

# Heating Controller MHCC

Weather-compensated heating circuit controller

Installation and operating instructions



**Read carefully before installation, commissioning and operation**

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## Safety Instructions

### EG-Conformity

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

- EG low voltage directive 2006/95/EG
- EG electromagnetic compatibility directive 2004/108/EG

conforms. Conformity has been verified and the corresponding documentation and the EG 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.

The device is an automatic, electric Weather-compensated heating circuit controller for/in Heating system and similar applications. 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 unit 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 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

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- 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

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The unit has been manufactured and tested with regard to high quality and safety requirements. The unit 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.
- 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

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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 MHCC

### About the Controller

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The Weather-compensated heating circuit controller MHCC facilitates efficient use and function control of your Heating 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 MHCC can be used with different variants of installations, see "Hydraulic Variants" on page 6.

Important characteristics of the MHCC 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.

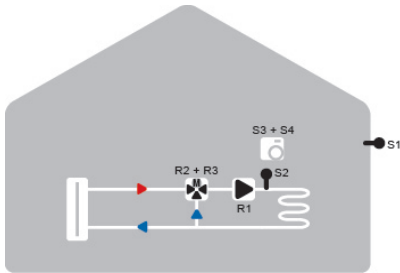
## Specifications

Model	MHCC	Weather-compensated heating circuit controller	
Temperature controller class	VI		
Energy efficiency	4%		
Standby loss	0,5		
Request type heater			
<b>Electrical specifications:</b>			
Power supply		230 VAC +/- 10%, 50 ... 60 Hz	
Power consumption / standby		0,5 W - 2,3 W/ 0,5	
Internal fuse	1	2A slow blow 250V	
Protection category		IP40	
Protection class / overvoltage category		II / II	
<b>Inputs/Outputs</b>		Measuring range	
Sensor inputs	4	Pt1000 temperature sensor	-40 °C ... 300 °C
Sensor inputs RC21	1	RC (S3 and S4)	
Outputs mechanical relay		3	
mechanical relay	R1 - R3	460VA for AC1 / 460W for AC3	
0-10V/PWM output	V1	for 10 k Ω working resistance 1 kHz, level 10 V	
<b>Max. cable length</b>			
Pt1000 sensor		<10m	
CAN		<3m; at> = 3m, a shielded twisted pair cable must be used. Isolate shielding and connect it to the protective conductor of <b><u>only one</u></b> of the devices.	
0-10V/PWM		<3m	
mechanical relay		<10m	
<b>Interface</b>			
Fieldbus		CAN	
<b>Permissible Ambient Conditions</b>			
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	
<b>Other Specifications and Dimensions</b>			
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 display, 128 x 64 dots	
Light diode		multicolour	
Real Time Clock		RTC with 24 hour power reserve	
Operation		4 entry keys	

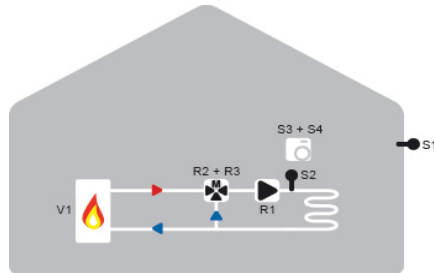
## Hydraulic Variants



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.



Mixed heating circuit



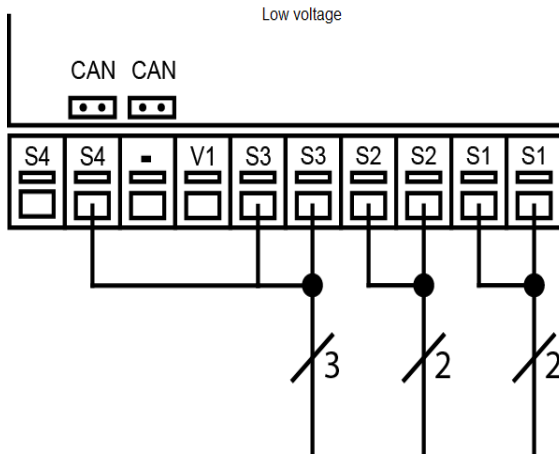
Mixed heating circuit with mixer and auxiliary heating

# Installation

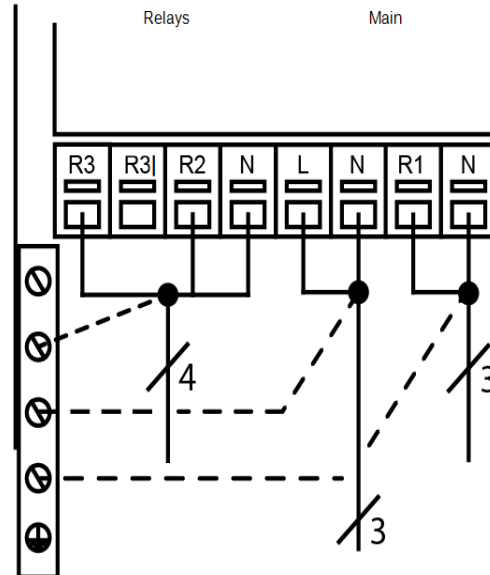
## Electrical Terminals



**Low voltages**  
max. 12 VAC / DC



**Mains voltages**  
230 VAC 50 - 60 Hz



Main 230V / AC

Terminal:	Connection for:
S1	Outdoor sensor
S1	Outdoor sensor (GND)
S2	Flow temperature sensor
S2	Flow temperature sensor (GND)
S3	Room sensor (RC21)
S3	Sensor ground (GND-RC21)
V1	0-10V output; heat request Install additional relays (item number 77502) if request is done via a normally open contact.
-	GND for heat request
S4	Remote control (RC21)
S4	Sensor ground (GND-RC21)
CAN	To connect several controllers with each other using a CAN cable. Terminate the CAN Bus on both ends using resistors, with the assignment of the CAN bus connectors being arbitrary!

Terminal:	Connection for:
N	Pump
R1	Pump
N	Mains phase conductor
L	Mains phase conductor
N	Neutral Mixer
R2	Mixer open
R3I	not used 230 V
R3	Mixer close

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



Do not cover R3I. Maintain 230 V AC main voltage at this contact. Wrong wiring can destroy mixing valve.

## RC21 Remote adjuster with thermostat



The RC21 is an optional accessory and is normally not included in the scope of supply. The controller also works without RC21.

The remote adjuster with integrated thermostat RC21 provides you with easy to use temperature controlled adjustment of heating from within your living space.

### Settings

The dial is used to parallel translate the heating curve. The flow temperature (still regarding the outdoor temperature) is raised or lowered respectively by your adjustment. When the dial is turned all the way down, the heat circuit is switched off. Frost protection stays active to prevent damage.

### Temperature Sensors

The RC21 contains a temperature sensor which is used by the controller. If the settings in the controller allow it, the sensor is used to alter the flow temperature. The switch changes the operation mode of the controller.



In Timer mode the temperature is controlled according to the set thermostat periods.



In Timer mode the temperature is controlled according to the set thermostat periods.

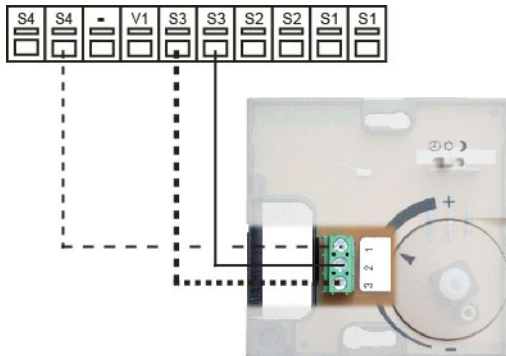


In Continuous day mode the set periods are ignored and the temperature is controlled according to the Day time settings. In Continuous night mode the temperature is usually set to lowest. This setting is best suited for periods of long absence like e.g. holidays.

### Installation

Carefully remove the dial from the casing with a screwdriver. Loosen the screw beneath. Remove the bright part of the casing from the black socket.

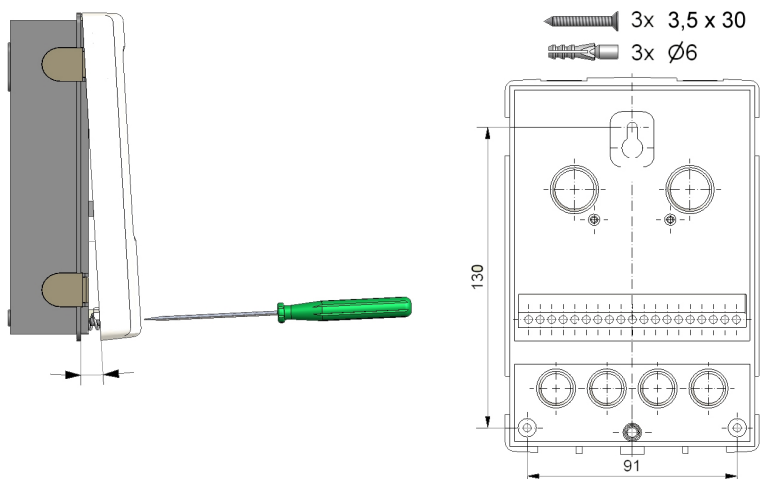
The RC21 is connected via terminal block to the controller.



The RC21 is suited for low voltage only!



## 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.

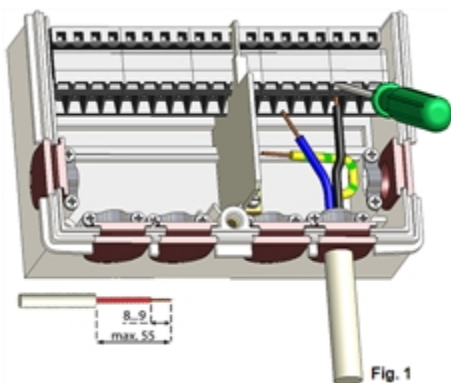


Fig. 1

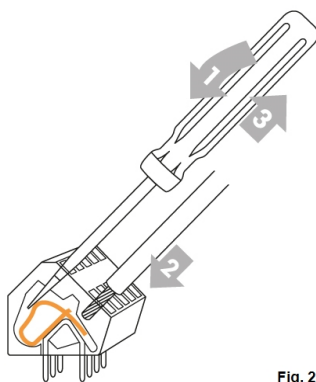


Fig. 2

1. open terminal cover.
2. Strip lines a max. of 55 mm, assemble the strain reliefs, strip wire ends 8-9 mm (figure 1)
3. Open clamps with a fitting screwdriver (figure 2) and connect electrical system to the controller.
4. Suspend clip room cover again and close with the screw.
5. Turn on mains supply and operate the controller.

## 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.

# 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.

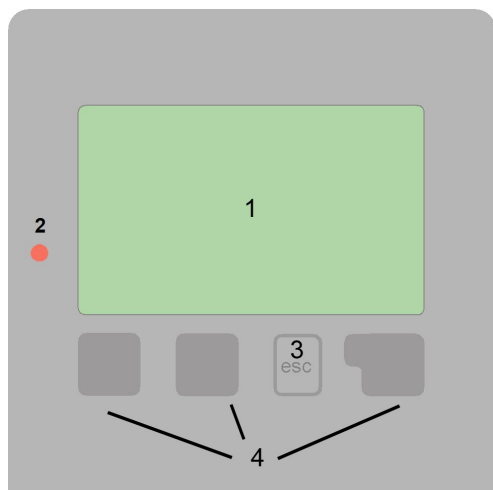

























Low-voltage cables such as temperature sensor cables must be routed separately from mains voltage cables. Feed temperature sensor cables only into the left-hand side of the unit, and mains voltage cables only into the right-hand side.

## 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	1070	1308	1347	1385

## Display and Input



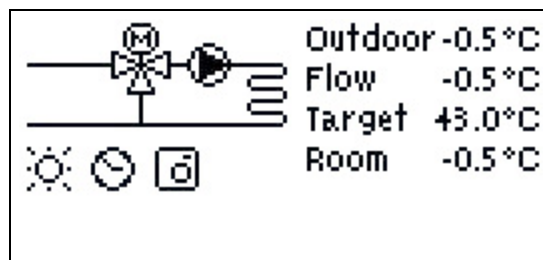
-  Pump (rotates when active)
  -  Mixer (black when active)
  -   HC -Day mode (Time progr.)
  -   HC-Night mode (Time progr.)
  -   HC-Comfort mode (Time progr.)
  -  Day mode
  -  Night mode
  -   Day mode due to RC21
  -   Night mode due to RC21
  -   Heat request on/off
  -  Heat request incoming from CAN bus
  -  Heat requested over CAN bus
  -  Reference value mode
  -  Reference value 14 day
  -  External thermostat off
  -  Warning/Error message
  -  New information available
- Further symbols can be found in the special functions

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

The LED (2) lights up green when a relay is switched on. The LED (2) lights up red when operating mode ,Off' is set. The LED (2) flashes quickly red when an error is present.

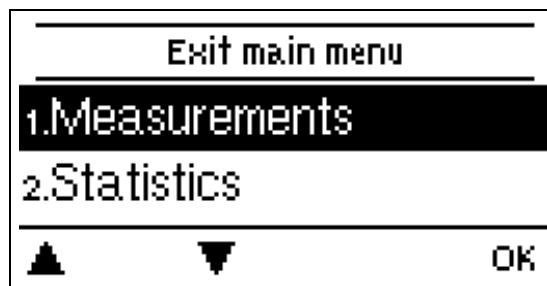
Entries are made using 4 keys (3+4), to which contextual functions are assigned. The ,esc' key (3) is used to cancel an entry or to exit a menu. If applicable, a request for confirmation appears to save the made changes.

The 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.

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

Setup wizard

Would you like to start the setup wizard?

no

yes

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).



The setup wizard can be accessed in menu 7.2. at any time.



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

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 15

## 1. Measurement values

Exit measurements

1.1.Outdoor

6.5°C

1.2.Flow

35.0°C

▲

▼

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!

### Today

---

#### Flow temperature of the last 24 hours

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

### 28 days

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#### Flow temperature during the last 28 days

In the graphical overview the characteristics of the outdoor and 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.

### Operating Hours Heating

---

Here the operating hours of the heating circuit are displayed. This is the entire time the heating circuit pump was active. The displayed date in this menu is the date of the last deletion. From this date on the current count is added.

### Error Messages

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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. Periods

Exit times	
3.1. Time & date	
3.2. Daylight saving	yes
▲ ▼	OK

Settings for time, date and operating times for the heating circuit.



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

#### 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!

#### Heating Circuit (Day)

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

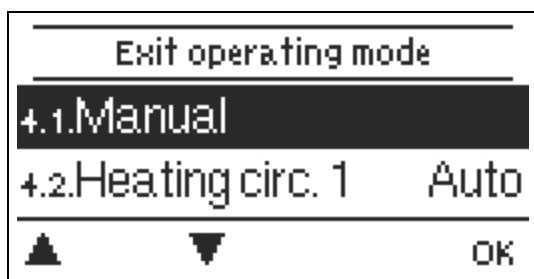


Unspecified times are automatically considered to be night-time mode. The set times are only taken into account in the 'Automatic' heating circuit operating mode.

#### 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 an increased comfort temperature, e.g. for quick heating in the morning.

## 4. Operating mode



To specify the operating modes for the heating circuit. After an interruption of the mains voltage, the controller automatically returns to the last operating mode selected.



Only in automatic mode does the controller use the set operating times and the correspondingly set target flow temperatures!

### Heating Circuit

**Auto** = Automatic/Normal mode using the set times.

**Continuous Day** = The set values for day mode are used.

**Continuous Night** = The set values for night mode are used.

**Reference Value** = Fixed flow temperature regardless of the outdoor temperature. The desired flow temperature must be set in Menu 4.3 .

**Reference value** = Menu 4.4 can be used to set specific flow temperatures for the next 14 days. After 14 days, the reference temperature of the 14th day is used continuously until the operating mode is changed. Different temperature values can be set in menu 4.4 for every individual day.

**Off** = Heating circuit is switched off (except Frost protection)

### 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.

### Heating Circuit Reference

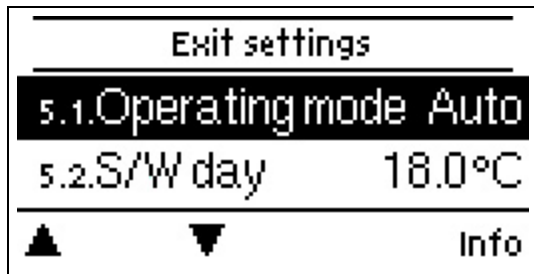
If operating mode 'Reference value' is selected, see " Heating Circuit " on page 15, the reference flow temperature must be set here, regardless of the curve and outdoor temperature.

### 14-day Reference

If operating mode '14-day reference value' is selected see " Heating Circuit " on page 15, the reference flow temperature for each of the 14 days can be set here. In Menu 4.4.1, the starting time of the program is shown. To restart the reference program, press 'restart'.

Pressing 'restart' again will reset the 14-day reference program and restart it at Day 1.

## 5. Settings



The basic settings for the control function of the heating circuit are applied. Basic settings applied.



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

### S/W Day

#### Summer / Winter changeover in daytime mode

If this value is exceeded at the outdoor sensor the controller automatically switches the heating circuit off = Summer mode. If the outdoor temperature drops below this value, the heating circuit is switched on again = Winter mode.



In addition to the operating times in normal daytime operation, this setting is also valid for times with activated comfort.

### S/W Night

#### Summer/Winter changeover in night-time mode

If this value is exceeded at outdoor sensor S1 during the nighttime mode times, the controller automatically switches the heating circuit off = Summer mode. If the outdoor temperature drops below this value, the heating circuit is switched on again = Winter mode.

### Curve

Type and slope of the heating characteristic curve

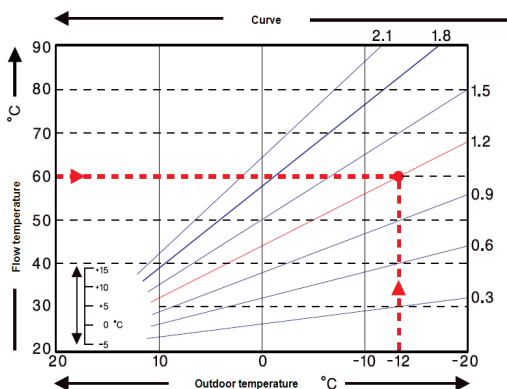
The characteristic curve is used to control the heat dissipation of the heating circuit relative to the outdoor temperature. The demand for heat differs due to factors such as the type of building, heating, insulation and outdoor temperature. For this reason, the controller can operate with a normal straight curve (setting ,simple') or split curve (setting ,split').

If ,simple' is selected, the curve is adjusted using the graphic diagram. While setting the slope, the controller also shows the slope value and the calculated target flow temperature at -12 °C as a reference point.

If ,split' is selected, the curve is set in the following steps:

1. Slope over outdoor temperature for change
2. Outdoor temperature for slope change
3. Slope below outdoor temperature for change

While setting the slope, the controller also shows the slope value and the calculated target flow temperature at -12 °C as a reference point. In case of repeated adjustment of the split curve, the settings appear in reverse order.



The diagram shows the influence of the selected characteristic curve steepness (standard curve) on the calculated reference flow temperature of the heating unit. The correct characteristic curve is determined by defining the intersection point of the maximal calculated flow temperature (=design temperature) at minimal outdoor temperature.

Example: The design temperature of the heater 60 °C flow at lowest outdoor temperature according to calculation of heat requirement -12 °C. The intersection point renders a slope of 1.2 as the setting.



## Day Correction

### Parallel characteristic translation

The day correction causes a parallel shift of the heating curve during daytime operating hours, because with certain outdoor temperatures the building might not be optimally heated with the set heating curve. With a non-optimised heating curve, the following situations frequently occur: hot weather = room too cold/cold weather = room too hot. In this case, the slope of the curve should be reduced stepwise by 0.2 points and increases the day correction by 2 ... 4 °C each.

## Night Correction

### Parallel characteristic translation

The night correction produces a parallel translation of the heating characteristic during the nighttime operating hours. If a negative value is set for the night correction, the reference flow temperature is lowered accordingly during the nighttime operating hours. In this manner, primarily at night, but also during the day when no-one is at home, the room temperature is lowered, thus saving energy. Example: A day correction of +5 °C and a night correction of -2 °C produces a reference flow temperature in nighttime operation that is 7 °C lower.

## Comfort Temperature Boost

### Parallel characteristic translation

The comfort temperature boost is added to the set day correction. In this manner it is possible to carry out quick heating and/or raise the temperature of living spaces at a certain time each day.

## Min. Flow

The minimum flow temperature is the lower limit of the heating curve, and by this, the reference flow temperature of the heating circuit. In addition to that, the minimal flow temperature is the reference flow temperature for the frost protection function.

## Max. Flow

This value is the upper limit of the reference flow temperature of the heating circuit. If however, the temperature of the heating circuit exceeds the set value, the heat circuit shuts down until the temperature falls below this value. The system purged for 30 seconds every 5 minutes.



The customer must provide an additional limiting thermostat which is connected to the pumps in series (eg underfloor heating) for safety.

## Energy Saving Mode

The Energy saving mode switches the heating on when T<sub>eco</sub> is undershot and heats up to T<sub>eco</sub> + hysteresis when solar charge or solid fuel boiler is active.

## Reference/Actual -

### Switch on hysteresis for additional heating

This setting determines the allowed undershoot of the heating circuit temperature below the calculated reference flow temperature. If the heating circuit flow temperature and the storage temperature drop below the reference flow temperature by this value, the additional heating will start the additional heat source after a 1 minute delay.



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

## Threshold

### For Energy saving mode

When Energy saving mode is active: During solar loading Threshold is used instead of TH set. When the temperature drops below T<sub>eco</sub> at thermostat sensor 1, the relay is switched on and heats up to Threshold + hysteresis.

## Mod. Offset

At modulated heat request the requested temperature can be increased by the value adjusted here.

## 14-day Reference

If operating mode, 14-day reference value<sup>1</sup> is selected see "Heating Circuit" on page 15, the reference flow temperature for each of the 14 days can be set here. In Menu 4.4.1, the starting time of the program is shown. To restart the reference program, press 'restart'.

Pressing 'restart' again will reset the 14-day reference program and restart it at Day 1.

## 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

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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.

### Frost Protection

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If the temperature on the outdoor sensor drops below 1 °C and the heating circuit is switched off, the heating circuit is automatically switched on if antifreeze is activated and the reference flow temperature will be set to the minimum flow temperature set under see "Min. Flow" on page 17. 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.

### Discharge Protection

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When activated, the heating circuit pump is switched off when the specified flow temperature is not reached, even though the mixing valve is at least somewhat open. Every 5 minutes, the system checks if the flow temperature has been reached.

## 7. Special Functions



Used to set basic items and expanded functions.



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

### 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 12



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.

### Mixer

Here individual parameters for mixer control can be changed.

#### Turn Time

The mixer is switched on i.e. is opening or closing for the time span set here, then the temperature is measured to control the flow temperature

#### 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. Setting the pause factor to ,4' would quadruple the pause time.

#### Increase

If the temperature rises very fast, this value is added to the measured flow temperature so that the mixer's reaction is stronger. If the measured temperature does not rise any more, the measured value is used again. The measurement occurs once every minute.



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

### Room Controller

The settings necessary for the optional room controller RC21 are set in this menu. The three modes, ,Continuous Day', ,Continuous Night' and ,Time controlled/Automatic' can be switched at the RC21. Additionally the reference temperature of the flow can be parallel translated by turning the control wheel. If the wheel is set to minimum, only the minimum values that can be set in the protective functions menu will be used.

## 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 of 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 long as it is within the limits of the min. and max. flow temperatures that can be set in the protective functions.

Example: Reference room temp.: e.g. 25 °C; room temp.: e.g. 20 °C ±5 °C. Calculated reference temp.: e.g. 40 °C: room controller: 10 % = 4 °C 5 X 4 °C = 20 °C. Accordingly, 20 °C are added to the reference flow temperature, giving 60 °C. If the value is higher than the one set in max. flow temp, the resulting temperature is the one set in max. flow temp.

## Room Reference (Day)

The desired room temperature for day mode. As long as this temperature is not reached, the reference flow temperature is raised and/or lowered according to the percent setting in ,room controller'. If ,room controller' is set to 0 %, this function is deactivated.

## Room Reference (Night)

The desired room temperature for night mode. As long as this temperature is not reached, the reference flow temperature is raised and/or lowered according to the percent setting in ,room controller'. If ,room controller' is set to 0 %, this function is deactivated.



In the modes ,Set point' and ,Set point program, the room controller has no influence.

## Thermostat

The room controller is set here. If no RC21 is connected, a room controller from another heating controller over can be selected over the CAN bus. The CAN bus ID of controller is shown in Menu 6, ,Service Data' under ,CAN Bus ID'. Choose the RC21 with the CAN Bus ID of the corresponding controller. The heat controller now obtains the switch position and rotary switch position from the CAN bus.

## Eco Display Mode

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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.

## Network

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

## 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 visible menu open und connect to the address of the connector or respectively the data logger. Your user name is going to appear in this menu and can be selected and confirmed with 'OK'.

## Note

You can find the address of the connector or respectively the data logger on the address sticker on the outside of the casing. Pointers and help on how to establish a connection you can find in the enclosed SOREL connect instructions or the instructions of the data logger.

Select a user with 'OK' to grant access.

To revoke access again, choose one of the users from your list and choose <remove user>.

## Ethernet

The data logger's Ethernet connection settings can be set using this menu.

### MAC Address

Displays the individual MAC address of the data logger.

### 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!**

### IP-Address

Please refer to the router configuration for the IP address to be set.

### Subnetz

Please refer to the router configuration for the subnetz to be set.

### Gateway

Please refer to the router configuration for the gateway to be set.

### DNS-Server

Please refer to the router configuration for the DNS server to be set.

### CAN bus ID

Here you can see the ID of the controller on the CAN bus.

## 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




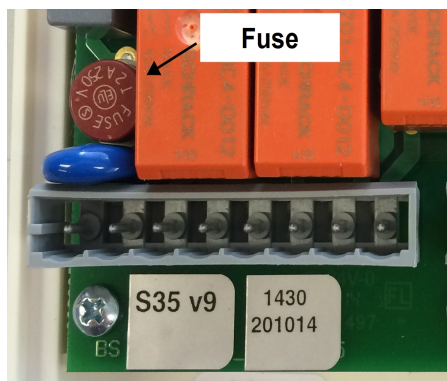
To select the menu language. For initial commissioning the query is automatic. The choice of languages may differ depending on the model. Language selection is not available for every model.

## 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 in Section 4.2.

### Possible error messages

Possible error messages	Notes for the specialist
Sensor x defective	Means that either the sensor, sensor entrance on the controller or the connecting wire was defective (see "Temperature Resistance Table for Pt1000 Sensors" on page 10 ).
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.

### Maintenance

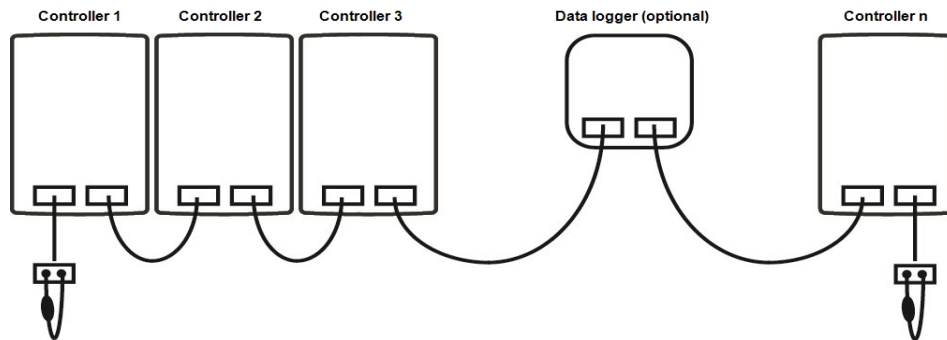
 In the course of the general annual maintenance of your heating system, the functions of the controller should also be checked by a specialist and the settings should be optimized if necessary.

Performing maintenance:

- Check the date and time (see "Time & Date" on page 14).
- Assess/check plausibility of statistics (see Section 2)see "Serve for function control and long-term monitoring of the system." on page 13
- Check the error memory see "Error Messages" on page 13
- Verify/check plausibility of the current measurement values see "Measurement values" on page 12
- Check the switch outputs/consumers in manual mode see "Manual" on page 15
- Possibly optimize the parameter settings.

### CAN bus

The CAN bus can be used to connect two or more controllers with each other or with the data logger to exchange data.



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

**The wiring of the two CAN sockets is arbitrary.**

3. Optionally, the data logger can also be connected to the CAN bus.

### Tips



The service values include not only current measurement values and operating states, but also all of the settings for the controller. Write the service values down just once after commissioning has been successfully completed.



In the event of uncertainty as to the control response or malfunctions the service values are a proven and successful method for remote diagnosis. Write the service values down at the time that the suspected malfunction occurs. Send the service value table by fax or e-mail with a brief description of the error to the specialist or manufacturer.



To protect against loss of data, record any statistics and data of particular importance at regular intervals.

## Final declaration

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Although these instruction 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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