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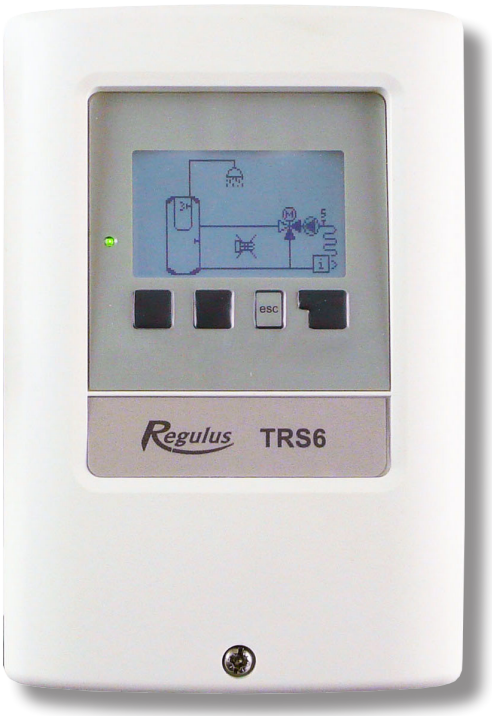
TRS6 K



Installation and Operation Manual

REGULUS TRS6 K CONTROLLER

EN

TRS6 K

Contents

This Manual applies to the following hardware versions:
TRS6 K

TRS6 K
3 output mechanical relays 230VAC
2 PWM/0-10V outputs for high-efficiency pumps
6 inputs for Pt1000 temperature sensors

Safety Instructions

A.1 EG Declaration of Conformity

By affixing the CE mark to the unit the manufacturer declares that the TRS6 K Controller conforms to the following relevant safety regulations:

- EC low voltage directive 2014/35/EC
- EC electromagnetic compatibility directive 2014/30/EC

A.2 General Information

Please read carefully!

These installation and operating instructions contain basic instructions and important information regarding safety, installation, commissioning, maintenance and the optimal use of the controller. Therefore these instructions must be read and understood completely by the installation technician/specialist and by the system user before installation, commissioning and operation of the controller. Under no circumstances does the controller replace any system safety devices (like a safety valve, air vent valve, high limit thermostat etc.) that are obligatory in the system. Installation, electrical connection, commissioning and maintenance of the controller may only be carried out by specialists who possess the appropriate training.

Users: Make sure that the specialist gives you detailed information on the function and operation of the controller. Always keep these instructions in the vicinity of the controller. Changes to the unit may compromise safety and functioning of the controller and entire heating system.

A.3 Explanation of Symbols


Failure to observe these instructions can result in electrocution.


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


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


Information which is especially importation for the function and optimal use of the unit and the system.

A.4 Changes to the Controller

- Changes, additions to or conversion of the unit are not permitted without written permission from the manufacturer.
- It is likewise forbidden to install additional components that have not been tested together with the unit.
- If it becomes clear that safe operation of the unit is no longer possible, for example because of damage to the housing, turn the unit off immediately.
- Any parts of the unit or accessories that are not in perfect condition must be exchanged immediately.
- Use only original spare parts and accessories.
- Markings made on the unit at the factory must not be altered, removed or made illegible.
- Only the settings described in these instructions may be set using the unit.

A.5 Warranty

The Controller has been manufactured and tested with regard to high quality and safety requirements. The Controller is subject to the statutory guarantee period of two years from the date of sale.

The warranty and liability shall not include, however, any injury to persons or material damage that is attributable to one or more of the following causes:

- Failure to observe these installation and operating instructions
- Improper installation, commissioning, maintenance and operation
- Improperly executed repairs
- Unauthorized structural changes to the unit
- Additional components have been installed into the Controller that have not been tested with it.
- Damage caused by continuing to use the Controller despite an obvious defect.
- Use of non-OEM spare parts
- Use of the device for other than its intended purpose
- Operation above or below the limit values listed in the Specifications section
- Force majeure

Description of the Controller

B.1 Specifications

Electrical Data:

Voltage	230VAC +/- 10% 50 - 60
Frequency	Hz
Consumption	0,5 - 2,5 W
Internal fuse	T2A / 250V slow blow
IP rating	IP40
Overvoltage category	II
Overvoltage category	II
Pollution degree	II

	TRS6 K
Mechanical relay 460 VA (AC1), 460 W (AC3)	3 (R1, R2, R3)
0-10V output, 10% tolerance, 10 kΩ, or PWM output, 1kHz, 10V	2 (V1, V2)
Pt1000 sensors, range from -40 °C to 300 °C	6 (S1 - S6)

Communication connection: CAN bus (Caleon)

Max. cable length for sensors / accessories:

Pt1000 sensors	<10m
CAN	<3m; over 3m, **a shielded twisted-pair cable is to be used and to be connected to the ground wire single-sidedly.**
0-10V / PWM	<3m
Mechanical relay	<10m

Clock backup time: 24 h

Permissible Ambient Conditions:

Ambient temperature:	
for controller operation	0 °C - 40 °C
pro přepravu/skladování	0 °C - 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, optionally panel installation
Overall dimensions	163 mm x 110 mm x 52 mm
Aperture installation dimensions	157 mm x 106 mm x 31 mm
Display	fully graphical , 128x64 dots
Light diode	multicolour red/green
Control	4 keys

B.2 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

B.3 Controller Description

TRS6 K Controller permits control of up to 2 heating circuits (one mixed, one unmixed), control of DHW heating and control of automatic operation of solar thermal systems, solid-fuel boilers and auxiliary electric / gas-fired heat sources. It involves two PWM outputs for high-efficiency pump control, 3 relay outputs and 6 inputs for temperature sensors. It can be connected to CAN bus and used for example together with Caleon Room Unit.

The Controller can be used with different variants of installations, see Hydraulic Variants in Chapter D.2.

Important characteristics of the TRS6 K are:

- depiction of graphics and texts on a backlit display
- simple viewing of the current measurement values
- statistics and system monitoring by means of statistical graphics
- extensive setting menus with explanations
- menu block can be activated to prevent unintentional setting changes
- resetting to previously selected values or factory settings

B.4 Disposal

IMPORTANT INFORMATION ON PROPER DISPOSAL OF E-WASTE AS REQUIRED BY THE EC DIRECTIVE 2002/96/EC (WEEE)

Do not dispose of this product as unsorted municipal waste. Please dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling.

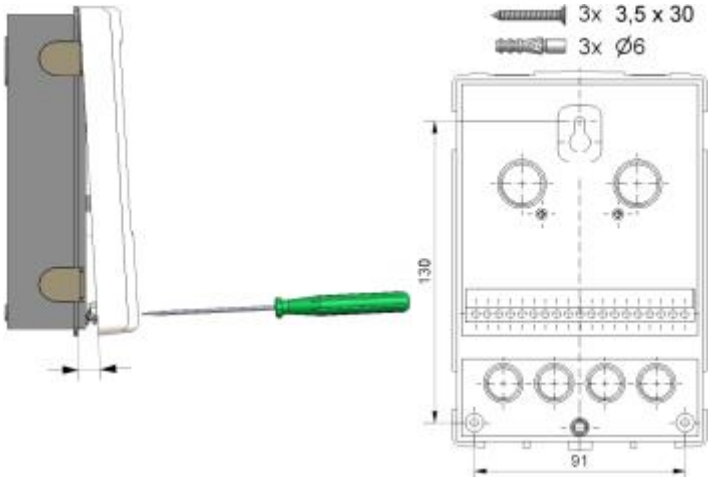
Respecting these rules will help to preserve, protect and improve the quality of the environment, protect human health and utilize natural resources prudently and rationally.

The crossed out wheeled bin with marking bar, printed ether in the Manual or on the product itself, identifies that the product must be disposed of at a recycling collection site.

Installation

C.1 Wall Installation

Install the Controller in dry rooms only!



1. Unscrew cover screw completely.
2. Carefully pull upper part of housing from lower part.
3. Set upper part of housing aside. Do not touch the electronics inside.
4. Hold the lower part of the housing up to the selected position and mark the three mounting holes. Make sure that the wall surface is as even as possible so that the housing does not become distorted when screwed on.
5. Using a drill and size 6 bit, drill three holes at the points marked on the wall and push in the plugs.
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.

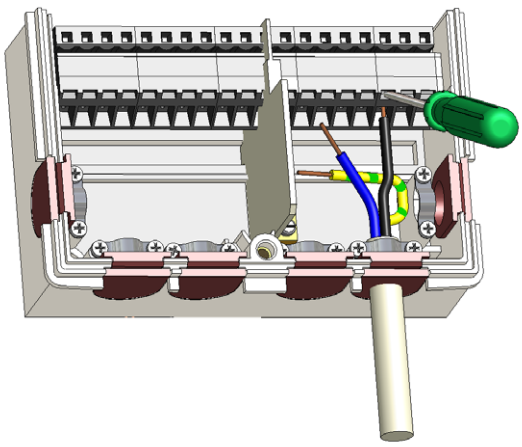
C.2 Electrical Wiring

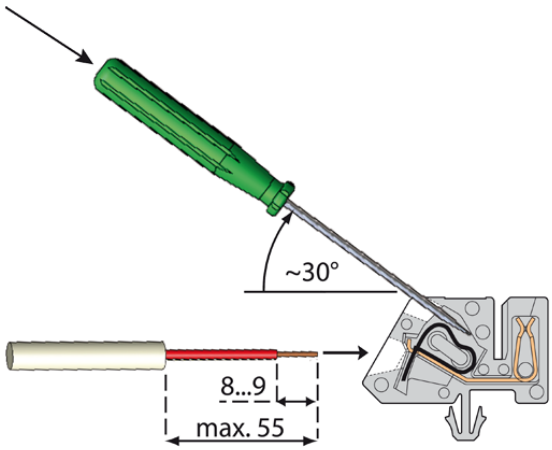
Before working on the unit, switch off the power supply and secure it against being switched on again! Check that there is no power flowing! Electrical connections may only be made by a specialist and in compliance with the applicable regulations. The unit may not be put into operation if there is visible damage to the housing, e.g. cracks.

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 power switch. It can be switched off e.g. by a circuit breaker in the electrical enclosure.

The cables being connected to the unit must not be stripped by more than 55 mm, and the cable jacket must reach into the housing just to the other side of the strain relief.





1. Open the Controller cover.
2. Strip lines a max. of 55 mm, assemble the strain reliefs.
3. Strip ends of all wires 8-9 mm.
4. Open clamps with a fitting screwdriver and connect the conductors following the wiring diagram.
5. Close the cover again and fix with the screw.
6. Turn on mains supply and commission the controller.

C.3 Installing the Temperature Sensors

The controller operates with Pt1000 temperature sensors.

The max. length of a sensor cable is 10m, use cables of 0.75 mm2 cross section min. Ensure there is no contact resistance! Position the sensor precisely in the area to be measured! Only use immersion, pipe-mounted sensors with the appropriate permissible temperature range. Flat-mounted contact sensors shall be used only exceptionally.

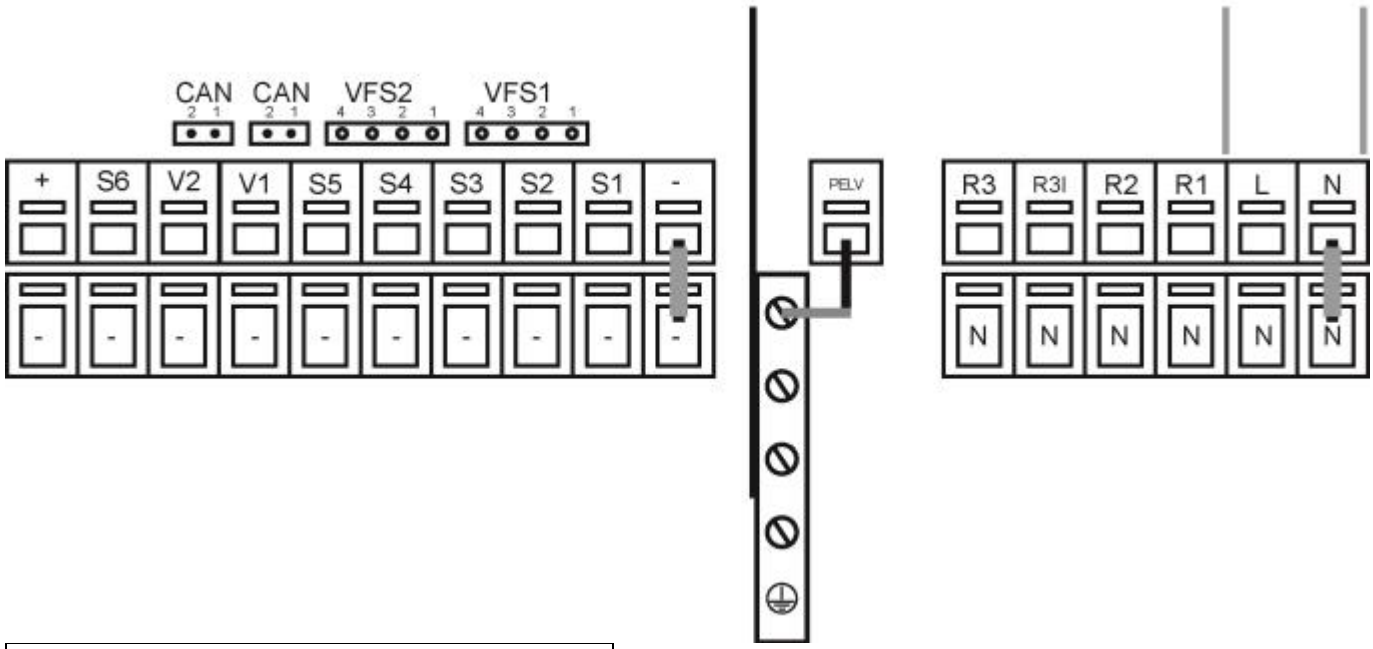
Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.

When connecting high-efficiency pumps via PWM, it is necessary to respect the proper wiring (i.e. connect “PWM output“ terminals on the Controller to “PWM input” terminals on the Controller and “GND” on the Controller with “GND” on the pump).

D.1 Terminals

Low voltage
max. 24 VDC

Power supply voltage
230 VAC 50 - 60 Hz



On the control board	
CAN1	CAN bus connection (1=high,2=low)
CAN2	CAN bus connection (1=high,2=low)
VFS1	Not used in Regulus systems.
VFS2	

Terminal:	**Connection:**
-	GND bridge for sensors, V1 and V2 outputs, power supply
S1	Temperature Sensor 1
S2	Temperature Sensor 2
S3	Temperature Sensor 3
S4	Temperature Sensor 4
S5	Temperature Sensor 5
S6	Temperature Sensor 6 (outdoor)
V1	0-10V / PWM signal output e.g. to control high-efficiency pumps
V2	0-10V / PWM signal output e.g. to control high-efficiency pumps
+	24V Power supply (e.g. for Caleon Room Units)

The connection of the ground wire is made at the lower grey terminal block.

Terminal:	**Connection:**
N	neutral conductor N
L	network outer conductor L
R1	relay 1
R2	relay 2
R3|	relay 3 normally closed contact (NC)*
R3	relay 3 normally open contact (NO)*

The neutral conductor N must be connected to the N terminal block.

The PE protective conductor must be connected to the PE metal terminal block!

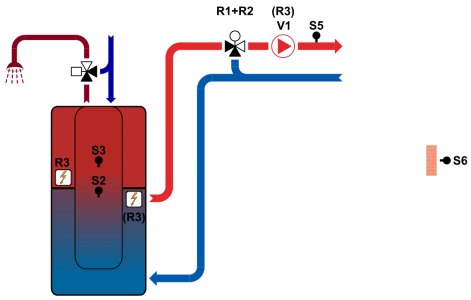
** Warning: These are voltage outputs!*

D.2 Hydraulic Variants

The following illustrations should be regarded only as schematic representations of the respective hydraulic systems and do not claim to be complete. Under no circumstances should the controller replace any safety devices. Depending on the specific application, additional system and safety components such as check valves, non-return valves, safety temperature limiters, scalding protectors, etc., may be required.

hydraulic variant No.	thermal store	DHW heating chap. 5.3.	solid fuel boiler chap. 5.11.	solar thermal system chap. 5.12.	aux. heating location - DHW chap. 5.8.	aux. heating location - ThSt chap. 5.8.	mixed heating circuit 1 chap. 5.1.	unmixed heating circuit 1 chap. 5.1.	unmixed heating circuit 2 chap. 5.2.	heat exchange ThSt->DHW chap. 5.6.	heating circuit return preheating chap. 5.22.
1	HSK DUO	✓			✓	✓	✓				
2	HSK DUO	✓	✓		✓	✓	✓				
3	HSK DUO		✓				✓				✓
4	HSK DUO	✓		✓	✓	✓	✓				
5	PS		✓			✓	✓				
6	PS	✓			✓	✓	✓			✓	
7	PS	✓	✓				✓			✓	
8	HSK DUO						✓				✓
9	PS	✓		✓			✓			✓	
10	PS	✓		✓	✓	✓	✓				
11		✓	✓		✓			✓		✓	
12		✓	✓			✓		✓		✓	
13							✓				
14							✓		✓		

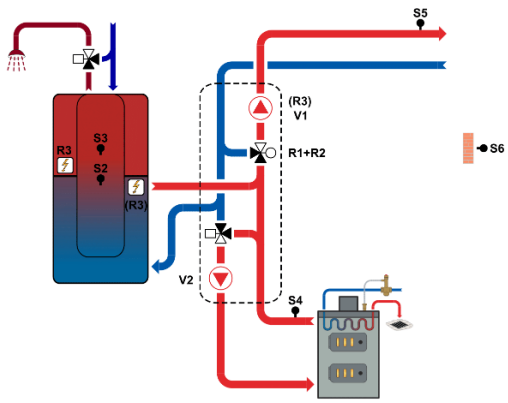
1. Combination thermal store (HSK) with a mixed heating circuit



S1	room temperature
S2	thermal store temperature
S3	hot water storage tank temperature
S4	
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	aux. heat source for DHW

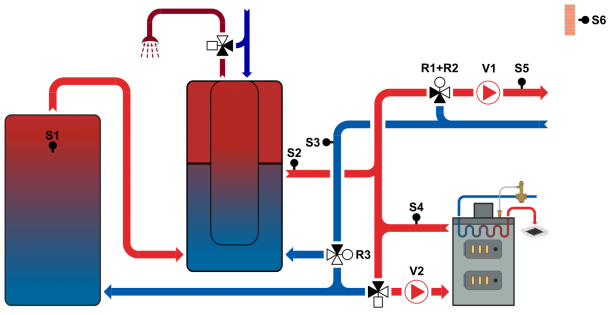
2. Combination thermal store (HSK) with a solid fuel boiler and a mixed heating circuit

For RegulusBIO MIX TRS6 K pump station



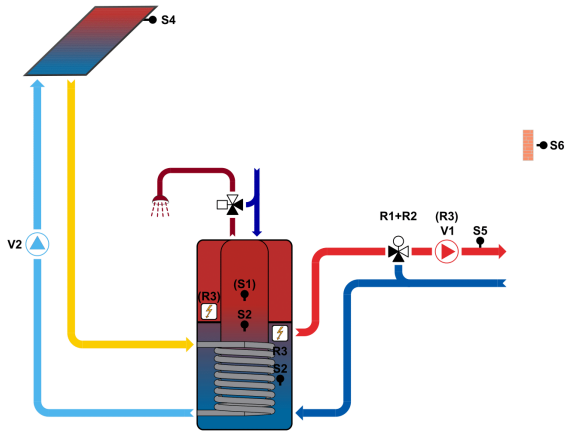
S1	room temperature
S2	thermal store temperature
S3	hot water storage tank temperature
S4	solid fuel boiler output temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	aux. heat source for DHW

3. Combination thermal store (HSK) with a solid fuel boiler, a mixed heating circuit and heating circuit return preheating



S1	temperature in the other thermal store (for preheating)
S2	thermal store temperature
S3	heating circuit return temperature
S4	solid fuel boiler output temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	return preheating valve

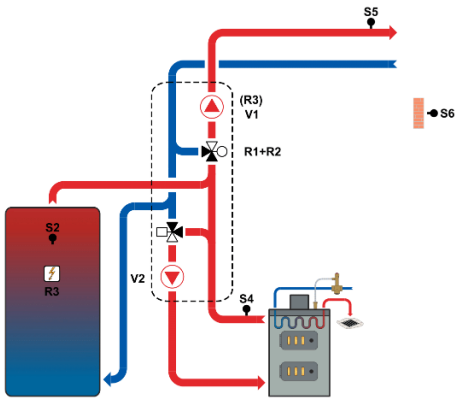
4. Combination thermal store (HSK) with a solar circuit and a mixed heating circuit



S1	room temperature
S2	thermal store temperature
S3	thermal store bottom section temperature (for solar)
S4	solar collector temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solar pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	auxiliary heat source in thermal store

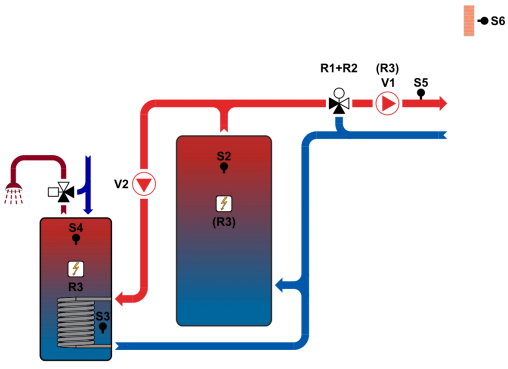
5. Thermal store with a solid fuel boiler and a mixed heating circuit

For RegulusBIO MIX TRS6 K pump station



S1	room temperature
S2	thermal store temperature
S3	
S4	solid fuel boiler output temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	auxiliary heat source in thermal store

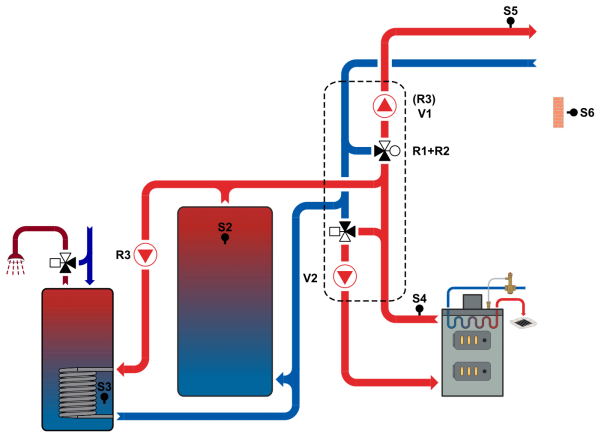
6. Thermal store with a mixed heating circuit and heat exchange to HW storage tank



S1	room temperature
S2	thermal store temperature
S3	HW storage tank bottom section temperature (heat exchange)
S4	hot water storage tank temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for heat exchange pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	aux. heat source for DHW

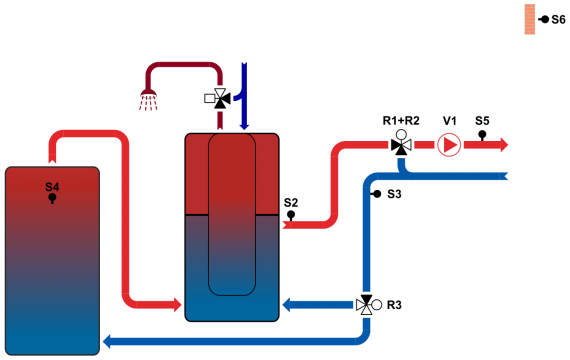
7. Thermal store with a solid fuel boiler, a mixed heating circuit and heat exchange to HW storage tank

For RegulusBIO MIX TRS6 K pump station



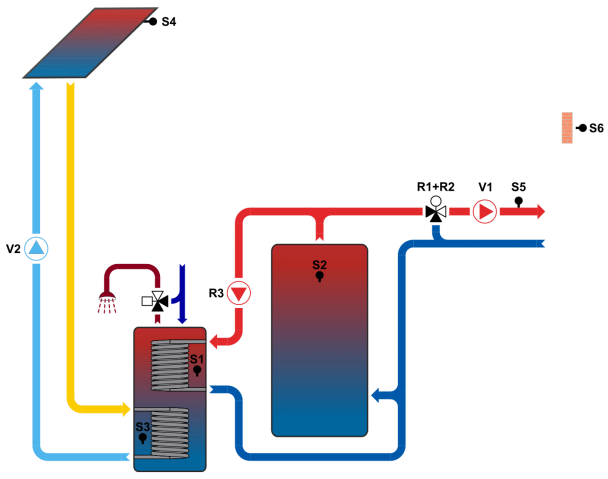
S1	room temperature
S2	thermal store temperature
S3	HW storage tank bottom section temperature (heat exchange)
S4	solid fuel boiler output temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	heat exchange pump

8. Combination thermal store (HSK) with a mixed heating circuit and heating circuit return preheating



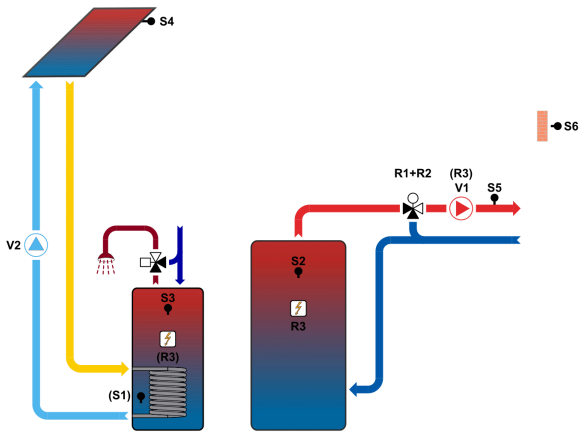
S1	room temperature
S2	thermal store temperature
S3	with a mixed heating circuit and heating circuit return preheating
S4	temperature in the other thermal store (for preheating)
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	return preheating valve

9. Thermal store with a mixed heating circuit, heat exchange to HW storage tank and solar circuit for DHW heating



S1	HW storage tank upper section temperature (heat exchange)
S2	thermal store temperature
S3	HW storage tank bottom section temperature (for solar)
S4	solar collector temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solar pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	heat exchange pump

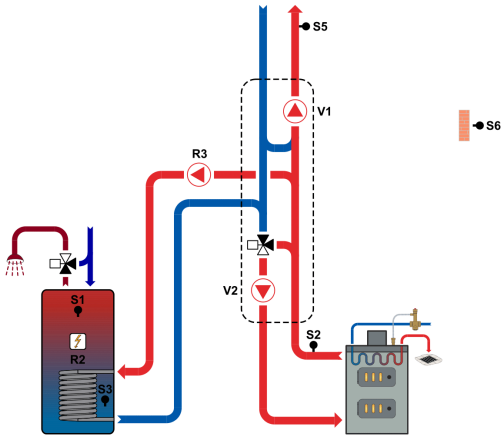
10. Thermal store with a mixed heating circuit and separate solar circuit DHW heating



S1	room temperature
S2	thermal store temperature
S3	hot water storage tank
S4	solar collector temperature
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solar pump
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	auxiliary heat source in thermal store

11. Pump station controlling a solid-fuel boiler pump, a heating circuit and heat exchange to HW storage tank (afterheating in HW storage tank)

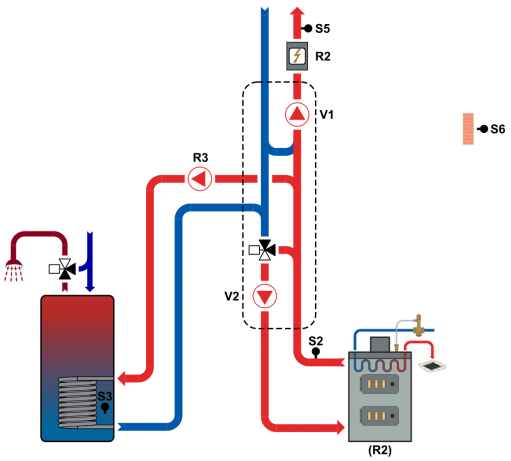
For RegulusBIO MIX TRS6 K pump station



S1	hot water storage tank temperature
S2	solid fuel boiler output temperature
S3	HW storage tank bottom section temperature (heat exchange)
S4	
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	
R2	aux. heat source for DHW
R3	heat exchange pump

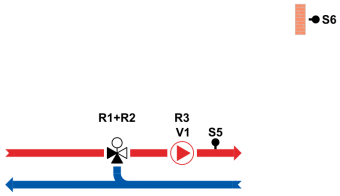
12. Pump station controlling a solid-fuel boiler pump, a heating circuit and heat exchange to HW storage tank (heating water afterheating)

For RegulusBIO MIX TRS6 K pump station



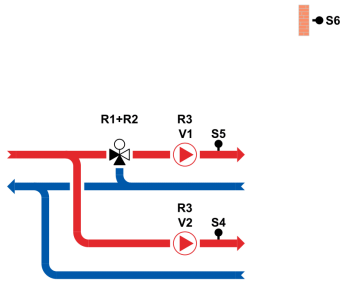
S1	room temperature
S2	solid fuel boiler output temperature
S3	HW storage tank bottom section temperature (heat exchange)
S4	
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	PWM signal for solid fuel boiler pump
R1	
R2	aux. heat source (heating water afterheating)
R3	heat exchange pump

13. Mixed heating circuit



S1	room temperature
S2	
S3	
S4	
S5	heating water temperature
S6	outdoor temperature
V1	PWM signal for heating circuit circulation pump
V2	
R1	heating circuit mixing valve - opening
R2	heating circuit mixing valve - closing
R3	power switching for heating circuit circulation pump

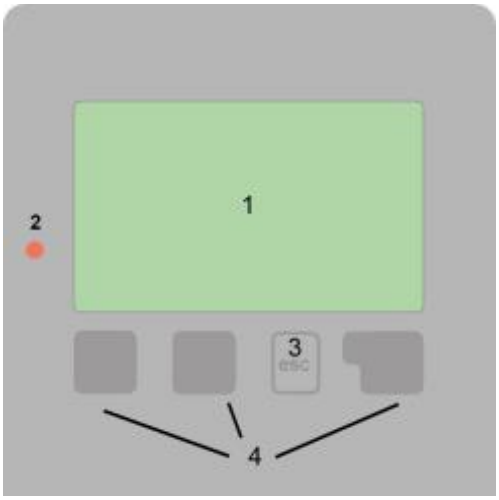
14. Mixed heating circuit and unmixed heating circuit



S1	room temperature (heating circuit 1)
S2	room temperature (heating circuit 2)
S3	
S4	heating water temperature, circuit 2
S5	heating water temperature, circuit 1
S6	outdoor temperature
V1	PWM signal for heating circuit 1 circulation pump
V2	PWM signal for heating circuit 2 circulation pump
R1	heating circuit 1 mixing valve - opening
R2	heating circuit 1 mixing valve - closing
R3	power switching for heating circuit 1 circulation pump

Operation

E.1 Display and Input



The display (1) shows in text and graphical mode the hydraulic variant, desired and measured values and other text information.

The LED (2):
is lit green – when a relay is switched on
is lit red - when Auto mode is set and all relays are off
flashes slowly red – when Manual mode is set
flashes fast red - when an error is present

Entries are made using 4 keys (3+4), to which contextual functions are assigned. The "esc" key (3) is used to cancel an entry or to exit a menu. If applicable, a request for confirmation appears to save the made changes.
The functions of the other 3 keys (4) is shown in the display right above the keys. The right-hand key generally has a confirmation and selection function.

The graphics mode appears if no key is pressed for 2 minutes or after exiting the main menu with "esc".

The temperature overview appears when you press the left button. Tapping the button again leads back to the graphic overview.

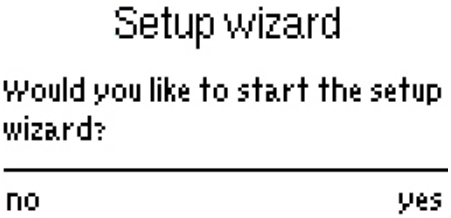
Pressing the "esc" key in the graphics mode takes you directly to the main menu.

⚠ Warning/Error message
New information available

Examples of key settings:

+/-	increase / decrease values
▼/▲	scroll down / up menu
Ano/Ne	agree / reject
Info	further information
Zpět	to the previous display
Ok	confirm selection

E.2 Commissioning Help - Setup Wizard



The first time the controller is turned on, a request appears on the display regarding setting the language and time.

After that 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 level 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, the mode menu 4.1 "Manual" should be used to test the switched outputs with the consumers connected, and to check the sensor values for plausibility. Only after checking proper operation of all connected consumers and sensors in the Manual mode, switch on automatic mode.

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
- menu 3.1. Time and Date
- menu 7.1. Program Selection
- menu 5. Settings, all values.
- menu 6. Protection Functions (if any adjustments necessary)
- menu 7. Special Functions (if any adjustments necessary)

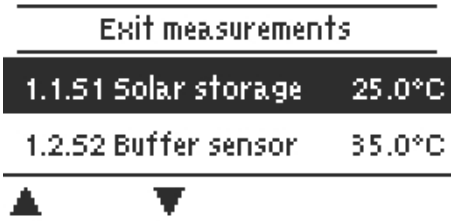
Note: The setup wizard can be accessed in menu 7.12 at any time.

Finally, the mode menu 4.1 "Manual" should be used to test the switched outputs with the consumers connected, and to check the sensor values for plausibility. Only after checking proper operation of all connected consumers and sensors in the Manual mode, switch on automatic mode.

Consider the explanations for the individual parameters on the following pages and check if further settings are necessary for your application.

Measurement Values

1. Measurement Values



Menu 1. Measurement Values is intended to display the current measured temperatures. The selected program and the specific model design determine which measurement values are displayed.

The menu is closed by pressing “esc” or selecting “Exit measurements”.

If “error” appears on the display instead of the measurement value, there may be a defective or incorrect temperature sensor. If the cables are too long or the sensors are not placed well, small deviations in the measurement values may occur. In this case, the display values can be compensated by adjustments in the controller - see “Sensor calibration”, chap. 7.6. The selected program, connected sensors and the settings determine which measurement values are displayed.

2. Statistics

Menu 2. Statistics is intended for function control and long-term monitoring of the system.

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

For system data statistics it is essential for the time to be set accurately on the controller. Please note that the clock will stop if the mains voltage is interrupted, and afterward must be reset. Incorrect time may result in data being cleared, recorded incorrectly or overwritten.

2.1. Today

In the graphical overview the characteristics of the flow temperature for the present day is shown from 0 to 24 h. The right button changes the unit of time (days) and the two left buttons scroll through the diagram.

2.2. 28 days

In the graphical overview the characteristics of the flow temperature during the last 28 days is shown. The right button changes the unit of time (days) and the two left buttons scroll through the diagram.

2.3. Operating hours

Display of the operating hours of the controller outputs, where different time ranges (last day, week, month, year) are available.

2.5. Graphic overview

This results in a clear illustration of the data from 2.1. to 2.2. as a bar graph. Different time ranges are available for comparison. You can page through with the two left keys.

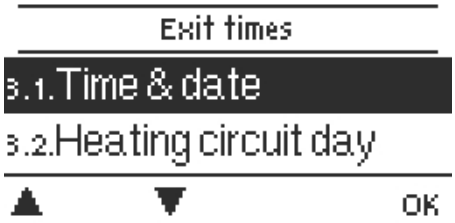
2.6. Error Messages

Display of the last 10 errors in the system with indication of date and time.

2.7. Reset/Clear

Resetting and clearing the selected statistics. Selecting “All statistics” clears everything except for the error log.

3. Periods



Menu 3. Periods contains settings for time, date and operating times for the heating circuit.

The menu is closed by pressing “esc” or selecting “Exit periods”.

The associated temperature reference values are specified in Menu 5. Settings.

3.1. Time & Date

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

For system data statistics it is essential for the time to be set accurately on the controller. Please note that the clock will stop if the mains voltage is interrupted, and afterward must be reset. Incorrect time may result in data being cleared, recorded incorrectly or overwritten.

3.2. Daylight saving time

Setting of an automatic change to and from DST (DST, Daylight Saving Time).

3.3. Heating Circuit

This menu is used to select the daytime (Comfort) mode times for the heating circuit; three time periods can be specified for each weekday and copied to the following days.

Unspecified times are automatically considered to be night-time (setback) mode. The set times are only taken into account in the “Automatic” heating circuit operating mode.

3.4. Heating Circuit Comfort

This menu can be used to select a time range for each day of the week in which the heating circuit is supplied with a comfort temperature increased by the value set in menu 5.1.8. This period can be used e.g. for quick heating in the morning after a longer operation in the setback mode.

3.5. Hot water enable

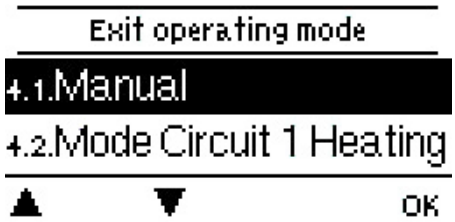
In this menu, the approval times for the DHW heating to temperatures set in menu 5.3.3 (DHW reference) are selected, whereby for every weekday 3 periods can be determined and copied in the following days.

3.6. DHW heating (comfort)

This menu used to select a time range for each day of the week in which the DHW is heated to comfort temperature set in menu 5.3.4 (DHW comfort).

In times that are **not** set in menu 3.5 and 3.6, DHW is heated to temperatures set in menu 5.3.2 (Hot water minimum).

4. Operating Mode



Menu 4. Operating Mode can be used to switch the controller to automatic mode, turn it off, or switch to manual mode.

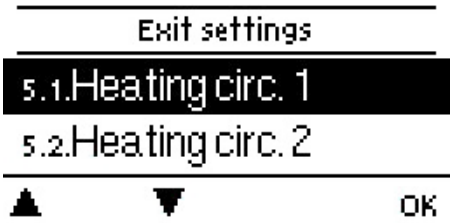
The menu is closed by pressing “esc” or selecting “Exit operating mode”.

4.1. Manual

In Manual mode, the individual relay outputs and the connected consumers can be checked for proper functioning and correct assignment. The relays and thus the connected consumers are switched on and off by pressing a key, with no regard to the current temperatures and set parameters.
The controller displays current measured temperatures.

The Manual mode may only be used by specialists for brief function tests, e.g. during commissioning or function checks. Activating Manual mode during normal operation may result in a system damage or overheated water in the HW storage tank!

5. Settings



In Menu 5. Settings the system parameters are set.

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

By no means does the controller replace any safety elements in a heating circuit, DHW circuit, solar circuit and in electric devices of a heating system.

5.1. Settings heating circuit (Heating circ.)

5.1.1. Operating mode

Heating = automatic operating mode for a heating circuit following the preset desired temperatures, periods and heating curves. A heating circuit is switched on if all currently set temperature and time conditions for **heating** are met.

Cooling = automatic operating mode for a heating circuit following the preset desired temperatures, periods and heating curves. A heating circuit is switched on if all currently set temperature and time conditions for **cooling** are met.

Heating/cooling = automatic heating and cooling operating when the transition between a heating and cooling modes is done by an external switch set in menu 5.1.19 (Room unit) to **sensor type = season**.

Ref. value = a special operating mode for a heating circuit, keeping a constant flow temperature set in menu 5.1.4. The controller ignores all other set desired temperatures, periods and heating curve.

14 day ref. value = a special operating mode for a heating circuit, keeping a constant flow temperature set in menu days. In this period, the controller ignores all other set desired temperatures, periods and heating curve.

5.1.2. S/W day

If this temperature is exceeded at the outdoor sensor in the day period (comfort mode) of the heating circuit, the controller will turn off the heating circuit and switch to the Summer mode. When the outdoor temperature drops below this value, the heating circuit will be turned on again and switched to Winter mode.

5.1.3. S/W night

If this temperature is exceeded at the outdoor sensor in the night period (setback mode) of the heating circuit, the controller will turn off the heating circuit and switch to the Summer mode. When the outdoor temperature drops below this value, the heating circuit will be turned on again and switched to Winter mode.

5.1.4. Heating circuit refer.

This menu is available only when the operating mode ***Ref. value*** is set in menu 5.1.1.

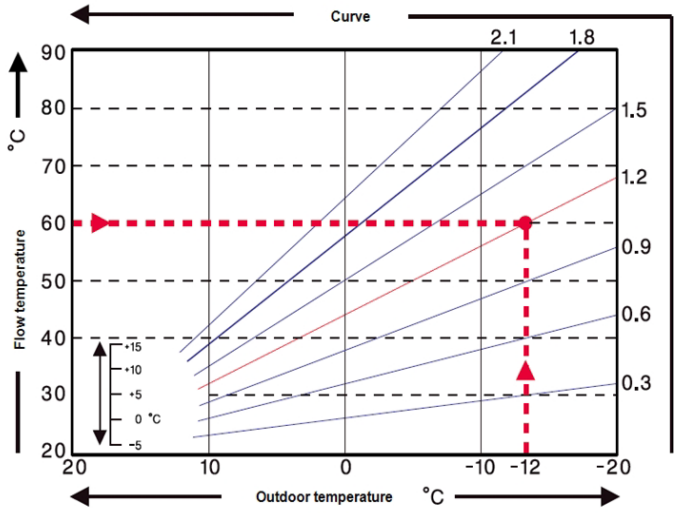
This is the fixed heating water temperature for the operating mode ***Ref. value*** set in menu 5.1.1.

5.1.5. Heating curve

The weather compensating curve is used to control the heat dissipation of the heating circuit relative to the outdoor temperature. The curve can be set either as simple, or as split that is divided by a ***slope change point*** into two parts. The simple curve can be set using one parameter. The split one needs to be set in 3 steps.

If the simple curve is selected, then it can be adjusted using a graph. The slope is changed and the calculated temperature for -12 °C outdoor temperature is shown.

Setting a split curve is more precise but also more complicated. First, a standard slope is set, then the slope change point and finally the slope after the slope change point. When setting the curve, the slope and calculated flow temperatures are shown for -12°C outdoor temperature.
The graph shows the influence of the selected slope of a simple curve (in the form of a straight line) on the calculated reference flow temperature. The correct curve is determined by defining the intersection point of the calculated max. flow temperature and min. outdoor temperature.



The right selection of a heating curve has a principal influence on a comfortable and efficient operation of a heating circuit. Its setting shall be done exclusively by an expert and based on the parameters of the specific heating system and its designed temperature drop.

Example:

Max. designed flow temperature is 60 °C for -12 °C outdoor temperature.

Then, the curve with 1.2 slope shall be selected in the controller.

The following settings (5.1.6. to 5.1.8.) can be used to apply a parallel shift of the heating curve for Day, Night and Comfort Temperature Boost modes.

5.1.6. Day correct.

The following settings (5.1.6. to 5.1.8.) can be used to apply a parallel shift of the heating curve for Day, Night and Comfort Temperature Boost modes.

5.1.7. Night correct.

The Night correction causes a parallel shift of the heating curve during nighttime operating hours. The value represents "by how many °C" the heating circuit will be hotter/colder in the Night mode. Positive values mean a higher temperature, negative values a lower temperature.

5.1.8. Comfort boost

The comfort temperature boost is a value added to / subtracted from the set day correction following a separate time schedule (3.4. Heating Circuit Comfort). The value of temperature increase / reduction is independent of the periods and Day/Night corrections.

In this manner it is possible to carry out e.g. quick heating up after night operating hours through a steeper heating water temperature rise, or on the contrary, a quicker temperature drop during a faster transition to night operating hours.

5.1.9. Min. flow

The minimum flow temperature kept while the heating circuit is on. In addition to that, the minimal flow temperature is the reference flow temperature for the frost protection function (6.2.) when the heating circuit is off.

5.1.10. Max. flow

The maximum flow temperature. When exceeded, the heating circuit pump will be switched off and not started again until the temperature falls below this value.

Limiting the max. flow temperature does not replace a high limit thermostat that shall be connected to the pump power cable in systems that require safe limiting the max. flow temperature (e.g. underfloor heating, pipes or devices of lower temperature resistance etc.).

5.1.11. Reference/actual -

Switch on hysteresis for an auxiliary heat source. If the flow temperature or thermal store temperature drops below the desired flow temperature by the given value, the request for an auxiliary heat source will be activated after 1 minute.

Heat request is started when the flow temperature is continuously below reference temperature for 1 minute.

The request only works if a heat source is activated in the respective menu, not blocked and set for the heating circuit request (HC request).

5.1.12. Reference/actual +

Switch off hysteresis for an auxiliary heat source. If the flow temperature or thermal store temperature exceeds the desired flow temperature by the given value, the request for an auxiliary heat source will be de-activated after 1 minute.

5.1.13. Version

Conditions for shutting off the heating circuit pump.

FL = the circulation pump is shut down if the reference temperature is exceeded.

SW = In the summer/winter mode (SW), it is shut down in the winter mode at Tmax, in the summer mode the heating circuit pump is shut down in general.

5.1.14. HC off

Conditions for shutting off the heating circuit.

Summer = the heating circuit will be shut off when the summer mode conditions are reached (threshold temperature exceeded, see 5.1.2. and 5.1.3)

Summer + room = the heating circuit will be shut off when the summer mode conditions are exceeded or the desired room temperature reached

5.1.15. Room hysteresis

Available only when the function HC off = Summer + room is activated (in menu 5.1.14). Hysteresis for switching on the heating circuit again. If the room temperature drops below the desired value by the set hysteresis, the heating circuit will be switched on again.

5.1.16. Buffer sensor

Choosing a thermal store (buffer) sensor for a proper operation of the heating circuit. Or it may be a boiler flow sensor in systems with a boiler and no thermal store.

This selection is required for a proper functioning of heat sources. The source shall be activated with HC request enabled (the heat source is started when there is a heat request for a heating circuit).

5.1.17. Thermal inertia of a building

Thermal inertia of a building indicates how fast the calculated desired heating water temperature (following the heating curve) is influenced by a change in outdoor temperature. The heavier the building design, the more slowly can be the heating water temperature modified through the outdoor temperature. The value of thermal inertia indicates the delay with which the given outside temperature change is reflected in the calculation.

0 = No correction applied, all changes are immediate

1 = 15 minutes delay, **2**= 60 minutes, **3** = 120 minutes, **4** = 300 minut

5.1.18. Overload protection

If this function is activated and the temperature at the thermal store sensor exceeds **"Max. buffer"** (an adjustable threshold, displayed after the function is turned on), the heating circuit pump will start at max. speed, disregarded of the actual mode of the heating circuit. While in the active protection mode, the controller will mix heating water to the max. HC temperature (5.1.10.). As soon as the temperature in the thermal store drops below **"Max. buffer"** minus 5°C, the heating circuit will return to its original mode.

5.1.19. Room Controller

This value is used to appoint the amount of influence the room temperature has on the reference flow temperature, as a percentage. For every degree the room temperature deviates from the reference room temperature, the percentage of the calculated reference flow temperature set here is added to or subtracted from the reference flow temperature. So the flow temperature is being adjusted following the real indoor temperature which reduces inefficient overheating of a building (or underheating e.g. in case of intensive ventilation). Flow temperature correction is possible only within the limits of the Min. (5.1.9.) and Max. (5.1.10.) Flow temperature.

Example:

The desired room temperature: 25 °C, current measured temperature: 20 °C (the difference is 5° C); the outdoor temperature is 0 °C
The calculated flow temperature following the heating curve is 40 °C. The room unit is set to 10%, 10% of the calculated temperature 40 °C makes 4 °C. The difference between the desired and current room temperature is multiplied by this value, i.e. 4x5 °C = 20 °C.
The required flow temperature shall be then increased by 20 °C, from 40 to 60 °C. If the Max. Flow parameter (5.1.10) is set to 50 °C, the required flow temperature will be increased only to this value.

Room Reference (Day)

The desired room temperature for day mode.

Room Reference (Night)

The desired room temperature for night mode.

In the modes **Ref, val.** and **14 day ref. val.** (menu 5.1.1.) the room unit has no influence.

Thermostat

The room controller is set here:

RC20 = the room unit has a direct influence on the flow temperature depending on the difference between the desired and real room temperature (please select if you use RC20, RC21 or °Caleon room unit).

Contact = room thermostat with potential-free contact, contact open = Heating Circuit function turned off; contact closed = Heating Circuit function turned on.

Season = a seasonal switch connected (for the selected mode heating/cooling), contact open = cooling mode; contact closed = heating mode.

Thermostat

Input terminal where a thermostat, seasonal input or a room unit's switch-over input is connected.

If you use °Caleon room unit, here you should select the unit with the appropriate ID (ID for °Caleon units can be found in menu 7.15 Network).

5.1.21. PV contact 1

This sensor input could be used as a PV-contact of Photovoltaic-System. If the PV-Contact set in this menu is closed, the heating circuit is set to Daytime mode.

For info on the operation and wiring of the PV contact please consult the technical manual of your PV system.

5.1.22. PV contact 2

This adds information on the condition of Smart grid from the electricity provider. When combined with the PV contact 1, the effect on the heating circuit is following:

PV1 open, PV2 open = heating circuit off

PV1 closed, PV2 open = heating circuit in Night mode

PV1 closed, PV2 closed = heating circuit in Day mode

PV1 open, PV2 closed = heating circuit in automatic mode following time program

5.2. Settings heating circuit 2 (Heating circ. 2)

Heating circuit 2 is present only in Variant 14 and its settings are identical with the settings of Heating circuit 1 (5.1).

5.3. Settings Domestic Hot Water (DHW)

By no means does the controller replace the safety appliances on site!

5.3.1. Operating mode

Auto = automatic DHW heating mode using the preset time program and temperatures

Vyp = DHW heating is off

5.3.2. Hot water minimum

Min. DHW temperature outside the preset periods (see 3.5.). If the temperature at the DHW sensor drops below this value, heat request for DHW is activated.

The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.3. DHW reference

The desired (min.) DHW temperature in the preset periods (see 3.5.). If the temperature at the DHW sensor drops below this value, heat request for DHW is activated.

The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.4. DHW comfort

The desired (min.) DHW temperature in the preset DHW Comfort periods (see 3.6.). If the temperature at the DHW sensor drops below this value, heat request for DHW is activated.

The request only works if a heat source is activated in the respective menu, it is not blocked and if this source is set for the DHW request.

5.3.5. DHW hysteresis

The temperature hysteresis (difference) for DHW heating to be switched off. If the DHW temperature exceeds the currently desired temperature (one of the temperatures set in 5.3.2. to 5.3.4. following time programs set in 3.5. and 3.6.) + hysteresis set here, the heat request for DHW is deactivated.

5.3.6. Buffer DHW load

The DHW heating from the thermal store is turned on at an active heat request for DHW and if the temperature at the thermal store sensor is at least 8°C higher than at the DHW sensor. The DHW heating from the thermal store is shut down if the temperature difference between the thermal store and HW storage tank is less than 4 °C or if the temperature at the DHW sensor has reached the desired value and no DHW heat request is present.

5.3.7. DHW priority

If this function is activated, the reference flow temperature during a BW heating will be set to the minimum flow temperature see " Min. Flow " on page 16 so that the mixer moves to the “closed” position.

5.3.8. DHW sensor

Here the DHW sensor is selected.

5.3.9. PV contact

This sensor input could be used as a PV-contact of Photovoltaic-System. If the PV-Contact is closed, the mode of DHW heating is changed to "comfort" (the desired DHW temperature will be set to the value of 5.3.4 DHW Comfort).

For information about the operation and the connection of PV-contact, refer to the technical description of your PV system.

5.4. 14 day reference value (14 day ref. val.)

The menu is available only if the mode 14 day ref. val. is set in menu 5.1.1.

Setting the program for heating circuit mode 14 day ref. val. In this menu, the start date and time for the program can be set together with the desired temperatures for the next 14 days.

5.5. Difference

The menu is available only if the differential thermostat is assigned to an output in menu 7. Special functions.

A differential thermostat that will switch on the output as soon as the switch-on temperature difference between sensors 5.5.2. and 5.5.3. is reached and switch it off if the switch-off temperature difference between sensors 5.5.2. and 5.5.3. is not reached any more.

5.5.1. ΔT DF on / ΔT DF off

Temperature difference between a source sensor 5.5.2. and consumer sensor 5.5.4. for switching on (ΔT on) and off (ΔT off) the respective controller output.

5.5.2. DF-Source

Temperature sensor for a heat source (e.g. a solar collector) – a higher temperature is expected than at the consumer sensor.

5.5.3. Diff. Tmin

Min. temperature at the heat source sensor that will permit the differential thermostat function. If the temperature **Diff. Tmin** is not reached at the heat source sensor, the differential thermostat output contacts will not close.

5.5.4. DF-Drain

Temperature sensor for a consumer (e.g. a thermal store) – a lower temperature is expected than at the source sensor.

5.5.5. Tmax DF-Drain

Max. temperature at the heat consumer sensor for switching off the differential thermostat function. If the temperature at the consumer sensor is higher than **DF-Drain**, the differential thermostat output contacts will not close.

5.6. Heat transfer

The menu is available only if the heat transfer function is assigned to an output in menu 7. Special functions.

The function of heat transfer between two hot water storage tanks that will switch on the output if the switch-on temperature difference between sensors 5.6.4. and 5.6.5 is reached and switch it off if the switch-off temperature difference between sensors 5.6.4. and 5.6.5. is not reached any more.

5.6.1. Δ T Heat transfer

Temperature difference between a source sensor 5.6.4. and consumer sensor 5.6.5. for switching on (ΔT on) and off (ΔT off) the heat transfer pump.

5.6.2. HT Tmax

Temperature difference between a source sensor 5.6.4. and consumer sensor 5.6.5. for switching on (ΔT on) and off (ΔT off) the heat transfer pump.

5.6.3. HT Tmin

Min. temperature at the heat source sensor that will permit heat transfer. If the temperature of **HT Tmin** is not reached at the source sensor, the heat transfer pump will not switch on.

5.6.4. HT-Source

The temperature sensor for a heat source (e.g. a thermal store) – a higher temperature is expected than at the consumer sensor.

5.6.5. HT-Drain

Temperature sensor for a consumer (e.g. a hot water storage tank) – a lower temperature is expected than at the source sensor.

5.7. General auxiliary heat source (Thermostat)

The menu is available only if the Auxiliary heat source function is assigned to an output in menu 7. Special functions.

Settings are identical with 5.8. Aux. heat source (heating element)

5.8. Aux. heat source (heating element)

The menu is available only if the Auxiliary heat source function is assigned to an output in menu 7. Special functions.

Switching an aux. heat source if there is a heat request to charge a thermal store (a request from a heating circuit) or a request for DHW heating.

5.8.1. DHW request

The Aux. heat source function will be activated only if there is a request for DHW heating (the measured DHW temperature has dropped below the currently desired temperature following the preset DHW temperatures and periods – see menu 5.3.).

5.8.2. HC request

The Aux. heat source function will be activated only if there is a request for thermal store heating for a heating circuit.

The aux. heat source switching is influenced by the time programs and method of switching – either following a request from DHW or following a request from the heating circuit. In case both the thermostats (5.8.1. and 5.8.2.) are switched off, the aux. heat source will never be switched on!

5.8.3. TH Set

Preset temperature to switch on an aux. heat source. The heat source will switch on when the temperature at the reference sensor (depending on the active request) drops below this value. In case of an active request, the reference sensor is the DHW sensor (5.3.8), in case of an active request for thermal store charging, the reference sensor is the thermal store (buffer) sensor (5.1.16.).

5.8.4. Delay

The aux. heat source switch-on delay. If all other switch-on conditions are met, the heat source will switch on after the time set here expires.

5.8.5. Hysteresis

The aux. heat source switch-off hysteresis. If the temperature at the reference sensor exceeds the preset temperature (5.8.3. **TH Set**) + hysteresis, the aux. heat source will be switched off.

5.8.6. Ecomode

The Energy Saving Mode for an aux. heat source in case when solid fuel boiler or solar charge is active. Either **Switch off** (the aux. source will turn off completely) or lowering options are available. In the lowering mode, the temperature Teco (5.8.7.) is used instead of **TH Set** (5.8.3.).

5.8.7. Teco

The set temperature for switching on an auxiliary heat source when the option lowering is selected and the Energy Saving Mode for an aux. heat source (5.8.6.) is active.

5.8.8. HC compensation

The desired heating water temperature reduction when the option lowering is selected and the Energy Saving Mode for an aux. heat source (5.8.6.) is active.

5.8.9. Heating rod periods

Time program for a heating element. For each weekday, three periods can be specified when the aux. source function is active. The source will be switched on in these periods only when the demand for switching from either DHW or a heating circuit is met and at the same time, the desired temperature is not reached.

5.8.10. Anti Legionella

Switching on protection against Legionella bacteria (this function makes sense only for a hot water storage tank). When this function is on, the controller will increase the desired temperature for DHW heating in the preset time intervals to the temperature 5.8.10.2. **AL Tref** using an auxiliary heat source.

This temperature will be kept by the controller at both the optional sensors (5.8.10.5., 5.8.10.6.) during the period set by parameter 5.8.10.3. **AL residence time**. After the set period expires, the date and time of the last AL heat is saved to parameter 5.8.10.4. **Last AL heat**.

5.11. Solid fuel boiler

The menu is available only if the Solid fuel boiler function is assigned to an output in menu 7. Special functions.

Switching on the solid fuel boiler pump when the difference between the boiler sensor and storage sensor (typically a thermal store or a hot water storage tank) is exceeded.

5.11.1. Solid fuel boiler Tmax

Maximum temperature at the storage sensor (5.11.6.) to stop the boiler pump. If the storage tank temperature is above this value, the boiler pump remains stopped disregarded of the other conditions.

5.11.2. Solid fuel boiler Tmin

Minimum temperature at the solid fuel boiler sensor (5.11.5.) to switch on the boiler pump. If the temperature at the boiler sensor is below this temperature, the boiler pump remains stopped disregarded of the other conditions.

5.11.3. Tmax KTP

Maximum temperature at the boiler sensor (5.11.5.) for the boiler pump to remain permanently on. If the boiler temperature is above this value, the boiler pump remains on even if the temperature difference is not met. When the max. storage temperature (5.11.1.) is reached, the pump is switched off again.

5.11.4. Δ T Solid fuel boiler

Switching temperature difference between the boiler sensor 5.11.5. and storage sensor 5.11.6. – to switch on (Δ T SF on) and off (Δ T SF off) the boiler pump.

5.11.5. Boiler sensor

Boiler temperature sensor – a higher temperature is expected than at the storage sensor.

5.11.6. Storage sensor

Storage temperature sensor – a lower temperature is expected than at the boiler sensor.

5.12. Solar

The menu is available only if the Solar function is assigned to an output in menu 7. Special functions.

Switching on the solar pump when the difference between the solar collector sensor and solar tank sensor (typically a thermal store or a hot water storage tank) is exceeded.

5.12.1. Tmin St.

Minimum temperature at the solar collector sensor (5.12.6.) to switch on the solar pump. If the temperature at the solar collector sensor is below this temperature, the solar pump remains stopped disregarded of the other conditions.

5.12.2. Δ T Solar

Temperature difference between a solar collector sensor 5.12.6. and a storage tank sensor 5.12.7. for switching on and off the solar pump.

5.12.3. Tmax

Maximum temperature at the solar tank sensor (5.12.7.) to start the solar pump. If the solar tank temperature is above this value, the solar pump remains stopped disregarded of the other conditions.

5.12.4. Starting aid

This function is not used for Regulus solar collectors.

For some solar thermal systems, in particular for evacuated tube collectors, the measurement recording on the collector sensors may be too slow or imprecise, because the sensor is often not on the warmest spot.

With an activated starting aid, the following procedure occurs:

If the temperature on the collector sensor increases within a minute by the value defined under "**Increase**", the solar circulation pump will be turned on for the set "**Purging time**". If the desired temperature difference (see 5.11.2) is not reached during this time, there will be a 5 minute block time for the start wizard function.

This function should only be activated by a technician if problems occur with the measurement recording. Observe in particular the instructions from the collector manufacturer.

5.12.5. Protective Functions

Protective functions for solar thermal system. The description of other protective functions can be found in Chap. 6. Protective Functions.

5.12.5.1. System protection

Priority protection function

The system protection should prevent an overheating of the components installed in the system through the forced shut down of the solar circulation pump. If the value "**AS Ton**" on the collector has been exceeded for 1 min., the pump will be turned off and not turn on again in order to protect the solar thermal system components from overheating. The pump is turned on again when the collector temperature drops below the value "**AS Toff**".

With the system protection on, there are increased stagnation temperatures in the solar collector and therefore an increased pressure in the system. The operating manuals from the system components must be observed.

5.12.5.2. Collector protection

The collector protection prevents the collector from overheating. A forced switching of the pump makes sure that the collector is cooled through the storage. If the value "**KS Ton**" is exceeded on the collector, the pump will be turned on in order to cool the collector. The pump is shut down if the collector temperature drops below "KS Toff" or the value "**KS Tmax Sp**." (5.12.5.2.3) on the solar storage is exceeded.

System protection has priority over collector protection! Even if the switch requirements for the collector protection are present, the solar circulation pump is turned off once "**AS T on**" is reached. As default, the values from the system protection (depending on the maximum temperature of the storage or other components) are higher than the collector protection.

5.12.5.3. 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 "**Return cooling Tref**" 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 "**Return cooling Tref**" is reached.

Energy is lost through the collector through this function! The recooling should only be activated in cases of exception, with low heat consumption, for example during holidays.

5.12.5.4. Frost Protection

A 2-level frost protection function can be activated. In level 1, the controller turns on the pump every hour for 1 minute if the collector temperature is below the set value "**Frost Level 1**". If the collector temperature continues to decrease to the set value "**Frost Level 2**", the controller will turn on the pump without disruption. If the collector temperature exceeds the value "**Frost level 2**" by 2 °C, the pump will turn off again.

Energy is lost through the collector through this function! Regulus solar thermal system use antifreeze fluid only and the frost protection is off.

5.12.5.5. Collector alarm

If the "Collector Tmax" temperature at the collector sensor is exceeded when the solar pump is turned on, a warning or error notification is triggered. There is a corresponding warning in the display.

5.12.6. Collector sensor

The temperature sensor placed at a solar collector – a higher temperature is expected than at the storage sensor.

5.12.7. Storage sensor

Temperature sensor for a solar tank (e.g. a thermal store) – a lower temperature is expected than at the collector sensor.

5.17. Gas boiler (Burner)

The menu is available only if the Burner function is assigned to an output in menu 7. Special functions.

Switching on the boiler when there is a request to charge a thermal store (demanded by a heating circuit), or to heat up DHW.

5.17.1. DHW request

The Boiler function will be activated only when there is an active demand for DHW heating (the measured DHW temperature has dropped below the currently desired value following the set DHW temperatures and periods – see menu 5.3.).

5.17.2. HC request

The Boiler function will be activated only when there is an active demand for charging the heating circuit's thermal store.

The boiler switching is influenced by the time programs and method of switching – either following a request from DHW or following a request from the heating circuit. In case both the thermostats (5.17.1. and 5.17.2.) are switched off, the boiler will never be switched on!

5.17.3. Burner sensor

An optional boiler temperature sensor for switching off the boiler when the max. temperature is reached (see 5.17.9.).

5.17.4. Delay

Boiler switching delay. If all other switch-on conditions are met, the boiler will switch on after the period of time set here expires.

5.17.5. Eco mode

A boiler economy mode when heating by a boiler or solar collectors is active. This function can be operated in 2 different variants: **Shutdown**, when the boiler is completely switched off, or **Decrease**. In the Decrease mode, the boiler is switched on only if the temperature at the optional boiler sensor drops below **Teco** (5.17.6.).

5.17.6. Teco

The preset switch-on temperature for the boiler when the **Decrease** option is selected and the boiler Eco mode is active (see 5.17.5.).

5.17.7. HC offset

The desired HC temperature offset if the **Decrease** option is selected and the boiler Eco mode is active (see 5.17.5.).

5.17.9. Tmax

Maximum boiler temperature measured by the optional boiler sensor. If this temperature at the set sensor is exceeded, the boiler is shut down. The boiler will be started again when the temperature drops below the value **Tmax**. Switching off the boiler by the max. temperature can be disabled by selecting the **Off** option.

5.17.10. Enable

Time program of the boiler. For each weekday, three time intervals can be specified when the boiler function is enabled. The boiler can be switched on in these intervals only if the switch-on request by either DHW or HC is met.

5.17.11. Anti Legionella

Protective function against Legionella.
The settings are identical with the settings of protective functions for aux. heat sources (see 5.8.10.).

5.22. Return flow increase

The menu is available only if the Return flow increase function is assigned to an output in menu 7. Special functions.

The return flow increase will be switched on when the difference between the storage sensor (e.g. thermal store) and the return flow sensor is exceeded.

5.22.1. RL Tmax

Max. temperature at the storage sensor (5.22.4.) to stop the return flow increase. If the storage temperature is above this value, the function remains stopped disregarded of the other conditions.

5.22.2. RL Tmax

A temperature difference between the storage sensor (5.22.4.) and the heating return flow sensor (5.22.3.) to switch on (Δt on) and off (Δt off) the return flow increase function.

5.22.3. Return flow sensor

The temperature sensor placed at a heating return flow – a lower temperature is expected than at the storage sensor.

5.22.4. Storage sensor

Temperature sensor for a storage tank (e.g. a thermal store) – a higher temperature is expected than at the heating return flow sensor.

5.23. Circulation (DHW recirculation)

The menu is available only if the DHW circulation function is assigned to an output in menu 7. Special functions.

Switching on the DHW recirculation pump when the temperature in the recirculation piping drops below the min. value.

5.23.1. Tmin

The min. DHW recirculation temperature to switch on the circulation pump. The circulation pump will switch on when the temperature at the reference sensor (5.23.3.) drops below this value.

5.23.2. Hysteresis

Hysteresis for switching off the circulation pump. If the temperature at the reference sensor reaches the set value (5.23.1. Tmin) + hysteresis, the DHW circulation pump will be shut down.

5.23.3. Circulation sensor

Circulation sensor in the DHW recirculation piping.

5.23.4. Circulation pause time

Pause time before the circulation pump is started again after it was shut down, when also the requirement **Tmin + hysteresis** is met. Intended to prevent frequent starting of the circulation pump.

5.23.6. Circulations periods

Time program of the DHW circulation pump. For each weekday, three time intervals can be specified when the DHW circulation pump function is enabled. The function will be switched on in these intervals only if the switch-on condition for DHW recirculation is met.

5.24. Dehumidifier

The menu is available only if the Dehumidifier function is assigned to an output in menu 7. Special functions. A special room unit °Caleon needs to be connected to the controller.

Switching on dehumidifying operation in the selected operating mode when the max. humidity set here is exceeded.

5.24.1. Operating mode

The operating mode of the dehumidifier function can be set here.

Summer = Dehumidifier is active only in the HC summer mode (see 5.1.2. and 5.1.3.).

Summer+Circ. = Dehumidifier is active only in the summer mode or if the HC circulation pump is running in winter mode.

Year round = Dehumidifier is active all year round disregarded of the heating circuit mode.

5.24.2. Reference humidity:

Max. humidity to switch on the dehumidifier function. The function will be switched on depending on the active operating mode if the actual humidity is higher than the set value.

5.24.3. Hysteresis

Hysteresis to switch off the dehumidifier. If the humidity drops below the value set here (5.24.2. **Reference humidity**) by the dehumidifier hysteresis value, the function will be switched off.

5.23.4. Dehumidifier periods

Time program of the Dehumidifier. For each weekday, three time intervals can be specified when the Dehumidifier function is enabled. The function will be switched on in these intervals only if the switch-on condition for Dehumidifier is met.

6. Protective Functions

In Menu 6. Protections the system protective functions are set and activated.

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

⚠ By no means does the controller replace the safety appliances on site!

6.1. Seizing Protection

If the anti-seizing protection is activated, the controller switches gradually all outputs at 12:00 noon for 5 seconds to prevent seizing of the pump/valve after long periods of inactivity.

6.2. Frost Protection

If the outdoor temperature at the respective sensor drops below 1 °C and the heating circuit is turned off, the heating circuit will automatically be turned on if the frost protection is activated and the reference flow temperature is set at the minimum flow temperature set under see "Min. Flow" (see 5.1.9.). As soon as the outdoor temperature exceeds 1 °C, the heat circuit is switched off again.

⚠ Switching the frost protection function off or setting the minimum flow temperature too low can lead to severe damage to the system.

6.3. Discharge Protection

With activated thermal store discharge protection and the temperature at thermal store sensor or heating circuit sensor dropping below the set min. temperature (6.3.2.), the HC mixing valve will be closed and its circulation pump shut down. This will prevent useless circulation of insufficiently warm heating water in the heating circuit.

6.3.2. Tmin for Discharge Protection

Minimum temperature at thermal store sensor or heating circuit sensor to switch on Discharge Protection. If the temperature at thermal store sensor or heating circuit sensor drops below this threshold, the HC mixing valve will be closed and its circulation pump shut down.

7. Special Functions

In Menu 7. Special Functions the basic controller settings and expanded functions are set.

The menu is closed by pressing “esc” or selecting “Exit Special Functions”.

⚠ The settings in this menu should only be changed by a specialist.

7.1. Program selection

Here the appropriate hydraulic variant is selected (see D.2. Hydraulic Variant). The respective diagram is displayed by pressing “info”.

The program selection normally occurs only once during the first entry into service by a specialist. An incorrect program selection may lead to unpredictable errors.

When the hydraulic variant is changed, other settings will be reset to default values.

7.2. Pump settings V1

This menu contains settings for pump speed control through the V1 output.

7.2.1. Signal type

The type of pump speed control is set here:

0-10V: high efficiency pump controlled by a 0-10V signal

PWM: high efficiency pump controlled by a PWM signal

7.2.2. Pump

A selection from the preset control profiles for the pump. The settings can still be changed manually after a profile has been selected.

7.2.3. Output Signal

This menu determines the type of the outgoing control signal. Solar pumps (**normal profile**) perform at their highest power when the signal is also at its maximum. Heating pumps (**inverted profile**) on the other hand are set to the highest power when the control signal is at the lowest.

7.2.4. PWM / 0-10V off

The control signal value for the pump to be turned off (required by pumps with cable break detection, their control signal value must not be zero).

7.2.5. PWM / 0-10V on

The control signal value for the pump to start and run at a minimum speed.

7.2.6. PWM / 0-10V max.

The control signal value for the pump to run at a maximum speed.

7.2.7. Show signal

Represents the set pump signal in a graphic and text overview.

7.3. Speed control V1

This menu involves setting the logic for a pump speed control through V1 output. The speed control function permits to change the speed of the connected pumps.

This menu may be unavailable in some program versions.

This function should only be activated by a specialist. Depending on the pump and its performance, the minimum speed should not be set too low, because otherwise the pump or the system may get damaged. The information provided by the relevant manufacturer must also be observed. If in doubt, the min. speed should generally be set rather higher.

7.3.1. Variant

The following speed variants are available here:

Off: There is no speed control. The connected pump is only turned off or on with full speed.

M1: Speed control set to ΔT, starts from the max. speed:

After the purging time the controller keeps the pump at the set max. speed. If the temperature difference ΔT between the reference sensors is smaller than the set value (in the settings for a solid fuel boiler or solar thermal system), then the speed is decreased by one step after the **Sweep time** expires. If the temperature difference between the reference sensors is greater than the set value, then the speed is increased by one step after the **Sweep time** expires. If the controller has adjusted the speed of the pump down to the smallest stage and the ΔT between the reference sensors is below the desired ΔT off, the pump is switched off.

M2: Speed control set to ΔT, starts from the min. speed:
After the purging time the controller switches to the set min. speed. If the temperature difference ΔT between the reference sensors is greater than the set value (in the settings for a solid fuel boiler or solar thermal system), then the speed is increased by one step after the **Sweep time** expires. If the temperature difference ΔT between the reference sensors is below the set value, then the speed is decreased by one step after the **Sweep time** expires. If the controller has adjusted the speed of the pump down to the smallest stage and the ΔT between the reference sensors is below the desired TΔ off, the pump is switched off.

M3: Speed control set to a constant heat source temperature, starts from the min. speed.

After the purging time the controller switches to the set min. speed. If the temperature at the heat source reference sensor is greater than the **Setpoint**, then the speed is increased. If the temperature at the source reference sensor is less than the **Setpoint**, then the speed is decreased.

7.3.2. Purging time

During this time the pump runs at its full speed (100 %) to ensure reliable starting. Only after this purging time does the pump run with speed control and switches to the max. or min. speed, depending on the variant set (M1-M3).

7.3.3. Sweep time

In the process of speed control a certain delay before any speed change is needed in order to avoid quick speed changes and subsequent large temperature oscillations.

7.3.4. Max. Speed

The maximum speed of the pump for speed control variants is determined here.

The indicated percentages are informative values that may vary to a greater or lesser extent depending on the system, pump and pump stage. 100% is the maximum possible power of the controller.

7.3.5. Min. Speed

The minimum speed of the pump for speed control variants is determined here.

The indicated percentages are informative values that may vary to a greater or lesser extent depending on the system, pump and pump stage. 100% is the maximum possible power of the controller.

7.3.6. Setpoint

This value is the control setpoint for speed control M 3 (see Chap. 7.3.1.) If this value undershot at the collector sensor, the speed is reduced. When it is exceeded, the speed is increased.

7.4. Pump settings V2

This menu involves settings for V2 speed control output.

The settings are identical with menu 7.2.

7.5. Speed control V2

This menu involves setting the logic for a pump speed control through V2 output.

The settings are identical with menu 7.3.

This menu may be unavailable in some program versions.

7.6. Sensor Calibration

If for example cables are too long or sensors are not positioned optimally, small deviations in the measured temperature values can occur. In such a case the deviation can be compensated for manually. The settings can be made for each individual sensor in steps of 0.5 °C.

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

7.7. Relay 1 (setting the R1 output)

If not all outputs are used in the selected hydraulic variant, free outputs can be assigned various additional functions. Every additional function can only be assigned once. For some settings, the option Inverted can be assigned which means that the relay remains closed for the whole operating time, turning to open only when the assigned function is switched on.

Please pay special attention to the relay's technical information (see "Specifications").

7.7.1. Heating Circuit

Heating circuit settings are described in Chap. 5.1.

7.7.2. Mixer opens

Here the separate parameters of mixing valve control can be adjusted.

7.7.2.2. Direction

The direction of the mixing valve rotation when opening – right or left.

7.7.2.3. Turn Time

The mixer is switched on i.e. is opening or closing for the time span set here, then the valve stops and a Pause (7.7.2.4.) starts. Depending on the temperature change, the controller controls further valve reaction. The shorter the turn (shift) time, the more precise is the control to the desired temperature, but slower, and vice versa.

7.7.2.4. Pause factor

The calculated pause time of the mixer is multiplied with the value set here. If the pause factor is "1", the normal pause time is used, "0.5" will use half the normal pause time, "4" would quadruple the pause time. The value is individual for different mixing system (actuator speed, thermal inertia of the system, flow rate, valve authority etc.). Setting a too short pause could cause instability and oscillation of mixing.

7.7.2.5. Increase

If the temperature drops very fast, this value is subtracted from the measured flow temperature so that the mixer's reaction is stronger. If the measured temperature does not drop any more, the measured value is used again. The measurement occurs once every minute.

These settings are only necessary in special cases at the time of initial commissioning by the specialist. Incorrect measurement values can lead to unpredictable errors and wrong functioning of the heating system.

7.7.3. Mixer closes

The setting is identical with the menu 7.7.2. Mixer closes.

7.7.6. Difference

Difference thermostat settings are described in Chap. 5.5.

7.7.7. Heat transfer

Heat transfer settings are described in Chap. 5.6.

7.7.8. Thermostat

Thermostat settings are described in Chap. 5.7.

7.7.9. Aux. heat source (heating element)

Heating element settings are described in Chap. 5.8.

7.7.10. Solid fuel boiler

Solid fuel boiler settings are described in Chap. 5.11.

7.7.11. Solar

Solar circuit settings are described in Chap. 5.12.

7.7.12. Gas boiler (Burner)

Gas boiler settings are described in Chap. 5.17.

7.7.14. Return flow increase

Return flow increase settings are described in Chap. 5.22.

7.7.15. Circulation

DHW recirculation settings are described in Chap. 5.23.

7.7.16. Error messages

The relay will close when an error occurs. This function can be reversed, which means that the relay will be closed normally and open when an error occurs.

The Controller error conditions are:

Collector protection

System protection

Frost Protection

Recooling

Anti Legionella

Message – a relay is activated when an informative message is displayed.

7.7.17. Dehumidifier

Dehumidifier settings are described in Chap. 5.24.

7.7.18. Parallel operation

The function switches parallel to the set signal output – both the outputs switch in parallel. The function can be inverted, so the output switches contrary to the set signal output.

7.7.18.2. Parallel to

Here, the output can be selected, which this function should be activated parallel to. Every available signal output can be selected.

7.7.18.3. Delay

In this menu, it is set how long to wait after switching the signal output until the parallel operated relay switches as well.

7.7.18.4. Followup time

In this menu, it is set how long the parallel-operated relay continues to operate after the set signal output has been deactivated.

7.7.20. Always on

Relay is permanently switched on.

7.8. Relay 2 (settings for R2 output)

Settings are identical with menu 7.7.

7.9. Relay 3 (settings for R3 output)

Settings are identical with menu 7.7.

7.10. Signal V1 (settings for V1 output)

Settings are identical with menu 7.7.

7.11. Signal V2 (settings for V2 output)

Settings are identical with menu 7.7.

7.12. Commissioning

The commissioning 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 (see also E.2.).

May be launched by an expert during commissioning only! Observe the explanations for the individual parameters and check whether further settings are necessary for your application.

7.13. Factory Settings

All settings can be reset, returning the controller to its delivery state.

The entire parametrization, statistics, etc. of the controller will be lost irrevocably. The controller must then be commissioned once again.

7.14. Eco Display Mode

In Eco Display Mode the backlight of the display is switched off if no buttons are pushed for 2 minutes. If a message exists, the backlight does not switch off until the message has been read by the user.

If a message is displayed, the backlight does not switch off until the message has been read by the user.

7.15. Network

If applicable, the network settings of the connected data logger have to be adjusted.

Regulus TRS6 K controller does not feature connection to a data logger and the menu 7.15.1-7.15.3 is not needed.

7.15.1. Access Control

This menu lets you give up to 4 users access to the data logger. The users that are registered then have access to the controller or respectively the data logger.

To add a user in the list, select **<add user>**. Leave the now the menu open und connect to the address of the controller or respectively the data logger through a web browser. Your user name is going to appear in this menu and can be selected and confirmed with OK.

7.15.2. Ethernet

Settings for Ethernet connection to data logger and controller.

7.15.2.1. MAC address

The physical MAC address of the controller.

7.15.2.2. Auto-Configuration (DHCP)

If auto-configuration is activated, the data logger requests IP addresses and network parameters from a DHCP server that assigns an IP address, subnet mask, gateway IP and DNS server IP. **If you deactivate the auto configuration (DCHP), you will have to make the required network settings manually!**

7.15.2.3. IP address

IP address of the controller.

7.15.2.4. Subnet

Subnet mask – see the network router settings.

7.15.2.5. Gateway

IP address of the network gateway (router).

7.15.2.6. DNS server

IP address of the DNS server for translation of domain names.

7.15.4. CAN bus ID

ID of the controller on the CAN bus, for connecting a °CALEON room unit.

7.15.5. Sensor reading interval

Interval for reading sensors connected to the CAN bus (e.g. temperature and humidity sensors inside the °CALEON room unit.

8. Menu Lock

Menu "8. Menu lock" can be used to secure the controller against unintentional changing the set values.

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

The menu lock represents a feature securing the controller against unintentional changing the set values.

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

1. Measurement values

2. Statistics

3. Times

8. Menu lock

To block the other menus, select “Menu lock on”. To enable the menus again, select “Menu lock off”.

9. Service values

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

Enter the values into the table when an error occurs.

The menu can be closed by pressing “esc”.

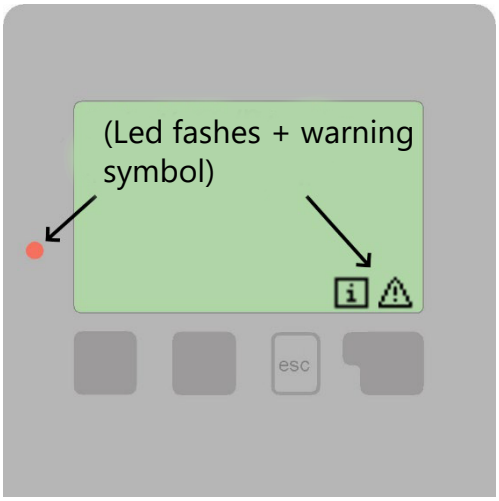
9.1.		**9.31.**	
9.2.		**9.32.**	
9.3.		**9.33.**	
9.4.		**9.34.**	
9.5.		**9.35.**	
9.6.		**9.36.**	
9.7.		**9.37.**	
9.8.		**9.38.**	
9.9.		**9.39.**	
9.10.		**9.40.**	
9.11.		**9.41.**	
9.12.		**9.42.**	
9.13.		**9.43.**	
9.14.		**9.44.**	
9.15.		**9.45.**	
9.16.		**9.46.**	
9.17.		**9.47.**	
9.18.		**9.48.**	
9.19.		**9.49.**	
9.20.		**9.50.**	
9.21.		**9.51.**	
9.22.		**9.52.**	
9.23.		**9.53.**	
9.24.		**9.54.**	
9.25.		**9.55.**	
9.26.		**9.56.**	
9.27.		**9.57.**	
9.28.		**9.58.**	
9.29.		**9.59.**	
9.30.		**9.60.**	

10. Language

Menu “10. Language” is used to select the language for the menu guidance. This is queried automatically during initial commissioning.

Malfunctions, Additional Info

Z.1. Malfunctions with error messages



If the controller detects a malfunction, the red light flashes and the warning symbol also appears in the display. If the error is no longer present, the warning symbol changes to an info symbol and the red light no longer flashes. To obtain more detailed information on the error, press the key under the warning or info symbol.

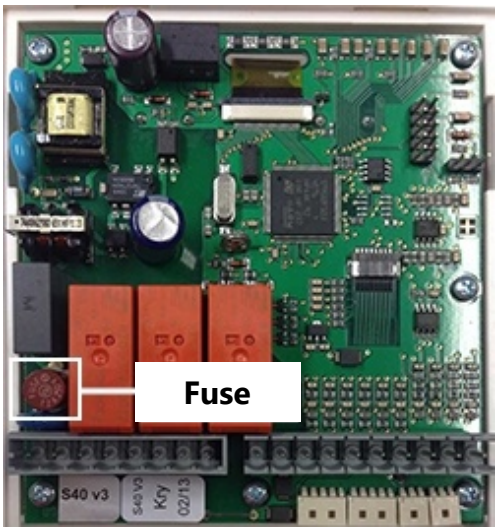
⚠ Consult a specialist in the event of an error!

Possible error messages:	Notes for the specialist:
Sensor x defectiv	Means that either the sensor, sensor entrance on the controller or the connecting wire is defective (see Temperature Resistance Table for Pt1000 Sensors, Chap. B.2)
Collector alarm	Means that the temperature on the collector set under 5.12.5.5. “Collector alarm" was exceeded.
Restart	Means that the controller was restarted, for example, due to a power outage. Check date & time!
Time & Date	This display appears automatically after a power supply disruption, because the time & date must be examined and, if applicable, adjusted.
Max. flow reached	The max. heating circuit temperature has been reached.
No flow	If ΔT between store and collector is 50 ° C or more for 5 minutes, this error message is displayed.
Frequent on/off	A relay swtiches frequently, i.e. opens and closes more than 5 times in 5 minutes.
AL not successful	This text will appear if the temperature at the sensor set as “**AL sensor 1**” does not reach the temperature “**AL Tref**” -5 °C for the time “**AL residence time**”.

Z.2 Replacing the Fuse

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



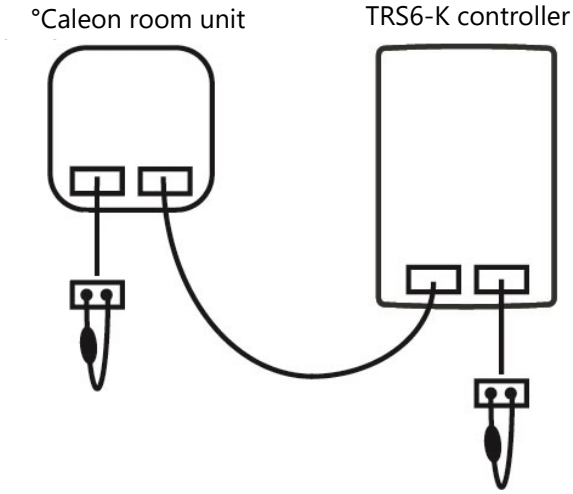
If the mains voltage is switched on and the controller still does not function or display anything, then the internal device fuse may be defective.

In that case, disconnect the device from the mains, open it, remove the old fuse and check it. If it is defective, replace it with a new one, locate and repair the external source of the error (e.g. the pump).

Then first recommission the controller and check the function of the switch outputs in manual mode as described in Chap. 4.1.

Z.3 CAN Bus

The CAN bus is used to connect °CALEON room units.



1. The devices are connected in series with the CAN bus cable.
2. The first and last devices in one connection in series must be fitted with terminating resistance.

Both the CAN sockets are identical! No matter how the cables are wired.

Z.4 Maintenance

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

Performing maintenance:

- Check date & time (Chap. 3.1.)
- Assess/check plausibility of statistics (Chap. 1.)
- Check the error memory (Chap. 2.6.)
- Check the switch outputs in manual mode (Chap. 4.1.)
- Possibly optimize the parameter settings

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