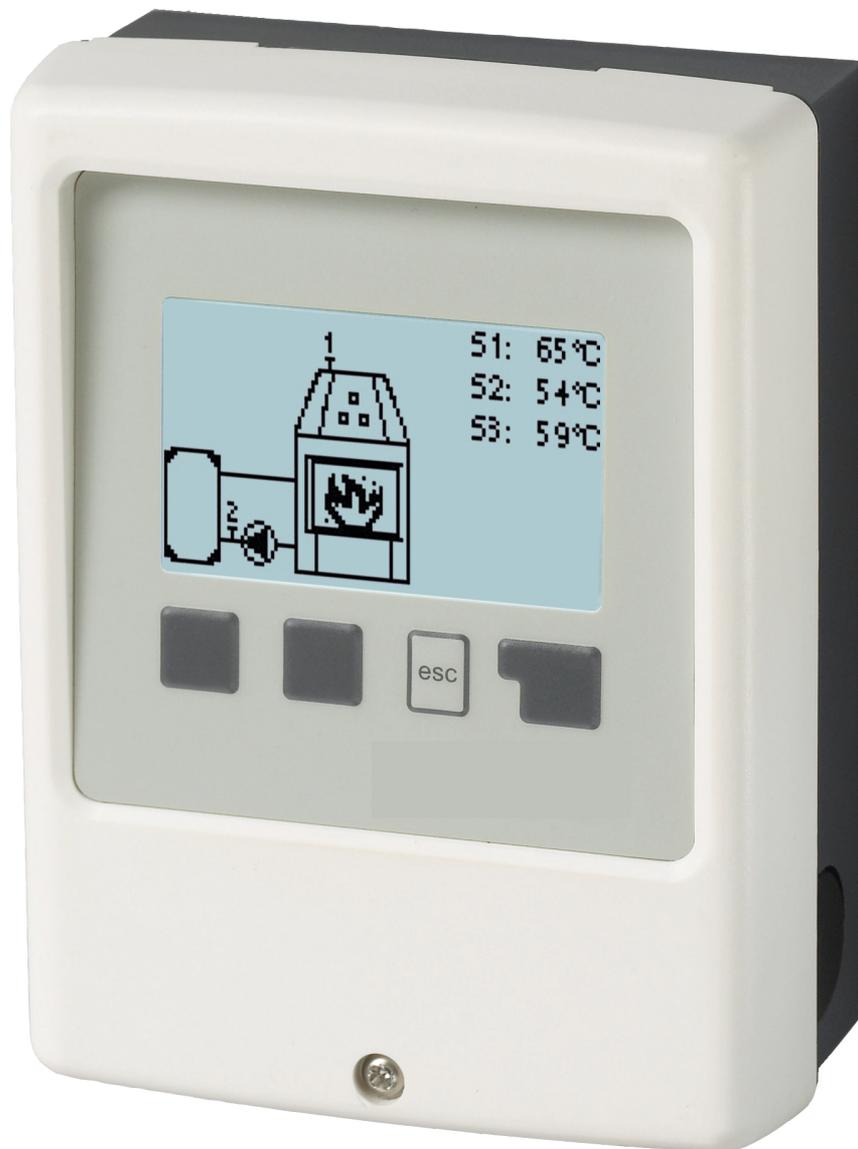


Biomass Controller SBMC

Installation and operating instructions



Read carefully before installation, commissioning and operation

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Safety Instructions

EU-Conformity

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

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

conforms. Conformity has been verified and the corresponding documentation and the EU declaration of conformity are kept on file by the manufacturer.

General instructions

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 unit. 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 unit.

This unit is an automatic, electrical Biomass Controller. Install the device only in dry rooms and under environmental conditions as described under "Technical Data".

The valid accident prevention regulations, VDE regulations, the regulations of the local power utility, the applicable DIN-EN standards and the installation and operating instruction of the additional system components must also be observed.

Under no circumstances does the unit replace any safety devices to be provided by the customer!

Installation, electrical connection, commissioning and maintenance of the device may only be carried out by an appropriately trained specialist. Users: Make sure that the specialist gives you detailed information on the function and operation of the unit. Always keep these instructions in the vicinity of the unit.

The manufacturer does not take over any liability for damage caused through improper usage or non-compliance of this manual!

Explanation of Symbols



Danger

Failure to observe these instructions can result in electrocution.



Danger

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



Caution

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



Caution

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

Changes to the Unit

- 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 from the manufacturer.
- 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.



Changes to the unit can compromise the safety and function of the unit or the entire system.

Warranty and Liability

The Unit has been manufactured and tested with regard to high quality and safety requirements. 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.
- Use of the device for other than its intended purpose.
- Operation above or below the limit values listed in the 'Specifications' section.
- Force majeure.

Disposal and Pollutants

The unit conforms to the European RoHS 2011/65/EU for the restriction of the use of certain hazardous substances in electrical and electronic equipment.



Under no circumstances may the device be disposed of with the normal household waste. Dispose of the unit only at appropriate collection points or ship it back to the seller or manufacturer.

Description SBMC

Specifications

Model	SBMC	Biomass Controller
Electrical specifications:		
Power supply		230 VAC +/- 10%, 50 ... 60 Hz
Power consumption / standby		1,5 W - 2,0 W/ 1,5W
Total switched power		460 VA for AC1 / 185 W for AC3
Switched power per relay		460 VA for AC1 / 185 W for AC3
Internal fuse	1	2A slow blow 250V
Protection category		IP40
Protection class / overvoltage category		II / II
Inputs/Outputs		
Sensor inputs	3	PT1000 -40 °C ... 300 °C
Outputs mechanical relay	1	460 VA for AC1 / 185 W for AC3
of relay with changeover contact	R	460 VA for AC1 / 185 W for AC3
0-10V/PWM output	V1	for 10 k Ω working resistance 1 kHz, level 10 V
Max. cable length		
Boiler sensor of this function	S1	< 30 m
Storage sensor	S2 and S3	< 10 m
0-10V/PWM		<3m
mechanical relay		< 10m
Permissible Ambient Conditions		
for controller operation		0 °C - 40 °C, max. 85 % rel. humidity at 25 °C
for transport/storage		0 °C - 60 °C, no moisture condensation permitted
Other Specifications and Dimensions		
Housing design		2-part, ABS plastic
Installation methods		Wall installation, optionally panel installation
Overall dimensions		115 mm x 86 mm x 45 mm
Aperture installation dimensions		108 mm x 82 mm x 25,2 mm
Display		completely graphic display 128 x 64 dots
Real Time Clock		RTC with 24 hour power reserve
Operation		4 entry keys

About the Controller

The Biomass Controller SBMC facilitates efficient use and function control of your System possible while its handling is intuitive. After every input step the suitable functions are matched to the keys and explained in a text above. In the menu 'measurement values and settings' are help text and graphics in addition to key words.

The SBMC can be used for the various system variants.

Important characteristics of the SBMC are:

- Depiction of graphics and texts using a lit 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.

Scope of supply

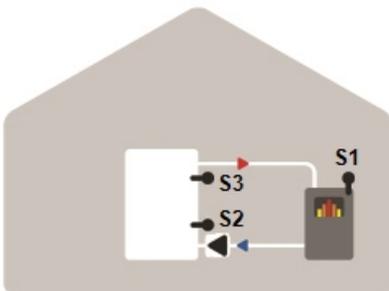
- Biomass Controller
- 2 screws 3,5 x 35 mm and 2 plugs 6 mm for wall installation.
- 4 strain relief clips with 8 screws, replacement fuse 2TA
- 1 connection clamp for PE terminal block
- SBMC Installation and operating instructions

Optionally contained depending on design/order:

- Pt1000 temperature sensors, immersion sleeves, overvoltage protection

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.



Storage and solid fuel boiler

Installation

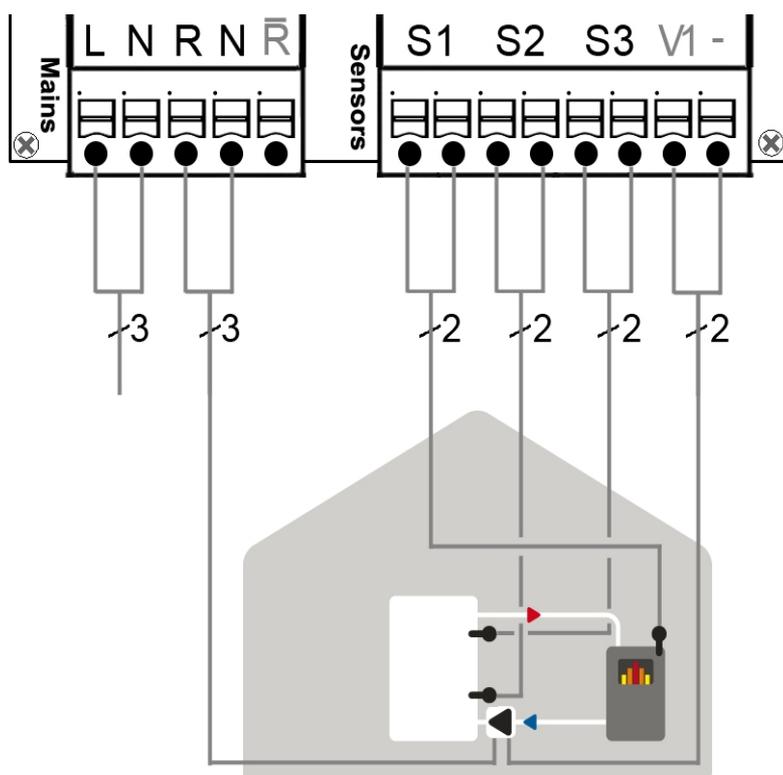
Electrical Terminals



Mains voltages
230 VAC 50 - 60 Hz

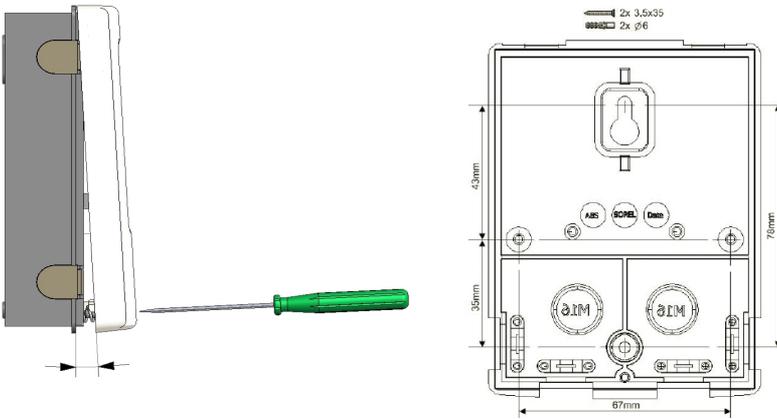


Low voltages
max. 12 VAC / DC



Terminal:	Connection for:	Terminal:	Connection for:
L	Network outer conductor L	S1 (2x)	Sensor 1 solid fuel boiler
N	Network neutral conductor N	S2 (2x)	Sensor 2 storage
R	Pump outer conductor L	S3 (2x)	Sensor 3 (for display only)
N	Pump neutral conductor N	The polarity of the sensors S1-S3 is freely selectable.	
R	Break contact	V1	0-10V / PWM Pump
The PE protective conductor must be connected to the PE metal terminal block!		-	0-10V / PWM Mass

Wall Installation



1. Unscrew cover screw completely.
2. Carefully pull upper part of housing from lower part. During the removal, the brackets are released as well.
3. Set upper part of housing aside. Do not touch the electronics.
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.

Electrical Connection

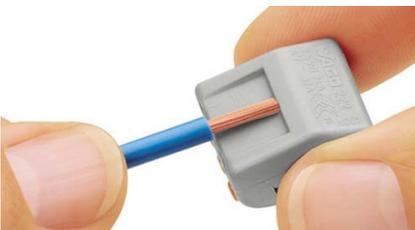
 Before working on the unit, switch off the power supply and secure it against being switched on again! Check that there is no power flowing! Electrical connections may only be made by a specialist and in compliance with the applicable regulations. The unit may not be put into operation if there is visible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

 The unit may not be accessible from behind.

 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 customer must provide an all-pole disconnecting device, e.g. an emergency heating switch.

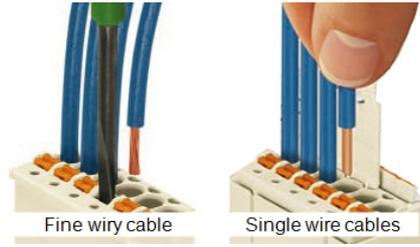
 The cables being connected to the unit must not be stripped by more than 55 mm, and the cable jacket must reach into the housing just to the other side of the strain relief.



1. Select required program/hydraulic system see "Hydraulic Variants" on page 6.
 2. Strip cables by 75 mm max., strip the last 9-10 mm of the wires.
- Open controller see "Wall Installation" on page 8, insert cables and install strain reliefs.



4. Install PE terminal block



5. Connect the supplied connection terminals see " Electrical Terminals " on page 7 and see " Hydraulic Variants " on page 6.

When using fine-stranded cables with a screwdriver, press the orange handles. For single-wire cables or cables equipped with wire-end ferrules, simply insert the cable.

6. Insert the connecting terminals into the appropriate pin strips.

7. Hang on the upper housing part and close the housing with gentle pressure

8. Cover screw tighten.

9. Turn on mains supply and operate the controller.

Installing the Temperature Sensors

The controller operates with Pt1000 temperature sensors which are accurate to 1 °C, ensuring optimal control of system functions.



If desired, the sensor cables can be extended to a maximum of 30 m using a cable with a cross-section of at least 0.75 mm². Ensure there is no contact resistance! Position the sensor precisely in the area to be measured! Only use immersion, pipe-mounted or flat-mounted sensors suitable for the specific area of application with the appropriate permissible temperature range.

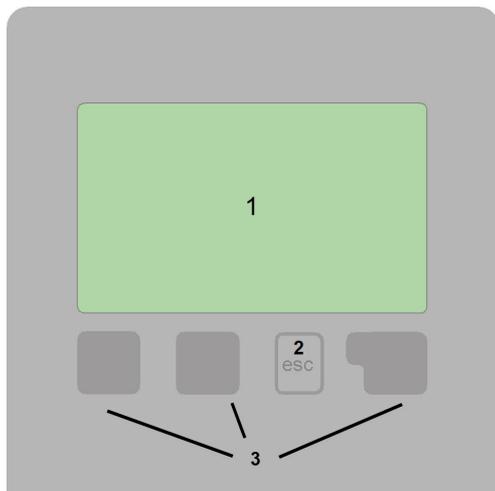


Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.

Temperature Resistance Table for Pt1000 Sensors

°C	-20	-10	0	10	20	30	40	50	60	70	80	90	100
Ω	922	961	1000	1039	1077	1116	1155	1194	1232	1270	1308	1347	1385

Display and Input



-  Pump (rotates when active)
-  Storage / buffer
-  Solid fuel boiler
-  Temperature Sensors
-  Warning/Error message
-  New information available

Further symbols can be found in the special functions

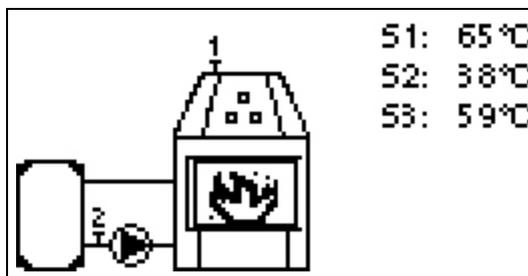
Examples for key settings:

- +/- Increase / decrease values
- ▼/▲ Scroll down / up menu
- Yes/No agree / reject
- About further information
- Back to the previous display
- Ok Confirm selection
- Confirm Confirm setting

The display's (1), extensive text and graphical mode, enables simple, almost self-explanatory, operation of the controller.

Entries are made using 4 keys (2+3), 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 function 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.



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



1. Set language and time
2. Commissioning help / setup wizard
 - a) select or
 - b) skip.

The setup wizard guides through the necessary basic settings in the correct order. Each parameter is explained in the control display. Pressing the „esc“ key takes you back to the previous setting.

b) With free commissioning the settings should be made in the following order:

- menu 10. Language
- menu 3. Time, Date and Operating Times.
- menu 5. Heating Circuit Settings, all values.
- menu 6. Protection Functions (if any adjustments necessary).
- menu 7. Special Functions (if any adjustments necessary).

3. In menu operating mode "4.2. Manual", test the witch outputs with the consumers connected and check the sensor values for plausibility. Then set to automatic mode.see " Manual " on page 13

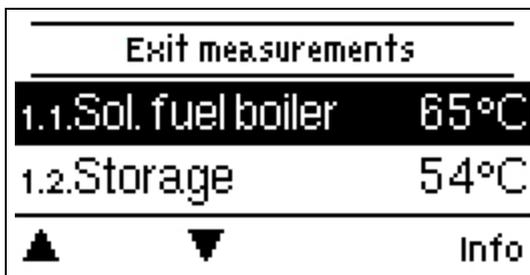


The setup wizard can be accessed in menu 7.6. at any time.



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

1. Measurement values



Serve to display the current measured temperatures.

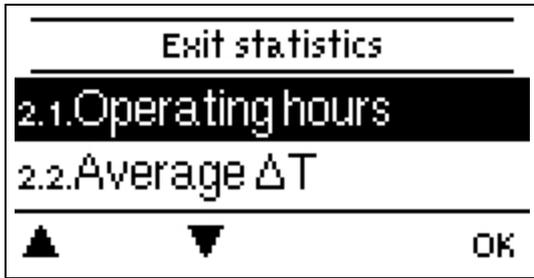


If ,error' appears on the display instead of the measurement value, there may be a defective or incorrect temperature sensor.



If the cables are too long or the sensors are not well-placed, 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'. The selected program, connected sensors and the specific model design determine which measurement values are displayed.

2. Statistics



Serve for function control and long-term monitoring of the system.



For system data statistics it is essential for the time to be set accurately on the controller. Please note that the clock continues to run for about 24 hours if the mains voltage is interrupted, and afterward must be reset. Improper operation or an incorrect time may result in data being cleared, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!

Operating hours

Display of the operating hours of the consumers connected to the controller (for example, solar pumps, valves etc.) whereby different time ranges (day-years) are available!

Average ΔT

Display of the average temperature difference between the reference sensors when the switched on consumers.

Graphic overview

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

Error messages

Display of the last 15 errors in the system with indication of date and time.

Reset / Clear

Resetting and clearing the selected statistics. Selecting 'all statistics' clears everything except the error log.

3. Display mode



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".

Schematic

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

Overview

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

Alternating

In alternating mode the schematic mode and then the overview mode are active for 5 seconds.

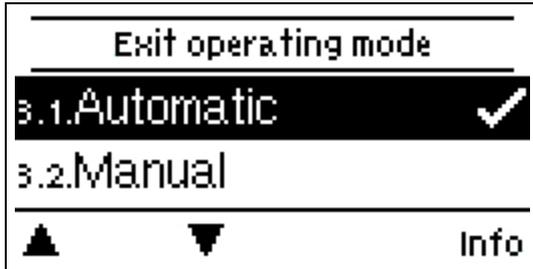
Eco Display Mode

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 scanned by the user.

4. Operating mode



Automatic

The automatic mode is the normal mode of the controller. A correct controller function under consideration of the current temperatures and the set parameters is only present in automatic mode! After an interruption of the mains voltage, the controller automatically returns to the last operating mode selected.

Manual

In 'Manual' mode, the individual relay outputs and the connected consumers can be checked for proper functioning and correct assignment.



The operating mode 'Manual' may only be used by specialists for brief function tests, e.g. during commissioning! Function in manual mode: 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. At the same time, the current measurement values of temperature sensors are also shown in the display for the purposes of function control.

Off



If the operating mode "off" is enabled, all control functions are turned off. The measured temperatures are displayed for the overview.

5. Settings

Exit settings	
5.1.Tmin S1	20°C
5.4.Tmax S2	55°C
 	Info



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

Tmin S1

Enable/start temperature at sensor 1:

If this value on the sensor 1 (collector sensor) is exceeded and the other conditions are not fulfilled, the controller will turn on the affiliated pump or the valve. If the temperature on the sensor 1 falls 5 °C below this value, the pump or the valve will be turned off again.

Tmax S2

Switch off temperature at sensor 2:

If this value is exceeded on the sensor 2, the controller turn off the affiliated pump or the valve. If this value on the sensor 2 is undershot and the other conditions are fulfilled, the controller will turn on the pump or the valve.



Temperature values which are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!

In multiple storage systems, if the shut-down temperature S2 is exceeded, a downstream installed storage or storage area is switched to.

ΔT R1

On/off temperature difference for solar charge through relay R1:

If the temperature difference ΔT Solar between the reference sensors S1 and S2 is exceeded and the other conditions are fulfilled, the controller will turn on the pump on the relay R1. If the temperature difference falls to ΔT Off, the pump will be turned off.



If the set temperature difference is too small, this may lead to ineffective operation depending on the system and sensor positioning. For speed regulation (see "Speed control" on page 16), special switch conditions apply!

Tmin Storage X

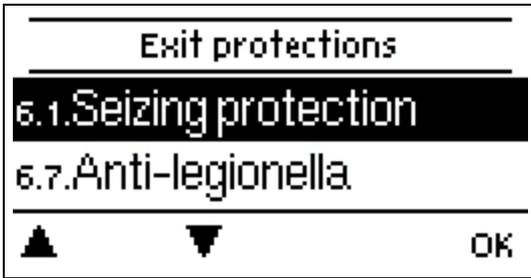
Switch off temperature at sensor S(X)

If this value is exceeded at sensor X then the controller switches the associated pump and/or valve off. If sensor 3 falls below this value again and the other conditions are also met, then the controller switches the pump and/or valve on again.



Temperature values which are set too high can lead to scalding or damage to the system. Scalding protection must be provided by the customer!

6. Protective Functions



The 'Protective functions' can be used by specialists to activate and set various protective functions.



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

Seizing Protection

If the anti-seizing protection is activated, the controller switches the heat pump and the mixer on/off at 12:00 noon for 5 seconds to prevent seizing of the pump/valve after long periods of inactivity.

ABS R(X)

Activation (daily, weekly) of the anti-lock protection to a relay (X) at 12:00 for 5 seconds.

Anti Legionella

With the help of the anti legionella function (hereinafter referred to as: AL), the system can be heated up at selected times in order to free it of legionella.



In the delivery state, the anti legionella function is switched off.



As soon as it has heated up with "AL" turned on, information with the date will be shown in the display.



This anti legionella function does not offer any secure protection against legionella, because the controller requires an adequate added amount of energy and the temperatures cannot be monitored in the entire storage area and the connected pipe system.



During the operation of the anti legionella function, if applicable, the storage is heated above the set value "Tmax", which may lead to scalding and system damage.

AL Tref

For a successful heating, this temperature has to be reached at the AL sensor(s) for the exposure time period.

AL residence time

For this period of time the AL Tref temperatures at the activated AL-sensors have to be reached for a successful heating.

Last AL heat

This displays when the last successful heating has occurred.

AL-times

During this periods the AL heat up is attempted. If within the defined period, the AL-condition is met (Tref at the defined sensors for the exposure time period), the heating is completed and logged as "Last AL heating".

7. Special Functions



Used to set basic items and expanded functions.



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

Pump settings V1/ Signal V1

In this menu, the settings for the speed controlled output V1 are executed.

Type of pump/ Type of signal

The type of speed controlled pump used can be set here.

0-10V: Control of special pumps (e.g. high efficiency pumps) through a 0-10V signal.

PWM: Control of special pumps (e.g. high efficiency pumps) through a PWM signal.

Pump/ Profile

In this menu, the preset profiles for the pump can be selected or under "manual" all settings can be done personally. The settings can still be changed after a profile has been selected.

Output Signal

In this menu, the type of pump is set: heating pumps have the greatest output with a small input signal, solar pumps in contrast have very little output with a small input signal. Solar = normal, heating = inverted.

PWM / 0-10V off

This signal / this voltage is emitted if the pump is turned off (pumps with cable break detection require a minimal voltage / a minimum signal).

PWM / 0-10V on

This voltage / this signal requires the pump in order to turn on and to run at a minimum speed.

PWM / 0-10V max.

With this value, the maximum voltage level / maximum frequency can be specified for the highest speed of the energy saving pump, which is used, for example, during the flushing or manual operation.

Show signal

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

Speed control

If the speed control is activated, itSBMC offers the possibility through a special internal electronic system to change the speed of pumps depending on the process.



This function should only be activated by a technician. Depending on the pump being used and the pump level, the minimum speed may not be set too small, because the pump or the system may be damaged. The specifications from the affected manufacturer must be observed for this! When in doubt, the min. speed and the pump level should be set too high instead of too low.

Purging time

For this time, the pump runs with its full speed (100%) in order to guarantee a secure start-up. Only after expiration of this purging time will the pump have a controlled speed and will switch, depending on the set variant, to the max. or min. speed. Speed.

Max. Speed

The maximum speed of the pump is determined here. During the setting, the pump runs in the respective speed and the flow can be determined.



The specified percentages are variables, which may deviate more or less strongly depending on the system, pump and pump level. 100% is the maximum possible power of the controller.

Min. Speed

The minimum speed of the pump is determined here. During the setting, the pump runs in the respective speed and the flow can be determined.



The specified percentages are variables, which may deviate more or less strongly depending on the system, pump and pump level. 100% is the maximum possible power of the controller.

Setpoint

This value is the control setpoint. If this value is below at the sensor, the speed is reduced. When it is exceeded, the speed is increased.

Ignition time

To optimize the speed control in consideration to setpoint and boiler sensor S1 during the ignition time the ignition time can be set here. The difference between Tmin S1 and the Setpoint see " Setpoint " on page 17. Is evenly distributed between the time set here. The setpoint value is increased during the ignition time from Tmin S1 to the setpoint.

Time & Date

Serve 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 continues to run for about 24 hours if the mains voltage is interrupted, and afterward must be reset. Improper operation or an incorrect time may result in data being cleared, recorded incorrectly or overwritten. The manufacturer accepts no liability for the recorded data!

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.



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

Commissioning

Starting 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 ‚esc‘ more than once takes you back to the selection mode, thus cancelling the commissioning help see " Commissioning help " on page 11



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.

Factory Settings

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



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

Heat quantity

If heat quantity metering is activated the approximate heat from the manually entered values of the flow from the system and the measured sensor values from the solid fuel boiler and storage are calculated. Additional inputs for the flow of the system are necessary. Additionally through the setting offset ΔT , a correction factor can be set for the heat quantity collection. Since the solid fuel boiler temperature and the storage temperature can be used for the heat quantity metering, depending on the system, there may be deviations from the displayed solid fuel boiler temperature to the actual previous temperature or the displayed storage temperature to the actual return temperature. Through the setting Offset ΔT , this deviation can be corrected.

Example: displayed collector temperature 40 °C, read previous temperature 39 °C, displayed storage temperature 30 °C, read return temperature 31 °C means a setting of -20% (displayed ΔT 10K, actual ΔT 8K => -20% correction value)



The heat quantity data in the "On" mode only consists of calculated values for the functional inspection of the system.

Flow rate supply flow (X)

Nominal system flow.

The flow of the system in liters per minute, which is used as calculation basis for heat metering.

Offset ΔT

Correction factor for the temperature difference for heat metering

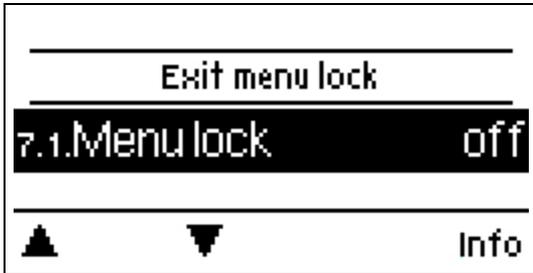
Since the collector temperature and the storage temperature can be used for the heat quantity metering, depending on the system, there may be deviations from the displayed collected temperature to the actual previous temperature or the displayed storage temperature to the actual return temperature. This deviation can be corrected with the adjustment value Offset ΔT

Example: displayed collector temperature 40°C, read previous temperature 39°C, displayed storage temperature 30°C, read return temperature 31° means a setting of -20% (displayed ΔT 10K, actual ΔT 8K => -20% correction value)

Daylight saving time

If this function is activated, the controller automatically changes to winter time or summer time (DST, Daylight Savings Time).

8. Menu Lock



Secure the controller against unintentional changing and compromise of basic functions.

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
9. Service values

9. Service values



Serve for remote diagnosis by a specialist or the manufacturer in the event of errors, etc.



Enter the values into the table when an error occurs.

10. Language



To select the menu language. For initial commissioning the query is automatic.

Malfunctions/Maintenance

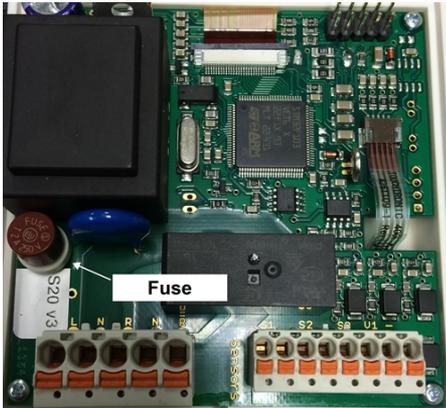
Replacing the Fuse



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 that there is no power flowing!



Only use the supplied spare fuse or a fuse of the same design with the following specifications: 2 AT/250 VSOREL Art. No.: 2125



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, open the device as described in section C, remove the old fuse and check it.

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

Maintenance



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

Performing maintenance:

- Check the date and time see " Time & Date " on page 17
- Assess/check plausibility of statistics see " Serve for function control and long-term monitoring of the system. " on page 12
- Check the error memory see " Error messages " on page 12
- Verify/check plausibility of the current measurement values see " Measurement values " on page 11
- Check the switch outputs/consumers in manual mode see " Manual " on page 13
- Possibly optimize the parameter settings.

Possible error messages

Possible error messages	Notes for the specialist
Sensor x defective	Means that either the sensor, sensor input on the controller or the connection line is / or was defective (see " Temperature Resistance Table for Pt1000 Sensors " on page 9)
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 longer network disruption, because the time & date must be examined and, if applicable, adjusted.
Frequent on / off	A relay was switched on and off more than 5 times within 5 minutes.
AL failed	Is displayed when AL ref -5 °C was not measured for the set AL residence time at the AL sensor.

Final declaration

Although these instructions have been created with the greatest possible care, the possibility of incorrect or incomplete information cannot be excluded. Subject as a basic principle to errors and technical changes.

Date and time of installation:

Name of installation company:

Space for notes:

Your specialist dealer:

Manufacturer:

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