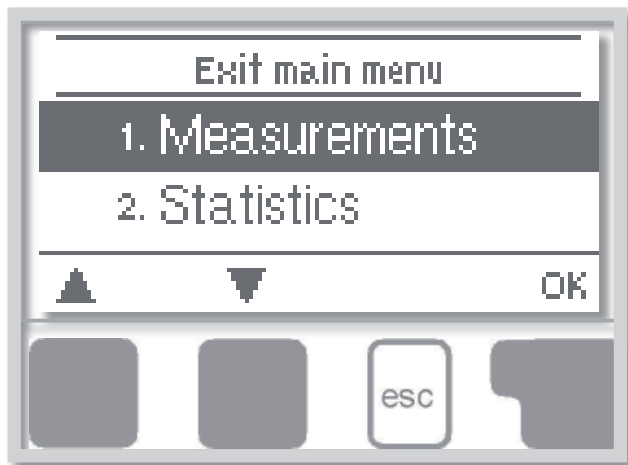
**Caution**

*Read the explanations for the individual parameters on the following pages, and check whether further settings are necessary for your application.*

## E 4 - Menu sequence and menu structure

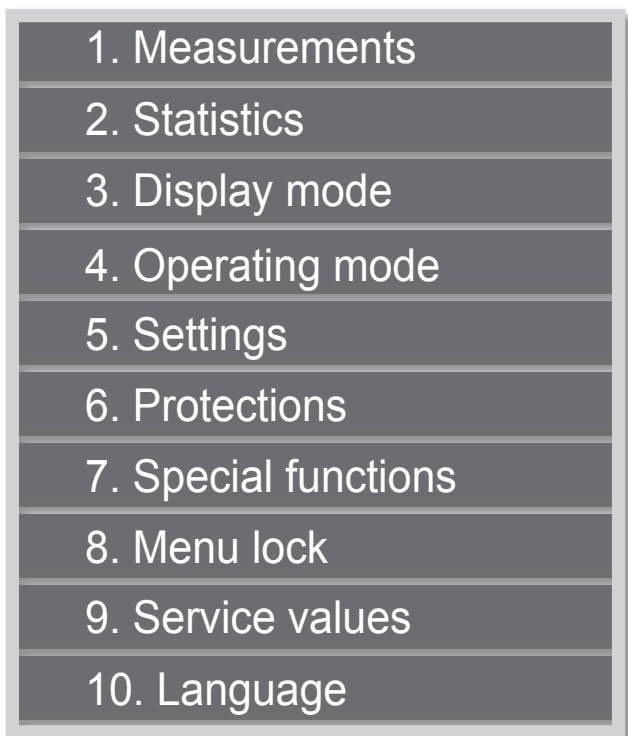


The graphics or overview mode appears when no key has been pressed for 2 minutes, or when the main menu is exited by pressing „esc“.



Pressing any key (**4**) in graphics or overview mode takes you directly to the main menu.

The following menu items are then available for selection there:



1. Current temperature values with explanations
2. Function control of the system with operating hours etc.
3. Select graphics mode or overview mode
4. Automatic mode, manual mode or switch unit off
5. Set parameters needed for normal operation
6. Solar and frost protection, recooling, antiseizing protection ...
7. Commissioning help, program selection, sensor calibration, clock etc.
8. Lock against unintentional setting changes
9. For diagnosis in the event of an error
10. Language selection

## F - Menu description

### F 1 - Measurements



Menu „**1. Measurements**” serves to display the currently measured temperatures. The menu is closed by pressing „**esc**” or selecting „**Exit measurements**”.



Selecting „**Details**” leads to a brief help text explaining the measurement values. Selecting „**Overview**” or „**esc**” exits the Info mode.



#### Caution

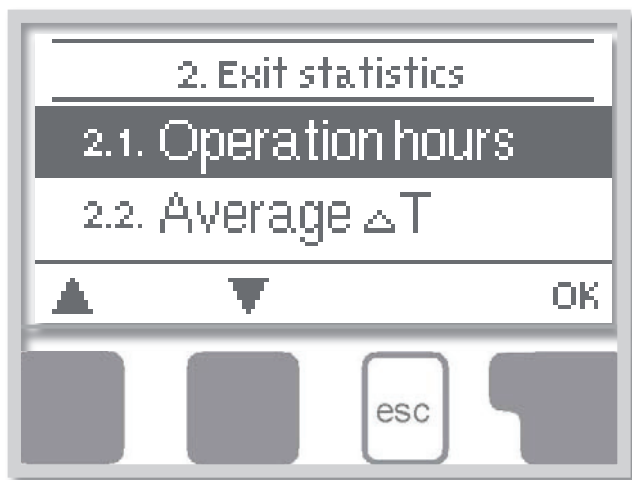
If „**Error**” appears on the display instead of the measurement value, then there may be a defective or improper temperature sensor.

If the cables are too long or the sensors are not placed optimally, the result may be small deviations in the measurement values. In this case the display values can be compensated for using the function of sensor compensation - see Chapter D 7.3.

What measurement values are displayed depends on the selected program, sensors connected and the specific device connected.



## F 2 - Statistics



Menu „**2. Statistics**” is used for function control and long-term monitoring of the system.

The menu is closed by pressing „**esc**” or selecting „**Exit statistics**”.



### Caution

*For analysis of the system data it is essential that time is set accurately on the controller.*

Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset. Incorrect time set in the controller may result in data being deleted, recorded incorrectly or overwritten.

### F 2.1 - Operating hours

Display of operating hours of the solar pump connected to the controller; various time ranges are available (day-year).

### F 2.2 - Average temperature difference $\Delta T$

Display of the average temperature difference between the reference sensors of the solar system with the consumer switched on.

### F 2.3 - Heat output

Display of the approximate heat output of the solar system. This menu can be selected, however, only when the function of Heat quantity is activated under F 7.7.

### F 2.4 - Graphic overview

This function provides a clearly-organized display of the data listed under F2.1 to F 2.3 as a bar graph. Various time ranges are available. The two left-hand keys can be used to page through the data.

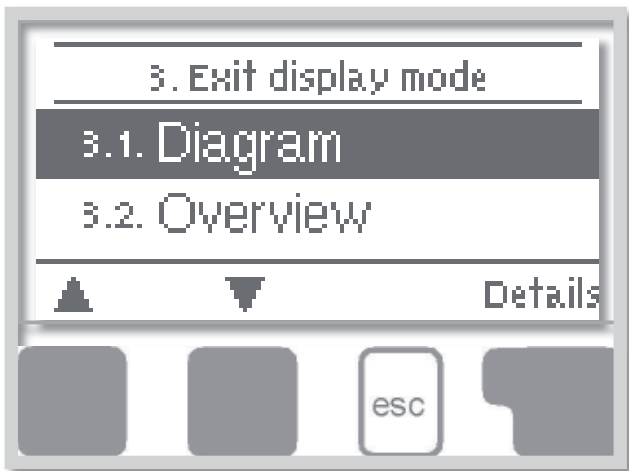
### F 2.5 - Error messages

Display of the last 20 errors occurring in the system with indication of date and time.

### F 2.6 - Reset / Clear

Resetting and deleting the individual analyses. The function „**All statistics**” clears all analyses but not the error messages.

## F 3 - Display mode



Menu „**3. Display mode**” is used to define the controller’s display for normal operation.

This display appears whenever two minutes go by without any key being pressed. The main menu appears again when a key is pressed. The menu is closed by pressing „**esc**” or selecting „**Exit display mode**”.

### F 3.1 - Schematic

In schematic mode, the selected hydraulic systems are depicted with the measured temperatures and operating states of the connected consumers.

### F 3.2 - Overview

In overview mode, the measured temperatures and operating states of the connected consumers are shown in text form.

### F 3.3 - Alternating

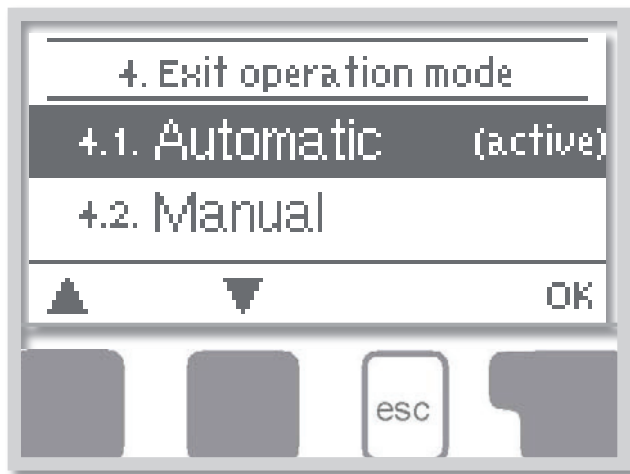
Display standby mode

### F 3.4 - In alternating mode the schematic mode and then the overview mode are active for 5 seconds at a time.

After 2 min. of inactivity the display goes to standby mode, turning off the illumination. The backlight does not turn off when the on-screen error message or information message.

*Setting range: On, Off / Default setting: Off*

## F 4 - Operating modes



In menu „**4. Operating modes**” the controller can either be switched to automatic mode, switched off, or switched to a manual operating mode.

The menu is closed by pressing „**esc**” or selecting „**Exit operating modes**”.

### F 4.1 - Automatic

Automatic mode is the normal operating mode of the controller. Only automatic mode provides proper controller function taking into account the current temperatures and the parameters that have been set! After an interruption of the mains voltage the controller automatically returns to the last operating mode selected!

### F 4.2 - Manual

The relay and thus the connected consumer are switched on and off by pressing a key, with no regard to the current temperatures and the parameters which have been set. The measured temperatures are also shown.



**Danger**

*When operating mode „**Manual**” is activated, the current temperatures and the selected parameters are no longer considered. There is a danger of scalding or serious damage to the system. The operating mode „**Manual**” may only be used by specialists for brief function tests or during commissioning!*

### F 4.3 - Off



**Danger**

*When the operating mode „**Off**” is activated, all controller functions are switched off. This can lead, for example, to overheating on the solar collector or other system components. The measured temperatures continue to be shown to provide an overview.*

## F 5 - Settings



The necessary basic settings required for the control function are made in menu „**5. Settings**”.

The menu is closed by pressing „**esc**” or selecting „**Exit settings**”.

### F 5.1 - Tmin S1

If this value is exceeded at sensor S1, then the controller switches the associated pump and/or valve on. If the temperature at sensor S1 drops below this value by 5 °C, then the pump and/or the valve are switched off again.  
*Setting range: 0-99 °C / default setting: 20 °C*



**Caution**

*When using hydraulic variant 3 with solid fuel boiler, at least 60 °C should be set. Consider instructions of boiler manufacturer!*

### F 5.2 - Tmax S2

If this value is exceeded at sensor S2, then the controller switches the associated pump and/or valve on. If the temperature at sensor S2 drops below this value by 5 °C, then the pump and/or the valve are switched off again.  
*Setting range: 0-99 °C (for hydraulic variants „Thermostat“ and „Universal ΔT“ this value may be set to Off)  
Default setting: 60 °C (for hydraulic variant „Solar system with pool“ the default setting is off)*



**Danger**

*Temperature values which are set too high will allow higher solar heat accumulation but it shall be checked that all system components are resistant to high temperature and scalding protection is provided. Regulus solar systems are safe for heating water up to 95 °C.*

### F 5.3 - ΔT

Switch-on/switch-off temperature difference for relay R

If the temperature difference ΔT between the reference sensors is exceeded, then the controller switches the pump/valve on. If the temperature difference between the reference sensors drops to ΔToff, then the pump/valve is switched off again.

*Settings range: ΔT from 3 to 20 °C / ΔToff from 2 to ΔT minus 1  
Default setting: ΔT 10 °C / ΔToff 3 °C.*



**Caution**

*If a too small temperature difference is set, it may happen that the heat source cannot heat up the consumer to the pump switch-off temperature (Tsource - Toff). Then the pump runs continuously.*



**Caution**

*The following settings are applicable only for the hydraulic variant 6 (Thermostat).*

#### F 5.4 - Tset

„**Thermostat**“ has 2 functions:

Backup (heating) - if the parameter value of „**Tset on**“ is lower than that of „**Tset off**“.

If the temperature at sensor S1 falls below „**Tset on**“ and the „**Thermostat**“ function is on (see F 5.5), the backup heating relay switches on and stays on until the temperature reaches „**Tset off**“.

**Example:** The storage tank shall be heated from a backup source to keep its temperature above 50 °C. A heat source pump shall be wired to relay R.

Set Tset On = 50 °C, Tset Off = 58 °C. When the temperature in the tank falls below 50 °C, relay R will switch on and remain switched until the tank heats up to 58 °C.

Heat exchange (tank recooling) - if the parameter value of „**Tset on**“ is higher than that of „**Tset off**“.

If the temperature at sensor S1 falls below „**Tset on**“ and the „**Thermostat**“ function is on (see F 5.5), the recooling relay switches on and stays on until the temperature reaches „**Tset off**“.

**Example:** When the tank temperature exceeds 60 °C, the surplus heat shall be conveyed into the heating system. A heat source pump shall be wired to relay R.

Set Tset On = 60 °C, Tset Off = 52 °C. When the temperature in the tank exceeds 60 °C, relay R will switch on and remain switched until the tank cools down to 52 °C.

Setting range:

Tset on: 10-90 °C / Default setting: 50 °C

Tset off: 0-99 °C / Default setting: 60 °C



**Caution**

If a S2 sensor is installed, then S1 sensor shall be used for switching on (Tset On) and S2 for switching off (Tset Off).

#### F 5.5 - Thermostat periods

Set the desired periods of time when the thermostat should be active. 2 periods can be set per day, settings can also be copied to other days. Outside the set times the thermostat is switched off.

Setting range: from 00:00 to 23:59 /default setting: 06:00 to 22:00

#### F 5.6 - Party function



With the party function the storage tank is heated up once to the set temperature (TsetS1), disregarding the set thermostat times.

The party mode is enabled by pressing the „**esc**“ key for 3 seconds in the main menu. While this mode is active, the system heats up to the set value Tset Off unattached to preset thermostat times. The mode is ended once the required temperature is reached.

#### F 5.7 - Tmax S3

Switch-off temperature at S3 sensor

If this value is exceeded at sensor S3, the controller switches the relay off. If the temperature falls below this value again, the controller switches the relay on again. For switching on and off further conditions shall be met as well.

Setting range: from 0 °C to 99 °C / default setting: 60 °C

(if the selected variant does not use S3, the default setting is Off).

## F 6 - Protections



Menu „**6. Protections**” can be used to activate and set various protective functions. These functions do not under any circumstances replace safety elements in solar systems!



The menu is closed by pressing „**esc**” or selecting „**Exit protections**”.

### F 6.1 - Seizing protection

Pump seizing protection using regular short turning on a pump or a valve. Seizing may occur after prolonged inactivity of valves or pumps. If this protection is activated, then the controller switches the relay in question and the connected consumer on every day at 12:00 or on Sundays at 12:00 (for weekly settings) for 5 seconds in order to prevent the pump and/or the valve from sticking after an extended stationary period.

*Setting range: daily, weekly, off / default setting: Off*

### F 6.2 - Frost protection (solar only)

A two-stage frost protection function is available. In stage 1 the controller switches the pump on for 1 minute every hour if the collector temperature drops below the set value „**Frost stage 1**”. If the collector temperature drops further to the set value „**Frost stage 2**” the controller switches the pump on continuously. If the collector temperature then exceeds the value „**Frost stage 2**” by 2 °C, the pump switches off again.

*Frost protection setting range: on, off / default setting: off*

*Frost protection stage 1 setting range: from -25 °C to 10 °C or off/default setting: 7 °C*

*Frost protection stage 2 setting range: from -25 °C to 8 °C or off/default setting: 5 °C*

This function causes energy loss via the collector!

As Regulus solar systems are filled with antifreeze fluid, the antifreeze protection shall remain off.

### F 6.3 - System protection prevents overheating of solar system components.

Funkce ochrany solárního okruhu zabraňuje přehřátí komponent .

If „**AS Ton**” is exceeded at the collector, the pump is switched off. The collector is let at high temperature. The pump is activated again when the temperature drops below „**AS TOff**”.

*Automatic shutdown - settings range: On / Off / Default: on AS Ton - settings range: 60 °C to 150 °C / Default: 120 °C*

*AS TOff - settings range: 50 °C to Ton minus 5 °C / Default: 110 °C*



When system protection is on, the temperature in the idle collector will reach a higher stagnation temperature and a corresponding pressure in the system!

#### F 6.4 - Collector protection

Collector protection prevents overheating of the collector. The pump is switched on to transfer heat from the collector to the storage tank.

If „**CP Ton**” is exceeded at the collector sensor, the pump is switched on until the temperature reaches „**CP Toff**” or the temperature „**CP Tmax storage**” is exceeded in the storage or pool.

*Collector protection - Setting range: On, Off / default setting: Off*

*CP Ton settings range: 60 °C to 150 °C / Default: 110 °C*

*CP Toff settings range: 50 °C to Ton minus 10 °C / Default: 100 °C*

*CP Tmax storage settings range: 0 °C to 140 °C / Default: 90 °C*



**Danger**

*When collector protection is active, the storage or pool may get heated to a very high temperature!*

#### F 6.5 - Col.- Alarm (solar only)

If this temperature is exceeded at the collector sensor when the solar pump is on, a warning is triggered and a warning message is shown in the display.

*Collector alarm settings range: on / off / Default: off*

*Col. alarm - setting range: 60 °C to 300 °C / Default: 150 °C*

#### F 6.6 - Recooling

At the end of a sunny day the temperature in a storage tank may easily reach high values. In order to prevent further temperature increase the next day, excess energy can be released into the air via collectors under cloudy conditions or after sunset.

If the temperature in the storage tank exceeds the value „**Recooling Tset**” and the collector is at least by 20 °C cooler than the storage tank, the solar pump starts. The storage tank is then cooled down until the „**Recooling Tset**” is reached.

*Setting range: Recooling off, on / default setting: off*

*Setting range: Recooling Tset from 0 °C to 99 °C / default setting: 70 °C*



**Caution**

*This function causes energy loss via the collector! It may be combined e.g. with the System protection function (F 6.3) that causes collector overheating. It is also useful during holiday absence when no heat is used.*

#### F 6.7 - Anti-Legionella

With the „**AL function**” activated the controller makes it possible to heat the storage tank up once at certain intervals („**AL interval**”) to a higher temperature („**AL Tset S2**”), assuming that the energy source allows this.

*AL Function settings range: on / off / Default: off*

*AL Tset S2 settings range: 60 °C to 99 °C / Default: 70 °C*

*AL interval settings range: 1 to 28 days/ Default: 7 days*



**Caution**

*The anti-Legionella function is switched off at delivery. This function is only relevant for storage tanks where sensor S2 is installed. Whenever heating-up has been carried out with the anti-Legionella function switched on, an information message with the date appears on the display.*



**Danger**

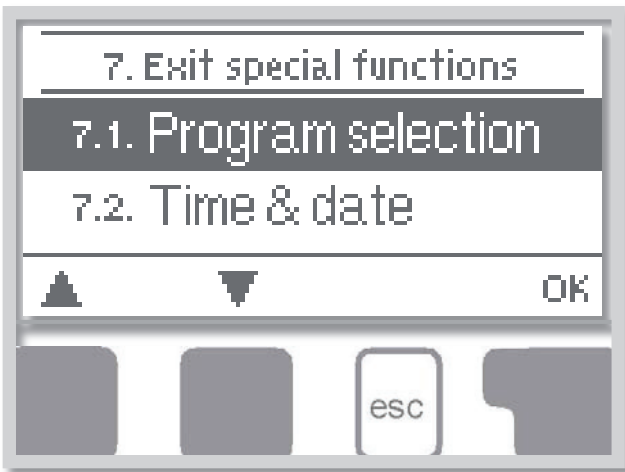
*During the anti-Legionella function the storage tank is heated up over the set value „**Tmax S2**”.*



**Danger**

*This anti-Legionella function does not provide complete protection against Legionella, because the controller is dependent on sufficient energy being fed in, and it is not possible to monitor the temperatures in the entire range of the storage tanks and the connected piping system. To provide complete protection against Legionella bacteria, it must be ensured that the temperature is raised to the necessary value, and at the same time there must be water circulation in the storage tanks.*

## F 7 - Special functions



Menu „7. Special functions” is used to set basic items and expanded functions. Other than the time all settings may only be made by a specialist.



*The menu is closed by pressing „esc” or selecting „Exit special functions”.*

### F 7.1 - Program selection

The suitable hydraulic variant for the specific application is selected and set here (see A2 Hydraulic variants). The associated diagram can be displayed by pressing „Details”.

Setting range: 1-15 / default value: 1



**Caution**

*Normally the program selection is made only once during initial commissioning by the specialist. Incorrect program selection can lead to unpredictable errors.*

### F 7.2 - Time & date

This menu is used to set the current time and date.



**Caution**

*For analysis of the system data it is essential for the time to be set accurately on the controller. Please note that the clock does not continue to run if the mains voltage is interrupted, and must therefore be reset.*

### F 7.3 - Sensor calibration

Deviations in the temperature values displayed, for example due to cables which are too long or sensors which are not positioned optimally, can be compensated for manually here. The settings can be made for each individual sensor in steps of 0.5 °C.

Offset S1...S3 -10 °C to +10 °C / default setting: 0 °C



**Caution**

*Settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to unpredictable errors.*

### F 7.4 - Commissioning help

Starting the commissioning help guides you in the correct order through the basic settings necessary for commissioning, and provides brief descriptions of each parameter in the display.

Pressing the „esc” key takes you back to the previous value so you can look at the selected setting again or adjust it if desired. Pressing the „esc” more than once takes you back to the selection mode, thus cancelling the commissioning help.



**Caution**

*May only be started by a specialist during commissioning! Observe the explanations for the individual parameters in these instructions, and check whether further settings are necessary for your application.*

### F 7.5 - Factory settings

All of the settings that have been made can be reset, thus returning the controller to its delivery state.



**Caution**

*The entire parameterization, analyses, etc. of the controller will be lost irrevocably. The controller must then be commissioned once again.*



## F 7.6 - Expansions

This menu can only be selected and used if additional options or expansions have been built into the controller. The associated supplementary installation, mounting and operation instructions are then included with the specific expansion.

## F 7.7 - Heat quantity

A simple heat metering function can be activated in this menu. Additional settings regarding the glycol, the percentage of glycol and the flow rate of the system are required. A correction value for the heat metering is also possible by adjusting the „Offset  $\Delta T$ ”.



**Caution**

*Keep in mind that the system is not changed, adjustments made in this menu are only used to calculate the heat volume and should be based on the actual system. Resulting data is only approximate value for function control!*

### F 7.7.1 - Heat metering

Activate or deactivate the heat metering function.

*Settings range: On/off /default setting: Off*

### F 7.7.2 - AF type

Adjust the type of antifreeze used in the system. The solar fluid used in Regulus systems is of propylene type.

*Setting range: Ethylene/Propylene / default setting: Ethylene*

### F 7.7.3 - Glycol portion

Adjust the percentage of glycol that has been used in the system. The solar fluid used in Regulus systems has a concentration of 50 %.

*Setting range: 0-60 % /default setting: 40 %*

### F 7.7.4 - Flow rate

Adjust the flow rate according to the system.

*Setting range: 10-5000l/h /default setting: 500l/h*

### F 7.7.5 - $\Delta T$ Offset

Since the calculation of the heat metering is based on the temperature of the collector and storage where measuring takes place, a possible deviation from the flow and return temperature can be compensated with this value.

**Example:** Displayed collector temp. 40 °C, measured flow temp. 39 °C, displayed storage temp. 30 °C, measured return temp. 31 °C means a setting of -20 %

(Displayed  $\Delta T$  10K, actual  $\Delta T$  8K => -20 % correction value)

*Setting range: -50 % to +50 % /default setting: 0 %*

## F 7.8 - Start aid function

With some solar systems, especially with vacuum tube collectors, it may occur that the measurement value acquisition at the collector sensor occurs too slowly or too inaccurately because the sensor is often not at the hottest location. When the start help is activated the following sequence is carried out:

If the temperature at the collector sensor increases by the value specified under „**Increase**” within one minute, then the solar pump is switched on for the set „**Purging time**” so that the medium to be measured can be moved to the collector sensor. If this still does not result in a normal switch-on condition, then the start help function is subject to a 5-minute lockout time.

*Start help setting range: on, off/default setting: off*

*Purging time setting range: 2-30 sec./default setting: 5 sec.*

*Increase setting range: 1 °C - 10 °C/default setting: 3 °C/min.*



**Caution**

*This function should only be activated by a specialist if problems arise with acquisition of measurement values.*

## F 8 - Menu lock



Menu „**8. Menu lock**” can be used to secure the controller against unintentional changing of the set values.

The menu is closed by pressing „**esc**” or selecting „**Exit menu lock**”.

The menus listed below remain completely accessible despite the menu lock being activated, and can be used to make adjustments if necessary:

- F 1 - Measurements
- F 2 - Statistics
- F 3 - Display mode
- F 7.2 - Time & date
- F 8 - Menu lock
- F 9 - Service values

To lock the other menus, select „**Menu lock on**”. To enable the menus again, select „**Menu lock off**”.

*Setting range: on, off/default setting: off*

## F 9 - Service values

The menu „9. Service values” can be used for remote diagnosis by a specialist in the event of an error etc.



### Caution

*Enter the values at the time when the error occurs e.g. in the table.*

The menu can be closed at any time by pressing „esc”.

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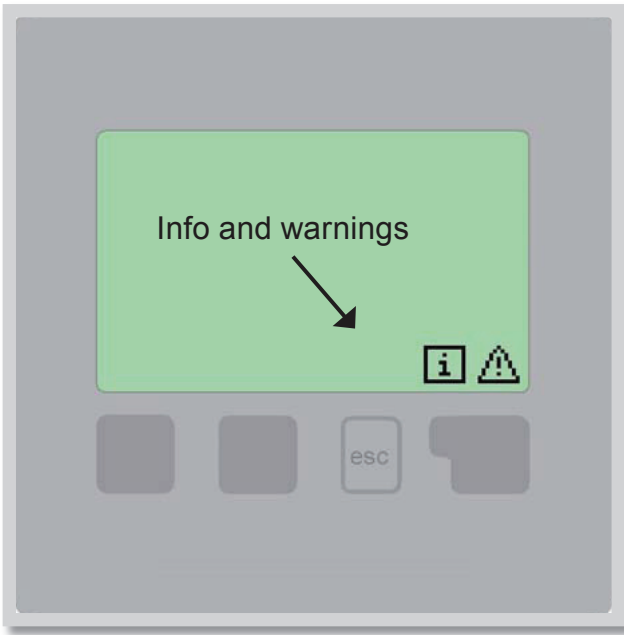
## F 10 - Language

Menu „10. Language” can be used to select the language for the menu guidance. This is queried automatically during initial commissioning. The choice of languages may differ, however, depending on the device design. Language selection is not available in every device design!

The latest version contains the following languages: German, English, Spanish, French, Italian, Swedish, Polish, Portuguese, Greek, Finnish, Hungarian and Czech.

## G - Defects and Maintenance

### G 1 - Malfunctions with error messages



If the controller detects a malfunction, a warning symbol appears in the display. If the error is no longer present, the warning symbol changes to an info symbol.

To obtain more detailed information on the error, press the key under the warning or info symbol.



**Do not try to deal with this yourself.  
Consult a specialist in the event of an error!**

#### Possible error messages:

Sensor x failed

Collector alarm

Night circulation

Restart

Time & date

#### Notes for the specialist:

Means that either the sensor, the sensor input at the controller or the connecting cable is defective.

Means that the collector has risen above the temperature set under menu F 6.3.1.

Means that the solar pump is/was in operation between 23:00 and 04:00. (Exception see F 6.6)

Means that the controller was restarted, for example due to a power failure. Check the date and time!

This message appears automatically after a mains failure because the time&date have to be checked, and reset if necessary.

### G 2 - Replacing the fuse



**Caution**

*Repairs and maintenance may only be performed by a specialist. Before working on the unit, switch off the power supply and secure it against being switched on again! Check for the absence of power!*

Only use the supplied spare fuse or a fuse of the same design with the following specifications: T2A 250V.



If the mains voltage is switched on and the controller still does not function or display anything, then the internal device fuse may be defective. In that case, disconnect the device, open it, remove the old fuse and check it.

Exchange the defective fuse for a new one, locate the external source of the error (e.g. pump) and exchange it. Then first recommission the controller and check the function of the switch outputs in manual mode as described under F 4.2.

Fig. G 2.1

### G 3 - Maintenance



Caution

*In the course of the general annual maintenance of your heating system you should also have the functions of the controller checked by a specialist and have the settings optimized if necessary.*

#### Performing maintenance:

- Check the date and time (see F 7.2)
- Assess/check plausibility of analyses (see F 2.4)
- Check the error memory (see F 2.5)
- Verify/check plausibility of the current measurement values (see F 1)
- Check the switch outputs/consumers in manual mode (see F 4.2)
- Poss. optimize the parameter settings

### G 4 - Disposal

#### **IMPORTANT INFORMATION ON DISPOSAL IN COMPLIANCE WITH THE EUROPEAN DIRECTIVE 2002/96/ES**

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.



WEEE registration number: 02771/07-ECZ



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