

# DeltaTherm® HC mini

beginning with firmware version 2.0

# RESOL®

## Heating controller

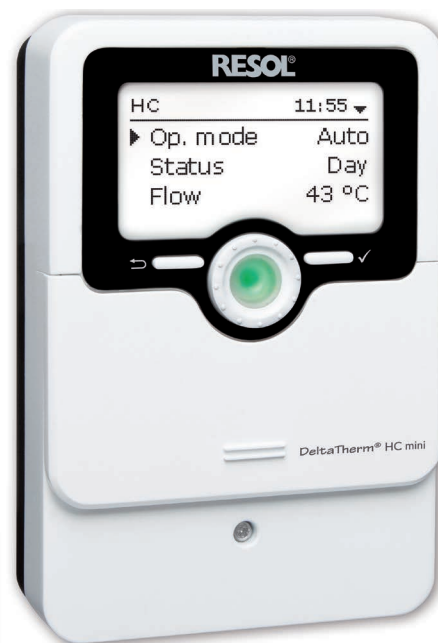
Manual for the  
specialised craftsman

## Installation

## Operation

## Functions and options

## Troubleshooting



10000953



The Internet portal for easy and secure access to  
your system data – [www.vbus.net](http://www.vbus.net)

Thank you for buying this product.

Please read this manual carefully to get the best performance from this unit. Please keep this manual safe.

en

Manual

[www.resol.com](http://www.resol.com)

## Safety advice

Please pay attention to the following safety advice in order to avoid danger and damage to people and property.

Danger of electric shock:

- When carrying out works, the device must first of all be disconnected from the mains.
- It must be possible to disconnect the device from the mains at any time.
- Do not use the device if it is visibly damaged!

The device must not be used by children or persons with reduced physical, sensory or mental abilities or without any experience and knowledge. Make sure that children do not play with the device!

Only connect accessories authorised by the manufacturer to the device.

Make sure that the housing is properly closed before commissioning the device.

Set the code to the customer code before handing over the controller to the customer.

## Target group

These instructions are exclusively addressed to authorised skilled personnel.

Only qualified electricians are allowed to carry out electrical works.

Initial commissioning must be effected by authorised skilled personnel.

Authorised skilled personnel are persons who have theoretical knowledge and experience with the installation, commissioning, operation, maintenance, etc. of electric/electronic devices and hydraulic systems and who have knowledge of relevant standards and directives.

## Instructions

Attention must be paid to the valid local standards, regulations and directives!

**Subject to technical change. Errors excepted.**

## Information about the product

### Proper usage

The controller is designed for use in heating systems in compliance with the technical data specified in this manual.

Any use beyond this is considered improper.

Proper usage also includes compliance with the specifications given in this manual.

Improper use excludes all liability claims.



### Note

Strong electromagnetic fields can impair the function of the device.

→ Make sure the device as well as the system are not exposed to strong electromagnetic fields.

### EU Declaration of conformity

The product complies with the relevant directives and is therefore labelled with the CE mark. The Declaration of Conformity is available upon request, please contact the manufacturer.



### Scope of delivery

The scope of delivery of this product is indicated on the packaging label.

### Storage and transport

Store the product at an ambient temperature of 0 ... 40 °C and in dry interior rooms only.

Transport the product in its original packaging only.

### Cleaning

Clean the product with a dry cloth. Do not use aggressive cleaning fluids.

### Data security

We recommend regular backups of the data stored on the device via MicroSD card.

## Decommissioning

1. Disconnect the device from the power supply.
2. Dismount the device.

## Disposal

- Dispose of the packaging in an environmentally sound manner.
- At the end of its working life, the product must not be disposed of as urban waste. Old appliances must be disposed of by an authorised body in an environmentally sound manner. Upon request we will take back your old appliances bought from us and guarantee an environmentally sound disposal of the devices.



## Description of symbols

**Warnings are indicated with a warning symbol!**

**Signal words** describe the danger that may occur, when it is not avoided.

### WARNING



**means that injury, possibly life-threatening injury, can occur.**

→ It is indicated how to avoid the danger described.

### ATTENTION



**means that damage to the appliance can occur.**

→ It is indicated how to avoid the danger described.



### Note

Notes are indicated with an information symbol.

→ Texts marked with an arrow indicate one single instruction step to be carried out.

1. Texts marked with numbers indicate several successive instruction steps to be carried out.

The heating controller offers a compact and user-friendly solution for simple heating systems. It controls a weather-compensated heating circuit and its backup heating demand. Additional DHW functions such as circulation or thermal disinfection, and the implementation of further heating circuits via extension modules are possible. Additionally, there's a choice of 6 different operating modes, a boiler protection option and a night correction.

Due to the commissioning menu and the 4 pre-configured basic systems, configuration is quick and easy.

In summer, the heating circuit takes over the demand-based cooling by means of a humidity sensor for dew point calculation.

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## 1 Overview

- 4 pre-configured basic systems
- Cooling over the heating circuit with humidity sensor
- Up to 5 extension modules via VBus® connectable, up to 7 weather-compensated heating circuits
- 6 operating modes, boiler protection, room thermostat and night correction
- Holiday mode and chimney sweeper function via microbuttons
- Data logging, storing, easy transfer of controller adjustments prepared and firmware updates via MicroSD card
- Modulating heating control with 0-10 V boiler control
- Weather-compensated control with room influence or demand-based room control with up to 5 room temperature sensors
- Remote access with a room control unit or the VBus® Touch HC App
- Heat pump demand (optional)

### Technical data

**Inputs:** 5 inputs for Pt1000, Pt500 or KTY temperature sensors (can optionally be used for remote controls, operating mode switches or potential-free switches, 1 of them convertible to V40), 1 analogue input for Grundfos Direct Sensor™ or FRH humidity sensor

**Outputs:** 3 semiconductor relays, 1 potential-free extra-low voltage relay, 2 PWM outputs (switchable to 0-10 V)

**PWM frequency:** 512 Hz

**PWM voltage:** 10.8 V

**Switching capacity:**

1 (1) A 240 V~ (semiconductor relay)

1 (1) A 30 V== (potential-free relay)

**Total switching capacity:** 3 A 240 V~

**Power supply:** 100–240 V~ (50–60 Hz)

**Supply connection:** type X attachment

**Standby:** 0.62 W

**Temperature controls class:** VIII

**Energy efficiency contribution:** 5 %

**Mode of operation:** type 1.B.C.Y action

**Rated impulse voltage:** 2.5 kV

**Data interface:** VBus®, MicroSD card slot

**VBus® current supply:** 60 mA

**Functions:** weather-compensated heating circuit control, backup heating, room thermostat, chimney sweeper function, screed drying function

**Housing:** plastic, PC-ABS and PMMA

**Mounting:** wall mounting, also suitable for mounting into patch panels

**Indication / Display:** graphic display, operating control LED (Lightwheel®)

**Operation:** 4 buttons and 1 adjustment dial (Lightwheel®)

**Ingress protection:** IP 20/EN 60529

**Protection class:** I

**Ambient temperature:** 0...40 °C

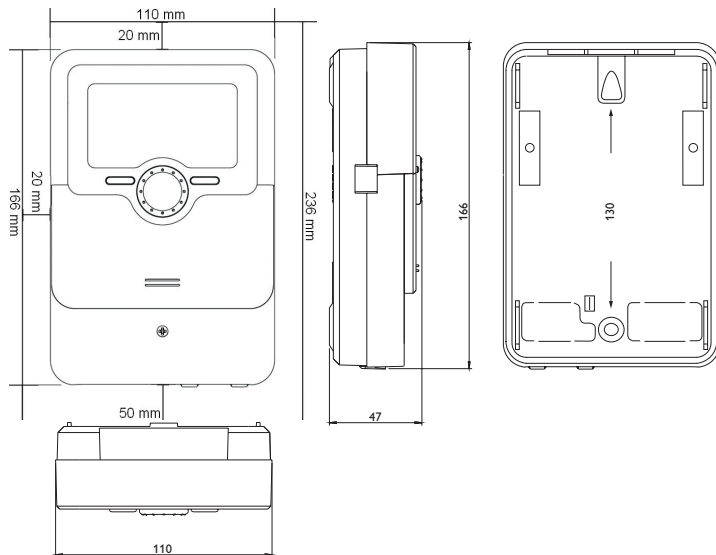
**Degree of pollution:** 2

**Relative humidity:** 10...90 %

**Fuse:** T4A

**Maximum altitude:** 2000 m above MSL

**Dimensions:** 110 x 166 x 47 mm



## 2 Installation

### 2.1 Mounting

#### WARNING! Danger of electric shock!



Upon opening the housing, live parts are exposed!

→ **Always disconnect the device from power supply before opening the housing!**



#### Note

Strong electromagnetic fields can impair the function of the device.

→ Make sure the device as well as the system are not exposed to strong electromagnetic fields.

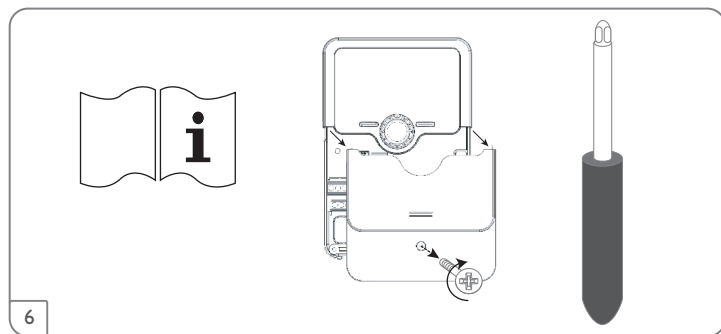
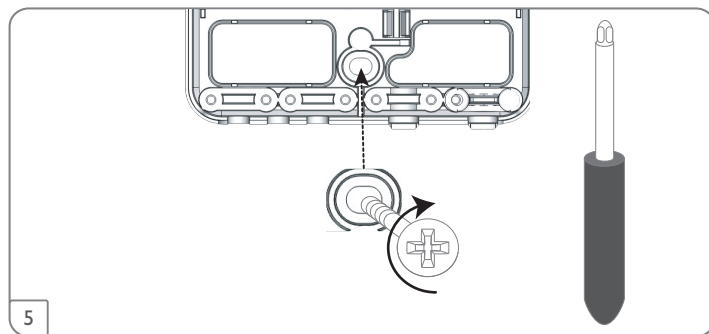
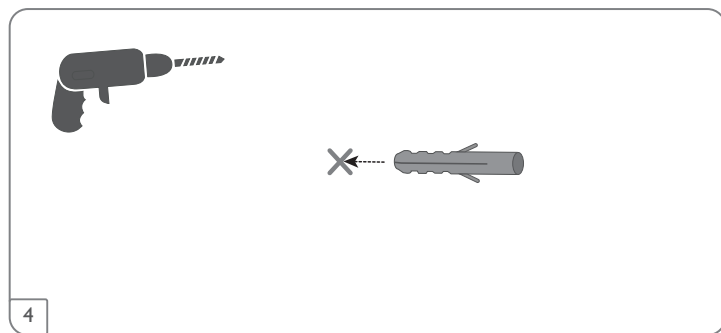
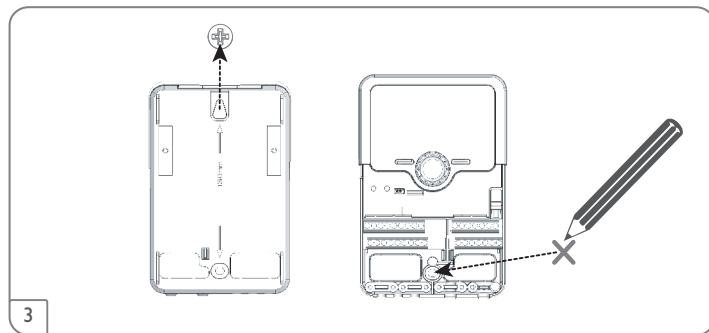
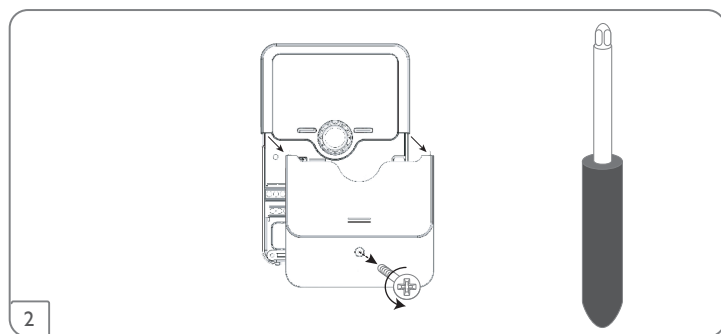
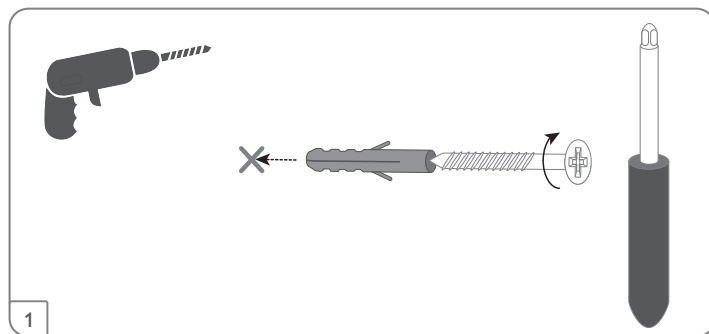
The device must only be located in dry interior rooms.

If the device is not equipped with a mains connection cable and a plug, the device must additionally be supplied from a double pole switch with contact gap of at least 3 mm or must be equipped with a disconnecting device (fuse) in accordance with the required installation regulations.

Please pay attention to separate routing of sensor cables and mains cables.

In order to mount the device to the wall, carry out the following steps:

1. Unscrew the crosshead screw from the cover and remove it along with the cover from the housing.
2. Mark the upper fastening point on the wall. Drill and fasten the enclosed wall plug and screw leaving the head protruding.
3. Hang the housing from the upper fastening point and mark the lower fastening points (centres 130 mm).
4. Insert lower wall plug.
5. Fasten the housing to the wall with the lower fastening screws and tighten.
6. Carry out the electrical wiring in accordance with the terminal allocation (see page 8).
7. Put the cover on the housing.
8. Attach with the crosshead screw.



## 2.2 Electrical connection

### WARNING! Danger of electric shock!



Upon opening the housing, live parts are exposed!

→ **Always disconnect the device from power supply before opening the housing!**

### ATTENTION! Damage by overheating! Danger of fire!



Improper connection of cables to the terminals can lead to damage caused by overheating!

→ **For a safe and permanent electrical connection, take care to properly connect the cables to the terminals according to IEC 60947-1!**

### ATTENTION! ESD damage!



Electrostatic discharge can lead to damage to electronic components!

→ **Take care to discharge properly before touching the inside of the device! To do so, touch a grounded surface such as a radiator or tap!**



#### Note

Connecting the device to the power supply must always be the last step of the installation!



#### Note

The **Speed** option must be set to **Off** when non-speed-controlled devices such as valves are connected.

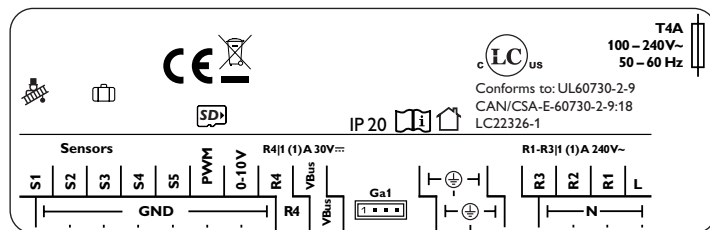


#### Note

It must be possible to disconnect the device from the mains at any time.

- Install the mains plug so that it is accessible at any time.
- If this is not possible, install a switch that can be accessed.

If the mains cable is damaged, it must be replaced by a special connection cable which is available from the manufacturer or its customer service.



### Do not use the device if it is visibly damaged!

The controller is equipped with **4 relays** in total to which loads such as pumps, valves, etc. can be connected:

Relays 1 ... 3 are semiconductor relays, designed for pump speed control:

Conductor R1 ... R3

Neutral conductor N (common terminal block)

Protective earth conductor  $\oplus$  (common terminal block)

Relay 4 is a potential-free extra-low voltage relay:

Connections to the R4 terminals can be made with either polarity.

Depending on the product version, mains cables and sensor cables are already connected to the device. If that is not the case, please proceed as follows:

Attach flexible cables to the housing with the enclosed strain relief and the corresponding screws.

Connect the **temperature sensors** (S1 to S5) to the terminals S1... S5 and GND (either polarity).

The cables carry low voltage and must not run together in a cable conduit with cables carrying a voltage higher than 50 V (please pay attention to the valid local regulations). The cable lengths depend on the cross-sectional area.

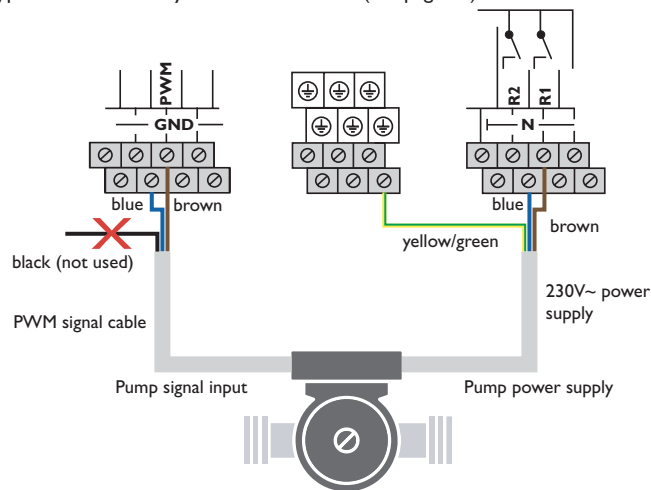
Example: up to 100 m at 1.5 mm<sup>2</sup>, up to 50 m at 0.75 mm<sup>2</sup>. The cables can be extended with a two-wire cable.

A **V40** flowmeter can be connected to the terminals S5 / V40 and GND (either polarity).

The terminals marked **PWM/0-10V** are control outputs for high-efficiency pumps (for connection see illustration).

### Electrical connection of a high-efficiency pump (HE pump)

Speed control of a HE pump is possible via a PWM signal / 0-10V control. The pump has to be connected to the relay (power supply) as well as to one of the PWM outputs of the controller. In the **Output** adjustment channel one of the PWM control types as well as a relay have to be selected (see page 17).



#### Note

When Grundfos Direct Sensors™ are used, connect the sensor ground common terminal block to PE.

Connect the **analogue Grundfos Direct Sensor™** or **FRH humidity sensor** to the Ga1 input.

The controller is supplied with power via a mains cable. The power supply of the device must be 100–240V~ (50–60 Hz).

Connect the **mains cable** to the following terminals:

Neutral conductor N

Conductor L

Protective earth conductor (PE) (common terminal block)



#### Note

For more details about the commissioning procedure see page 20.

### 2.3 Data communication / Bus

The controller is equipped with a VBus® for data transfer and energy supply to external modules. The connection is to be carried out at the terminals marked **VBus** (any polarity).

One or more VBus® modules can be connected via this data bus.

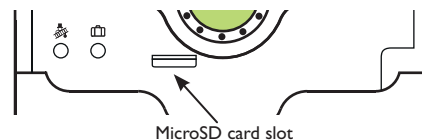
Different solutions for visualisation and remote parameterisation are available on the website [www.resol.com](http://www.resol.com). On the website, firmware updates are also available.

### 2.4 MicroSD card slot

The controller is equipped with a MicroSD card slot.

With a MicroSD card, the following functions can be carried out:

- Store measurement and balance values onto the MicroSD card. After the transfer to a computer, the values can be opened and visualised, e.g. in a spreadsheet.
- Prepare adjustments and parameterisations on a computer and transfer them via the MicroSD card.
- Store adjustments and parameterisations on the MicroSD card and, if necessary, retrieve them from there.
- Download firmware updates from the Internet and install them on the controller via MicroSD card.

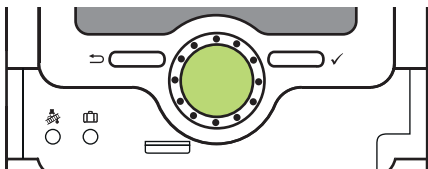


#### Note

For more information about using a MicroSD card, see page 58.

### 3 Operation and function

#### 3.1 Buttons and adjustment dial



The controller is operated via 2 buttons and 1 adjustment dial (Lightwheel®) below the display:

Left button (←) - escape button for changing into the previous menu / to the home screen (keep pressed for 2 s, see page 30)

Right button (✓) - confirming / selecting

Lightwheel® - scrolling upwards/scrolling downwards, increasing adjustment values / reducing adjustment values

#### 3.2 Microbutton for chimney sweeper function and holiday mode

The controller is equipped with two microbuttons for quick access to the holiday mode and the chimney sweeper function. The microbuttons are located underneath the slidable housing cover, the slider.

Microbutton : The **chimney sweeper function** can be triggered with the microbutton . The chimney sweeper function is activated by default. In order to trigger the chimney sweeper function, press and hold down the microbutton  for 3 s.

Microbutton : The microbutton  is used for activating the holiday mode. If the microbutton is pressed and held down for approx. 3 s, the adjustment channel **Days of absence** appears, allowing to enter the number of days for an absence. If the parameter is set to a value higher than 0, the holiday mode becomes active and the days will be counted backwards at 00:00. If the value is set to 0, the holiday mode is deactivated.

#### 3.3 Operating control LED

The controller is equipped with a multicolour LED in the centre of the Lightwheel®, indicating the following states:

| Colour                                                                            | Permanently shown       | Flashing                                        |
|-----------------------------------------------------------------------------------|-------------------------|-------------------------------------------------|
|  | Everything OK           | Manual mode on, initialisation                  |
|  | Screed drying cancelled | Sensor line break, sensor short circuit         |
|  | Holiday mode active     | Chimney sweeper function / screed drying active |
|  |                         | Manual mode off                                 |

#### 3.4 Selecting menu points and adjusting values

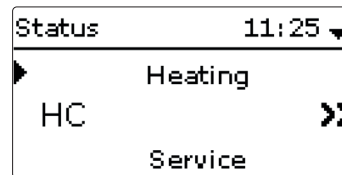
During normal operation of the controller, the display shows the status menu.

If no button is pressed for 1 min, the display illumination switches off. After 3 further minutes, the controller will display the home screen (see page 30).

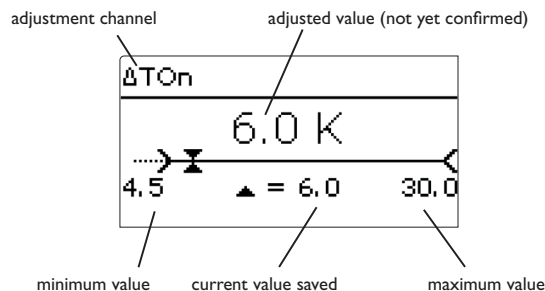
→ In order to get from the status menu into the main menu, press the left button (←)!

→ Press any key to reactivate the display illumination.

→ In order to scroll through the menu items, turn the Lightwheel®.



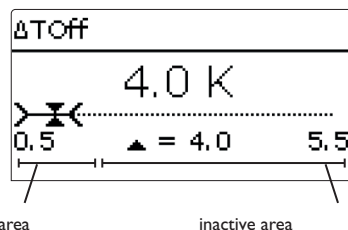
If the symbol » is shown behind a menu item, pressing the right button (✓) will open a new submenu.



Values and options can be changed in different ways:

Numeric values can be adjusted by means of a slide bar. The minimum value is indicated to the left, the maximum value to the right. The large number above the slide bar indicates the current adjustment. By turning the Lightwheel®, the upper slide bar can be moved to the left or to the right.

Only after the adjustment has been confirmed by pressing the right button (✓) will the number below the slide bar indicate the new value. The new value will be saved if it is confirmed by pressing the right button (✓) again.



When values are locked against each other, they will display a reduced adjustment range depending on the adjustment of the respective other value.

In this case, the active area of the slide bar is shortened, the inactive area is indicated as a dotted line. The indication of the minimum and maximum values will adapt to the reduction.

| System |                                            |
|--------|--------------------------------------------|
| ▶      | <input checked="" type="radio"/> Heat/Cool |
|        | <input type="radio"/> Cool                 |
|        | <input type="radio"/> Heat                 |

If only one item of several can be selected, they will be indicated with radio buttons. When one item has been selected, the radio button in front of it is filled.

| Modules |                                              | E ▼ |
|---------|----------------------------------------------|-----|
| ▶       | <input checked="" type="checkbox"/> Module 1 |     |
|         | <input type="checkbox"/> Module 2            |     |
|         | <input type="checkbox"/> Module 3            |     |

If more than one item of several can be selected, they will be indicated with checkboxes. When an item has been selected, an x appears inside the checkbox.

If no button has been pressed within a couple of minutes, the adjustment is cancelled and the previous value is retained.

### 3.5 Adjusting the timer

When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.

In the **Day selection** channel, the days of the week are available individually and as frequently selected combinations.

If more than one day or combination is selected, they will be merged into one combination for the following steps.

The last menu item after the list of days is **Continue**. If Continue is selected, the timer menu opens, in which the time frames can be adjusted.

▶ Day selection  
 Reset  
 back

Day selection  
☐ Mon-Sun  
☐ Mon-Fri  
☐ Sat-Sun  
☒ Mon  
☐ Tue  
☒ Wed  
☐ Thu  
☐ Fri  
☐ Sat  
☒ Sun  
 ▶ Continue

3. In order to save the time frame, select **Save** and confirm the security enquiry with **Yes**.

Stop  
 08:30

Mon, Wed, Sun  
 Start 06:00  
 Stop 08:30  
 ▶ Save

Save  
 Save? Yes

Mon, Wed, Sun  
 00 06 12 18  
 ▶ New time frame  
 Copy from

Mon, Wed, Sun  
 00 06 12 18  
 ▶ New time frame  
 Copy from

Day selection  
 ▶ Mon, Wed, Sun  
 Reset

#### Adding a time frame:

In order to add a time frame, proceed as follows:

1. Select **New time frame**.

Mon, Wed, Sun  
 00 06 12 18  
 ▶ New time frame  
 Copy from

Mon, Wed, Sun  
 ▶ Start --:--  
 Stop --:--  
 back

Start  
 06:00

4. In order to add another time frame, repeat the previous steps.

6 time frames can be adjusted per day or combination.

2. Adjust **Start** and **Stop** for the desired time frame.  
The time frames can be adjusted in steps of 15 min.

5. Press the left button  in order to get back to the day selection.

### Copying a time frame:

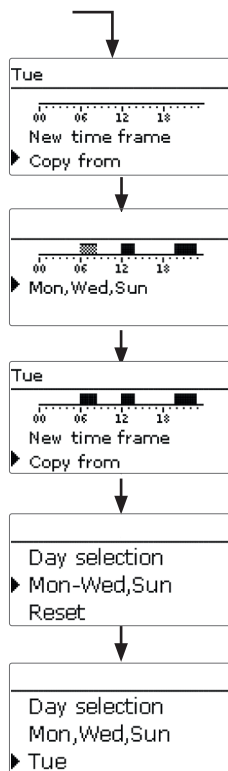
In order to copy time frames already adjusted into another day / another combination, proceed as follows:

1. Choose the day / the combination into which the time frames are to be copied and select **Copy from**.

A selection of days and / or combinations with time frames will appear.

2. Select the day or combination from which the time frames are to be copied.

All time frames adjusted for the selected day or combination will be copied.

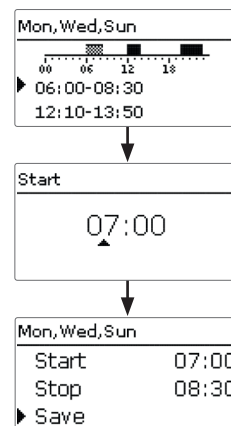


If the time frames copied are not changed, the day or combination will be added to the combination from which the time frames have been copied.

### Changing a time frame:

In order to change a time frame, proceed as follows:

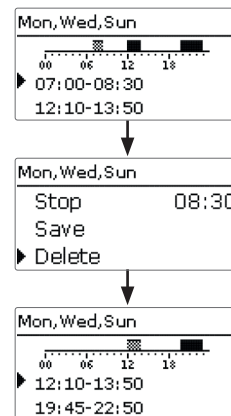
1. Select the time frame to be changed.
2. Make the desired change.
3. In order to save the time frame, select **Save** and confirm the security enquiry with **Yes**.



### Removing a time frame:

In order to delete a time frame, proceed as follows:

1. Select the time frame that is to be deleted.
2. Select **Delete** and confirm the security enquiry with **Yes**.



### Resetting the timer:

In order to reset time frames adjusted for a certain day or combination, proceed as follows:

1. Select the desired day or combination.

|                 |
|-----------------|
| Day selection   |
| ► Mon, Wed, Sun |
| Tue             |

|               |
|---------------|
| Mon, Wed, Sun |
| 00 06 12 18   |
| Copy from     |
| ► Reset       |

|            |
|------------|
| Reset      |
| Reset? Yes |

2. Select **Reset** and confirm the security enquiry with **Yes**.

The selected day or combination will disappear from the list, all its time frames will be deleted.

|                 |
|-----------------|
| ► Day selection |
| Tue             |
| Reset           |

In order to reset the whole timer, proceed as follows:

- ➔ Select **Reset** and confirm the security enquiry with **Yes**.

|               |
|---------------|
| Mon, Wed, Sun |
| Tue           |
| ► Reset       |

|            |
|------------|
| Reset      |
| Reset? Yes |

All adjustments made for the timer are deleted.

|               |
|---------------|
| Day selection |
| ► Reset       |
| back          |

### 3.6 Adjusting functions

|                    |     |
|--------------------|-----|
| Add new function   | E ▼ |
| ► Th. Disinfection |     |
| DHW heating        |     |
| DHW preheat.       |     |

In the **Optional functions** / **Add new function** menus, optional functions can be selected and adjusted.

The kind and number of optional functions offered depends on the previous adjustments.



#### Note

For most optional functions, an extension module is required.

|                                           |     |
|-------------------------------------------|-----|
| Th. Disinfection                          | E ▼ |
| ► Dem and                                 | A   |
| <input type="checkbox"/> Circulating pump |     |
| Sensor                                    | -   |

When a function is selected, a submenu opens in which all adjustments required can be made.

In this submenu, an output and, if necessary, certain system components can be allocated to the function.

If an output can be allocated to the function, the **Output** submenu opens (see page 17).

When a function has been adjusted and saved, it will appear in the **Opt. functions** menu above the menu item **Add new function**.

|                     |     |
|---------------------|-----|
| Heating/Opt. funct. | E ▼ |
| ► Th. Disinfection  |     |
| DHW heating         |     |
| Add new function    |     |

This allows an easy overview of functions already saved.

An overview about which sensor has been allocated to which component and which output has been allocated to which function is given in the **Status** menu.

|                 |           |
|-----------------|-----------|
| Circulation     | E ▲       |
| Toff            | 45 °C     |
| Funct.          | Activated |
| ► Save function |           |

At the end of each optional function submenu, the menu items **Funct.** and **Save function** are available. In order to save a function, select **Save function** and confirm the security enquiry by selecting **Yes**.

In functions already saved, the menu item **Delete function** will appear instead.

|                   |           |
|-------------------|-----------|
| Circulation       | E ▲       |
| Toff              | 45 °C     |
| Funct.            | Activated |
| ► Delete function |           |

In order to delete a function already saved, select **Delete function** and confirm the security enquiry by selecting **Yes**. The function will become available under **Add new function** again. The corresponding outputs will be available again.

|                                              |
|----------------------------------------------|
| Funct.                                       |
| <input type="radio"/> Switch                 |
| ► <input checked="" type="radio"/> Activated |
| <input type="radio"/> Deactivated            |

With the menu item **Funct.**, an optional function already saved can be temporarily deactivated or re-activated respectively. In this case, all adjustments will remain stored, the allocated outputs will remain occupied and cannot be allocated to another function. The allocated sensor will be monitored for faults.

By selecting **Switch**, the function can be activated or deactivated respectively by means of an external potential-free switch.

If **Switch** is selected, the channel **Sensor** appears, in which a sensor input can be defined as a switch.

|             |        |
|-------------|--------|
| Circulation | E ▲    |
| Toff        | 45 °C  |
| Funct.      | Switch |
| ► Sensor    | -      |

### 3.7 Output submenu

The **Output** submenu is available in almost all functions. Therefore, it will not be explained in the individual function descriptions.

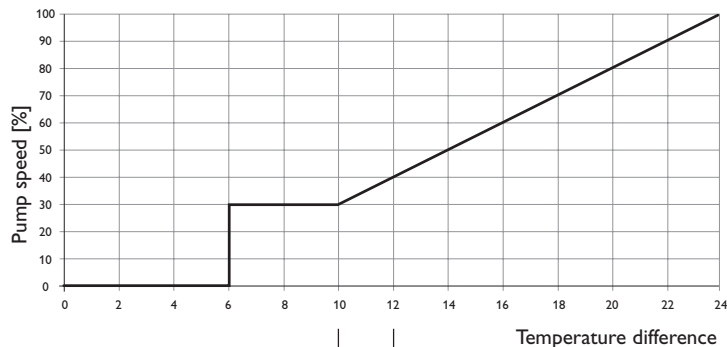
In this submenu, relays and/or signal outputs can be allocated to the function selected. All adjustments required for the outputs can be made in this menu.

All controller and module (if connected) outputs available will be displayed. If - is selected, the function will run normally in the software but will not operate an output. Relay and signal outputs can be activated separately. Depending on the adjustments made, the following results are possible:

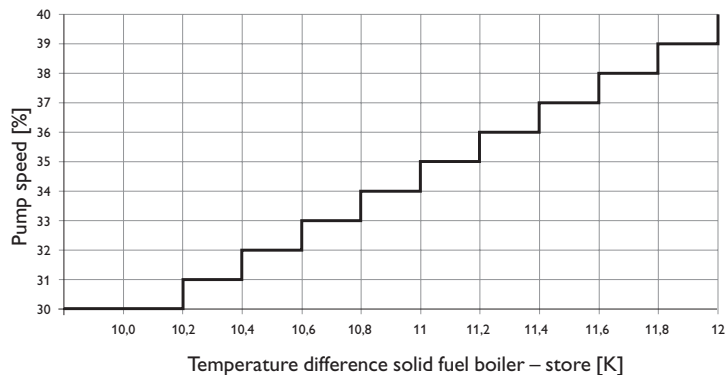
#### Adjustments

| Relay option | PWM/0-10 V option | Speed control | Result                        |                                |
|--------------|-------------------|---------------|-------------------------------|--------------------------------|
|              |                   |               | Behaviour of the relay output | Behaviour of the signal output |
| Yes          | Yes               | Yes           | → On/Off                      | Modulating                     |
| Yes          | No                | Yes           | → Burst control               | -                              |
| Yes          | No                | Yes           | → On/Off                      | -                              |
| Yes          | No                | No            | → On/Off                      | -                              |
| Yes          | Yes               | Yes           | → On/Off                      | Modulating                     |
| Yes          | Yes               | Yes           | → On/Off                      | Modulating                     |
| Yes          | Yes               | No            | → On/Off                      | 0 % / 100 %                    |
| No           | Yes               | Yes           | → -                           | Modulating                     |
| No           | Yes               | No            | → -                           | 0 % / 100 %                    |

| Adjustment channel | Description                | Adjustment range / selection | Factory setting  |
|--------------------|----------------------------|------------------------------|------------------|
| Relay              | Relay option               | Yes, No                      | No               |
| Relay              | Relay selection            | system dependent             | system dependent |
| PWM/0-10 V         | PWM/0-10 V option          | Yes, No                      | No               |
| Output             | Signal output selection    | system dependent             | system dependent |
| Signal             | Signal type                | PWM, 0-10 V                  | PWM              |
| Profile            | Curve                      | Solar, Heating               | Solar            |
| Speed              | Speed control              | Yes, No                      | system dependent |
| Min.               | Minimum speed              | 20 ... 100 %                 | 30 %             |
| Max.               | Maximum speed              | 20 ... 100 %                 | 100 %            |
| Inverted           | Inverted switching option  | Yes, No                      | No               |
| Blocking protect.  | Blocking protection option | Yes, No                      | No               |
| Manual mode        | Operating mode             | On, Max., Auto, Min., Off    | Auto             |



Detail



## Speed control

In the **Speed** adjustment channel, the speed control for the output can be activated or deactivated respectively. If **Yes** is selected, the channels **Min.** and **Max.** will appear.

In the **Min.** adjustment channel, a relative minimum speed for a pump connected can be allocated to the output.

In the **Max.** adjustment channel, a relative maximum speed for a pump connected can be allocated to the output.

For functions controlling loads which are not speed controlled, the speed control will not be shown on the display (e.g. mixer).

If the temperature difference reaches or exceeds the switch-on temperature difference, the pump switches on at 100% speed for 10 s. Then, the speed is reduced to the minimum pump speed value. If the temperature difference exceeds the adjusted set value by 1/10 of the rise value, the pump speed increases by one step (1%). The response of the controller can be adapted via the parameter **Rise**. Each time the difference increases by 1/10 of the adjustable rise value, the pump speed increases by one step until the maximum pump speed of 100% is reached. If the temperature difference decreases by 1/10 of the adjustable rise value, pump speed will be decreased by one step.

## Relay option

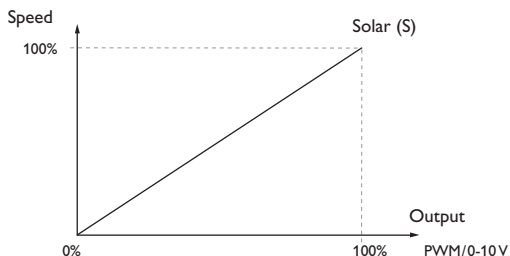
If the **Relay** option is activated, a relay can be allocated to the output selection.

### PWM/0-10 V option

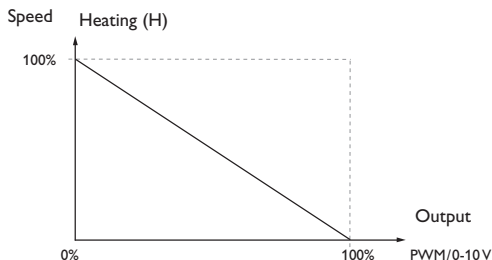
If the **PWM/0-10 V** option is activated, a PWM/0-10 V output can be allocated to the output selection.

In the **Signal** channel, a selection between a PWM or a 0-10V signal can be made. In the **Profile** channel, characteristic curves for solar and heating pumps can be selected.

#### Signal characteristic: PWM; Profile: Solar



#### Signal characteristic: PWM; Profile: Heating



### Blocking protection

In order to protect the pumps against blocking after standstill, the controller is equipped with a blocking protection option. This option can be activated in the output selection submenu. The **Blocking protection** option can be adjusted in the **Basic settings/Blocking protect.** menu (see page 56).

### Manual mode

In the **Manual mode** adjustment channel, the operating mode of the output can be selected. The following options are available:

On = Output is active at 100% speed (manual mode)

Max. = Output is active at adjusted maximum speed (manual mode)

Auto = Output is in automatic mode

Min. = Output is active at adjusted minimum speed (manual mode)

Off = Output is switched off (manual mode)



#### Note

After service and maintenance work, the operating mode must be set back to Auto. In manual mode the control logic is suspended.

### 3.8 Sensor configuration

Some sensors must be registered and configured in the **Basic settings/Sensors** menu (see page 56 and page 59).

In some functions, the **Sensor config.** channel is available for sensor selection, in which sensors not used and not registered can be selected. The selected sensor input will automatically be set to the sensor type required for the function. Registering the sensor in the **Basic settings/Sensors** menu is then no longer necessary.



#### Note

If a sensor is used as the temperature sensor of a function, the sensor types **Switch**, **Fern**, **BAS** and **None** will not be available for the corresponding input.

## 4 Commissioning

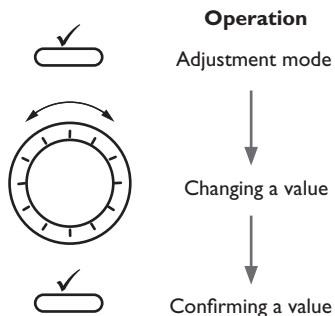
When the hydraulic system is filled and ready for operation, connect the controller to the mains.

The controller runs an initialisation phase in which the operating control LED flashes green.

When the controller is commissioned or when it is reset, it will run a commissioning menu after the initialisation phase. The commissioning menu leads the user through the most important adjustment channels needed for operating the system. Disconnecting the controller from the mains after having run the commissioning menu will not delete adjustments that have already been carried out. After you switch on the device again, the controller will not start the commissioning menu, but normal operation after the initialisation phase.

### Commissioning menu

The commissioning menu consists of the channels described in the following.



#### 1. Language:

→ Adjust the desired menu language.

|           |
|-----------|
| Language  |
| Deutsch   |
| ▶ English |
| Francais  |

#### 2. Units:

→ Adjust the desired unit system.

|                                                     |
|-----------------------------------------------------|
| Units                                               |
| <input type="radio"/> °F / gal / MBTU               |
| ▶ <input checked="" type="radio"/> °C / Liter / kWh |

#### 3. Daylight savings time adjustment:

→ Activate or deactivate the automatic daylight savings time adjustment.

|                                        |
|----------------------------------------|
| Auto DST                               |
| ▶ <input checked="" type="radio"/> Yes |
| <input type="radio"/> No               |

#### 4. Time:

→ Adjust the clock time. First of all adjust the hours, then the minutes.

|       |
|-------|
| Time  |
| 12:26 |

#### 5. Date:

→ Adjust the date. First of all adjust the year, then the month and then the day.

|            |
|------------|
| Date       |
| ?? ?? 2025 |

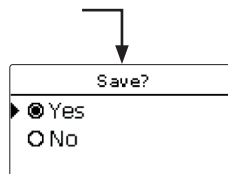
#### 6. Scheme:

→ Enter the scheme number of the desired system (see page 22).

|                                       |
|---------------------------------------|
| Scheme                                |
| <input type="radio"/> Yes             |
| ▶ <input checked="" type="radio"/> No |

## 7. Completing the commissioning menu:

After the system has been selected or the scheme number has been entered, a security enquiry appears. If the security enquiry is confirmed, the adjustments will be saved.



| Save?                            |     |
|----------------------------------|-----|
| <input checked="" type="radio"/> | Yes |
| <input type="radio"/>            | No  |

- ➔ In order to confirm the security enquiry, select **Yes**.
- ➔ In order to reenter the commissioning menu channels, select **No**.

If the security enquiry has been confirmed, the controller will be ready for operation.



### Note

The adjustments carried out during commissioning can be changed anytime in the corresponding adjustment channel. Additional functions and options can also be activated and adjusted (see page 28).

**Set the code to the customer code before handing over the controller to the customer (see page 59).**

## 4.1 Schemes with basic settings

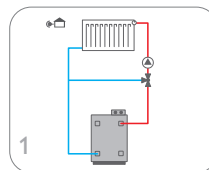
The controller is pre-programmed for 4 basic systems. The basic pre-adjustments have already been made. For backup heating it is necessary to allocate the demand and the boiler loading pump by means of shared relays. Afterwards the system can easily be extended.

Relay and sensor allocation correspond to the figures.

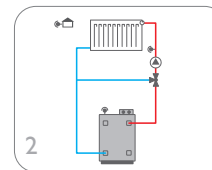
Scheme 0 has no pre-adjustments. The schemes are set with preceding zeros.

Example: In order to select scheme 3, enter scheme number 0003.

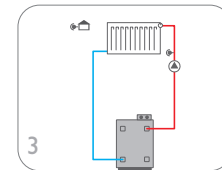
| Scheme |
|--------|
| 0003 ▲ |



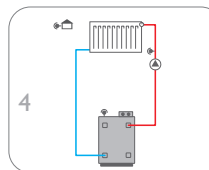
1 mixed heating circuit



1 mixed heating circuit with backup heating

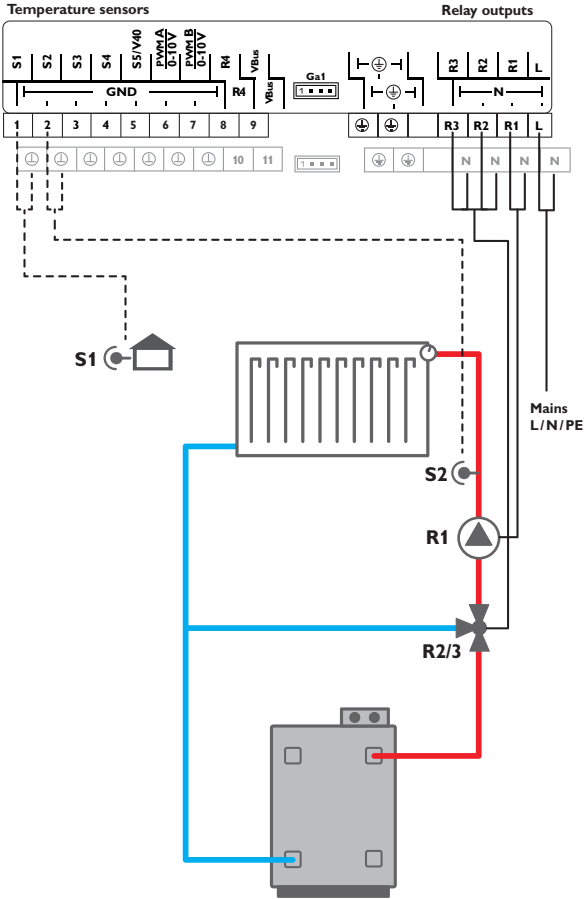


1 unmixed heating circuit



1 unmixed heating circuit with backup heating

Scheme 1: 1 mixed heating circuit



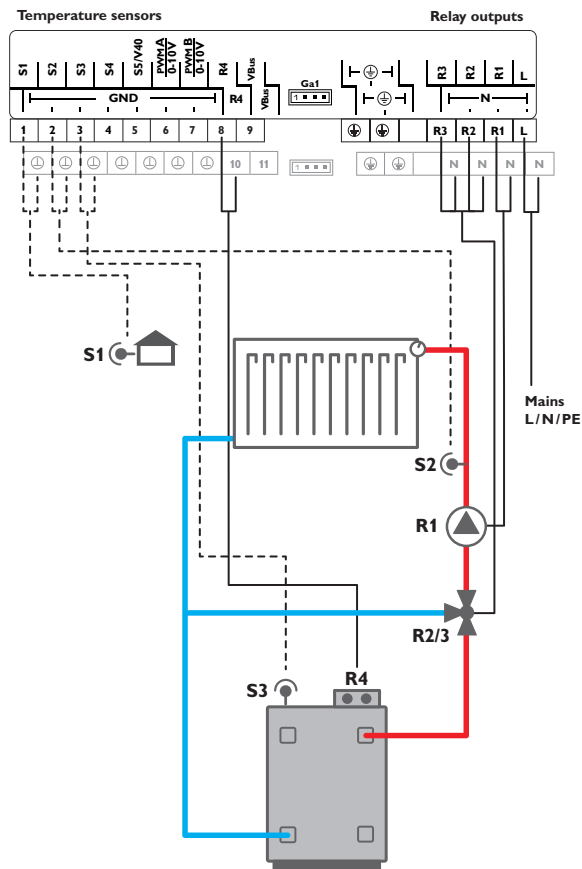
By means of the outdoor temperature sensor S1 and the flow sensor S2, a mixed weather-compensated heating circuit can be controlled.

| Sensors |         |       |
|---------|---------|-------|
| S1      | Outdoor | 1/GND |
| S2      | Flow HC | 2/GND |
| S3      | Free    | 3/GND |
| S4      | Free    | 4/GND |
| S5      | Free    | 5/GND |

| Relay |              |         |
|-------|--------------|---------|
| R1    | HC pump      | R1/N/PE |
| R2    | Mixer open   | R2/N/PE |
| R3    | Mixer closed | R3/N/PE |
| R4    | Free         | 8/10    |

| 0-10 V/PWM |      |       |
|------------|------|-------|
| A          | Free | 6/GND |
| B          | Free | 7/GND |

## Scheme 2: 1 mixed heating circuit with backup heating (demand)



By means of the outdoor temperature sensor S1 and the flow sensor S2, a mixed weather-compensated heating circuit can be controlled. Boiler demand via the potential-free relay is triggered depending on the temperature difference between the set flow temperature and the value measured at the backup heating sensor S3.

### Sensors

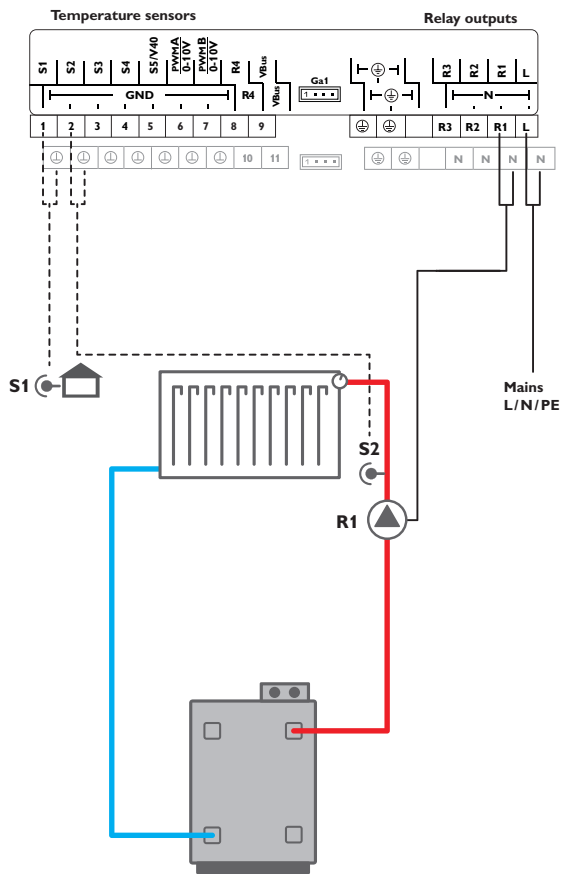
|    |                        |       |
|----|------------------------|-------|
| S1 | Outdoor                | 1/GND |
| S2 | Flow HC                | 2/GND |
| S3 | Backup heating/ boiler | 3/GND |
| S4 | Free                   | 4/GND |
| S5 | Free                   | 5/GND |

### Relay

|    |              |         |
|----|--------------|---------|
| R1 | HC pump      | R1/N/PE |
| R2 | Mixer open   | R2/N/PE |
| R3 | Mixer closed | R3/N/PE |
| R4 | Demand       | 8/10    |

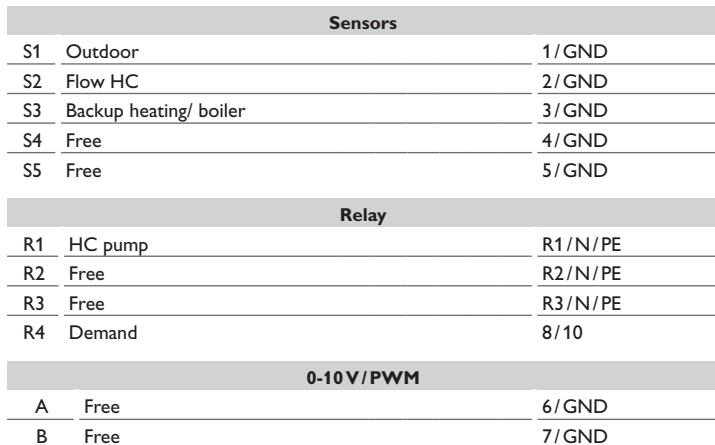
### 0-10V/PWM

|   |      |       |
|---|------|-------|
| A | Free | 6/GND |
| B | Free | 7/GND |



By means of the outdoor temperature sensor S1 and the flow sensor S2, an unmixed weather-compensated heating circuit can be controlled.

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By means of the outdoor temperature sensor S1 and the flow sensor S2, an unmixed weather-compensated heating circuit can be controlled. Boiler demand via the potential-free relay is triggered depending on the temperature difference between the set flow temperature and the value measured at the backup heating sensor S3.

## 4.2 Step-by-step parameterisation

The heating controller **DeltaTherm® HC mini** is a controller that offers a broad variety of functions to the user. At the same time, the user has a lot of freedom in configuring them. Therefore, to set up a complex system, careful planning is required. We recommend drawing a sketch of the system first.

If planning, hydraulic construction and electrical connection have all been carried out successfully, proceed as follows:

### 1. Running the commissioning menu

After the commissioning menu has been finished (see page 20), further adjustments can be made. The commissioning menu can be repeated any time by means of a reset (see page 56). Additional adjustments will be deleted.

### 2. Registering modules, sensors and devices

If a flowmeter, a switch, Grundfos Direct Sensors™, humidity sensors, extension modules and/or room control units are connected, these have to be registered in the **Basic settings / Modules**, **Basic settings / Sensors** and **Basic settings / Devices** menu respectively.

For further information about the registration of modules, sensors and devices see page 56.

### 3. Adjusting heating circuits and activating optional heating functions

Now the heating circuit can be adjusted.

In combination with extension modules, further heating circuits can be controlled, for the heating part of the arrangement, optional functions can be selected, activated and adjusted.

Heating circuits and their optional functions can use shared relays for (boiler) demands, loading pumps or valves. They have to be selected in the shared relay menu first (see page 31). All free outputs available on the controller and on the modules connected can be used.

The controller always suggests the numerically smallest output available.

Sensors can be allocated to more than one function.

For further information about heating circuits and optional heating functions see page 42.

## 4. Adjusting the operating mode

After commissioning the heating circuit will be in automatic mode. The operating mode can be changed in the status menu (see page 29).

The operating mode of the first heating circuit also applies to all further heating circuits (via extension modules), if they are linked. If you wish to operate one of the heating circuits 2 ... 7 independently, deactivate the linking of the corresponding heating circuit (see page 29).

### 5. Activating optional arrangement functions

Now, optional functions for the arrangement can be selected, activated and adjusted: Outputs available can be allocated to functions which require an output. The controller always suggests the numerically smallest output available.

Sensors can be allocated to more than one function.

For further information about the optional arrangement functions see page 47.

## 5 Menu structure

### Main menu

- Status
- Heating
- Arrangement
- HQM
- Basic settings
- SD card
- Manual mode
- User code

### Heating

- Shared rel.
- Heating circuits
- Optional functions
- Screed drying

### Arrangement

- Optional functions

### Basic settings

- Language
- Date/Time
- Sensors
- Modules
- Devices
- Blocking protection
- ...

### Heating circuit

- Basic settings
- Heating system
- Cooling system
- Room control
- Special funct.

### Optional functions

- Parallel relay
- Mixer
- Zone loading
- Error relay
- ...

### Basic settings

- System
- HC pump
- Mixer open
- Mixer closed
- ...

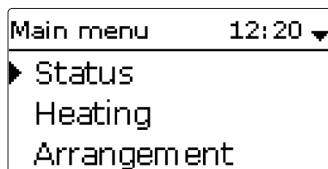
### Parallel relay

- Output
- Reference relay
- Overrun
- Delay
- ...



### Note

The menu items and adjustment values selectable are variable depending on adjustments already made. The figure only shows an exemplary excerpt of the complete menu in order to visualise the menu structure.



The following menus are available:

- Status
- Heating
- Arrangement
- HQM
- Basic settings
- SD card
- Manual mode
- User code

The following chapters describe the individual menus.



#### Note

If no button is pressed for 1 min, the display illumination switches off. After 3 further minutes, the controller will display the home screen (see page 30).

In the status menu of the controller, the status messages for every menu area can be found.

At the end of each submenu, the menu item **Adj. values** can be found.

If this one is selected, the corresponding menu opens.

→ In order to get back to the Home Screen (see page 30), push the left button  for 2 s.

### 7.1 Heating

In this menu, the status of the activated heating circuits as well as of the selected optional functions is indicated.

The status of the first heating circuit is also the home screen of the controller. In this menu, the operating mode of the heating circuit can be changed:

**Auto:** Automatic heating mode with optionally activated DHW heating and circulation.

**Day:** Constant heating mode with the adjusted day correction.

**Night:** Constant heating mode with the adjusted night correction and the selected correction mode.

**Summer:** The heating circuit is switched off. The optionally activated DHW heating and circulation remain active.

**Off:** The heating circuit as well as the optionally activated DHW heating and circulation are switched off.

**Holiday:** Constant heating mode within an adjustable time frame with the adjusted night correction and the selected correction mode.

If the operating mode **Holiday** is selected, the adjustment channel **Holiday** will appear for adjusting the days of an absence. The day, on which the adjustment is made, is the first day of absence. The days will be counted backwards at 00:00. The remaining days are indicated in the status menu (countdown). If 0 is reached, the controller automatically switches to the operating mode Automatic.

The operating mode of the first heating circuit also applies to all further heating circuits (via extension modules), if they are linked. If you wish to operate one of the heating circuits 2 ... 7 independently, deactivate the linking of the corresponding heating circuit (see page 41).

## 7.2 Arrangement

This menu shows all status information of all activated optional functions of the arrangement.

## 7.3 HQM

In this menu, all current measured values of the flow and return sensors, flow rate and power as well as heat quantities are indicated.

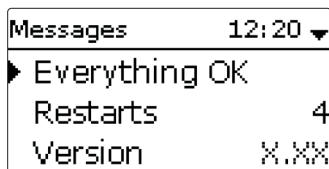
Furthermore, the impulse counter values are indicated.

## 7.4 Measured / Balance values

This menu shows all current measurement values as well as a range of balance values. Some of the menu items can be selected in order to enter a submenu.

Each sensor and output is indicated with the component or function it has been allocated to. The symbol ► at the edge of the display next to a sensor allocated to a function, means that this sensor has several functions. Use the Lightwheel® to scroll to these functions. The sensors and outputs of the controller and all modules connected are listed in numerical order.

## 7.5 Messages



This menu shows error and warning messages.

During normal operation, the message **Everything OK** is indicated.

When a monitoring function from the function control is activated and detects a fault condition, a corresponding message will be indicated (see table page 30).

A message consists of the name of the monitoring function, a 4-digit error code and a short text description of the fault condition.

In order to acknowledge a message, proceed as follows:

1. Select the code line of the desired message by turning the Lightwheel®.
2. Confirm the message with the right button (✓).
3. Confirm the security enquiry by with **Yes**.

When the installer user code has been entered, the menu item **Restarts** will appear below the messages. The value indicates the number of controller restarts since commissioning. This value cannot be reset.

| Error code | Display            | Monitoring function                                            | Cause                                                                         |
|------------|--------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------|
| 0001       | !Sensor fault      | Sensor line break                                              | Sensor line broken                                                            |
| 0002       | !Sensor fault      | Sensor short circuit                                           | Sensor line short-circuited                                                   |
| 0041       | !Flow rate monit.  | Flow rate monitoring                                           | No flow at sensor                                                             |
| 0051       | !Overpressure      | Overpressure monitoring                                        | Max. system pressure exceeded                                                 |
| 0052       | !Low pressure      | Low pressure monitoring                                        | System pressure below minimum                                                 |
| 0061       | !Data storage def. | Storing and changing adjustments not possible                  |                                                                               |
| 0071       | !RTC module def.   | Time-controlled functions (e.g. night correction) not possible | Incorrect date and time settings due to power failure or defective RTC module |
| 0091       | Restarts           | Restart counter (non-adjustable)                               | Number of restarts since commissioning                                        |



### Note

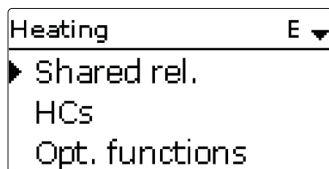
A power failure can lead to incorrect date and time settings. In this case, the message about a defective RTC module will be displayed.

➔ In order to rectify the error, check the date and time settings and adjust again, if necessary.

## 7.6 Home screen

In this menu, the menu which will appear if no button is pressed for a longer period of time can be selected.

For the pre-programmed schemes, the status of the heating circuit (1) is preset as the home screen.

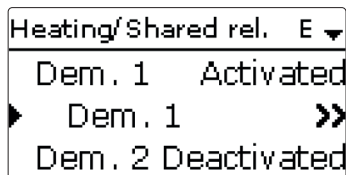


In this menu, all adjustments for the heating part of the arrangement or for the heating circuit respectively can be made.

In combination with extension modules, further heating circuits can be controlled, for the heating part of the arrangement, optional functions can be selected, activated and adjusted.

Shared relays for demands, loading pumps or valves can be activated and adjusted. In this menu, the screed drying function can be activated and adjusted.

### 8.1 Shared relays



In this menu, adjustments for heat generators, loading pumps and valves which are shared by several heating circuits and their optional functions can be made.

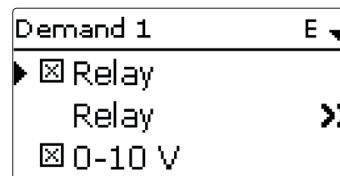
Further options such as boiler protection, start-up and overrun are also available.

Shared relays will be available for selection under **Virtual** in the heating circuits and in the relay allocation channels of the corresponding optional functions of the Heating menu. This way, several heating circuits and optional functions (heating) can demand the same heat source.



#### Note

Activate and adjust the shared relays first. They will then be available in the heating circuits and optional functions.



### Heating / Shared rel.

| Adjustment channel | Description                           | Adjustment range / selection | Factory setting  |
|--------------------|---------------------------------------|------------------------------|------------------|
| Dem. 1 (2)         | Demand 1 (2)                          | Activated, Deactivated       | Deactivated      |
| Dem. 1 (2)         | Demand submenu                        | -                            | -                |
| Relay              | Relay option                          | Yes, No                      | No               |
| Relay              | Relay submenu                         | -                            | -                |
| Relay              | Relay selection                       | system dependent             | system dependent |
| Boiler pr. min     | Option for boiler protection min      | Yes, No                      | No               |
| TMin               | Minimum boiler temperature            | 10 ... 90 °C                 | 55 °C            |
| Boiler pr. max     | Option for boiler protection max      | Yes, No                      | No               |
| TMax               | Maximum boiler temperature            | 20 ... 95 °C                 | 90 °C            |
| Sen. boiler        | Boiler sensor selection               | system dependent             | S3               |
| 0-10V              | 0-10V option                          | Yes, No                      | No               |
| 0-10V              | 0-10V submenu                         | -                            | -                |
| Output             | Output selection                      | -, A, B                      | -                |
| TSet 1             | Lower boiler temperature              | 10 ... 85 °C                 | 10 °C            |
| Volt 1             | Lower voltage                         | 1.0 ... 10.0V                | 1.0V             |
| TSet 2             | Upper boiler temperature              | 15 ... 90 °C                 | 80 °C            |
| Volt 2             | Upper voltage                         | 1.0 ... 10.0V                | 8.0V             |
| Permanent volt.    | Permanent voltage option              | Yes, No                      | No               |
| Volt               | Permanent voltage value               | 0.1 ... 9.9V                 | 2.0V             |
| TMin               | Minimum value set boiler temperature  | 10 ... 89 °C                 | 10 °C            |
| TMax               | Maximum value set boiler temperature  | 11 ... 90 °C                 | 80 °C            |
| ΔTFlow             | Increase for the set flow temperature | 0 ... 20 K                   | 5 K              |
| Sen. flow          | Flow sensor option                    | Yes, No                      | No               |
| Sensor             | Flow sensor selection                 | system dependent             | -                |
| Interval           | Monitoring period                     | 10 ... 600 s                 | 30 s             |
| Hysteresis         | Correction hysteresis                 | 0.5 ... 20.0K                | 1.0 K            |
| Correction         | Correction of the voltage signal      | 0.0 ... 1.0V                 | 0.1V             |

| Adjustment channel | Description                          | Adjustment range / selection | Factory setting  |
|--------------------|--------------------------------------|------------------------------|------------------|
| Min. runt.         | Minimum runtime option               | Yes, No                      | No               |
| tMin               | Minimum runtime                      | 0 ... 120 min                | 10 min           |
| Manual mode        | Operating mode for shared relays     | Max., Auto, Off, Min.        | Auto             |
| Pump 1 (2)         | Shared relay option for loading pump | Activated, Deactivated       | Deactivated      |
| Pump 1 (2)         | Pump submenu                         | -                            | -                |
| Output             | Output selection                     | system dependent             | system dependent |
| Delay              | Pump delay                           | No, Time, Temp.              | No               |
| TO <sub>on</sub>   | Boiler start-up temperature          | 10 ... 90 °C                 | 60 °C            |
| Duration           | Delay to a demand                    | 0 ... 300 s                  | 60 s             |
| Overrun            | Pump overrun                         | No, Time, Temp.              | No               |
| TO <sub>off</sub>  | Remaining boiler temperature         | 10 ... 90 °C                 | 50 °C            |
| Duration           | Delay to a demand                    | 0 ... 300 s                  | 60 s             |
| Sen. boiler        | Boiler sensor selection              | system dependent             | system dependent |
| Manual mode        | Manual mode of output                | Max., Auto, Min., Off        | Auto             |
| Valve 1 (2)        | Shared relay option for valve        | Activated, Deactivated       | Deactivated      |
| Valve 1 (2)        | Valve submenu                        | -                            | -                |
| Output             | Output selection                     | system dependent             | system dependent |
| Manual mode        | Manual mode of output                | Max., Auto, Min., Off        | Auto             |

back

Every demand can be carried out by means of a relay and/or a 0-10V output. If both the **Relay** and the **0-10 V** option are activated, the demand uses both outputs in parallel.

Example:

The potential-free relay R4 can be allocated to the shared relay **Dem. 1**, for example. R4 will then become available for potential-free boiler demand in the heating circuits and e.g. the DHW heating function.

### Relay option

If the **Relay** option is activated, the submenu **Relay** appears, in which a relay can be allocated to the demand.

The **Boiler pr. min** option is used for protecting a boiler against cooling. If the temperature falls below the adjusted minimum temperature, the allocated relay will be energised until the minimum temperature is exceeded by 5 K.

The **Boiler pr. max** option is used for protecting a boiler against overheating. If the adjusted maximum temperature is exceeded, the allocated relay will be switched off until the temperature falls by 5 K below the maximum temperature.

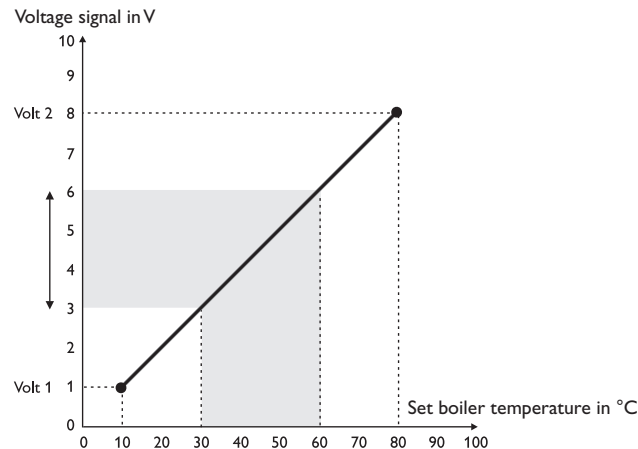
For this purpose, a boiler sensor is required.

### 0-10 V option

If the **0-10 V** option is activated, the submenu **0-10 V** appears, in which a 0-10 V output can be allocated to the demand.

With this option, the controller can demand modulating heat generators equipped with a 0-10 V interface.

The characteristic curve of the 0-10V signal as a function of the set boiler temperature is defined by means of 2 set points according to the specifications of the boiler manufacturer. At a temperature of **TSet 1**, the voltage signal of the heat generator is **Volt 1**. At a temperature of **TSet 2**, the voltage signal of the heat generator is **Volt 2**. The controller automatically calculates the characteristic curve resulting from these values. If the **permanent voltage** option is activated, the parameter **Volt** appears, by means of which a minimum voltage that is permanently applied to the output can be defined.



By means of the adjustment channels **TMax** and **TMin** the maximum and minimum values for the set boiler temperature can be defined.

When the **Sen. flow** option is activated, the controller monitors whether the heat generator actually reaches the desired set temperature and, if necessary, adjusts the voltage signal accordingly. In order to do so, the controller checks the temperature at the boiler flow sensor when the interval has elapsed. If the temperature measured deviates from the set boiler temperature by more than the hysteresis, the voltage signal is adapted by the **Correction** value. This process will be repeated

until the temperature measured is identical to the set boiler temperature. When the **Min. runtime** option is activated, a minimum runtime can be adjusted for the demand.

### Pump

For loading pumps, the shared relays **Pump 1** and **Pump 2** are available. Concerning a demand, the options **Delay** and **Overrun** can be activated for the shared relays. The demand can either be time- or temperature controlled. For temperature-dependent control an allocated boiler sensor is required.

The **Delay** option is used for switching on the loading pump with a delay to a demand. If the adjusted minimum temperature at the allocated sensor is exceeded or the adjusted duration has elapsed, the allocated output switches on. The **Overrun** option is used for switching off the loading pump with a delay to a demand. If the temperature falls below the adjusted remaining boiler temperature or the adjusted duration has elapsed, the allocated output switches off.

### Valve

Valves and parallel relays can use the shared relays **Valve 1** and **Valve 2**. These shared relays are energised individually or along with a reference relay (e.g. loading pump).



#### Note

If the 0-10V demand is used for DHW heating, the voltage signal will always be identical to **TMax**.

## 8.2 Heating circuits

The controller has 1 mixed weather-compensated heating circuit and is able to control up to 6 further external mixed heating circuits by means of extension modules.

| Heating/HCs | E |
|-------------|---|
| ► HC        |   |
| new HC...   |   |
| back        |   |

If one or more extension modules are connected, they have to be registered with the controller. Only registered modules will be available in the heating circuit selection.

If **new HC...** is selected for the first time, the first heating circuit is allocated to the controller.

## Heating / HCs / new HC...

| Adjustment channel | Description                             | Adjustment range / selection   | Factory setting |
|--------------------|-----------------------------------------|--------------------------------|-----------------|
| Basic settings     | Basic settings submenu (see page 33)    | -                              | -               |
| Heating system     | Heating system submenu (see page 34)    | -                              | -               |
| Cooling system     | Cooling system submenu (see page 37)    | -                              | -               |
| Room control       | Room control submenu (see page 39)      | -                              | -               |
| Special funct.     | Special functions submenu (see page 39) | -                              | -               |
| Funct.             | De/activation of the heating circuit    | Activated, Deactivated, Switch | Activated       |
| Sensor             | Switch input selection                  | -                              | -               |

### 8.2.1 Basic settings submenu

In this menu, relays for the heating circuit pump and the heating circuit mixer can be selected.

3 relays are required for a mixed heating circuit.

In the **System** parameter, a selection can be made between **Heat**, **Cool** and **Heat/Cool**.

| Basic settings | E ▼       |
|----------------|-----------|
| ► System       | Heat/Cool |
| HC pump        | R1        |
| Mixer op.      | R2        |

If the measured flow temperature deviates from the set flow temperature, the mixer will be activated in order to adjust the flow temperature correspondingly.

The mixer runtime can be adjusted with the parameter **Interval**.

### Heating / HCs / new HC... / Basic settings

| Adjustment channel | Description                           | Adjustment range / selection | Factory setting  |
|--------------------|---------------------------------------|------------------------------|------------------|
| System             | Heating circuit mode selection        | Heat, Cool, Heat/Cool        | Heat             |
| HC pump            | Heating circuit pump output selection | system dependent             | system dependent |
| Mixer op.          | Output selection mixer open           | system dependent             | system dependent |
| Mixer cl.          | Output selection mixer closed         | system dependent             | system dependent |
| Interval           | Mixer interval                        | 1 ... 20 s                   | 4 s              |
| Sen. outd.         | Outdoor sensor selection              | system dependent             | system dependent |
| Sen. flow          | Flow sensor selection                 | system dependent             | system dependent |

## 8.2.2 Heating system submenu

|            |       |
|------------|-------|
| Heat. sys. | E ▼   |
| ► Mode     | Curve |
| Curve      | 1.0   |
| TFlowmin   | 20 °C |

In this menu, a mode for the heating circuit control can be selected and adjusted.

5 modes are available:

- Constant
- Curve
- Linear
- Room influence
- Room

The **Constant** mode aims to keep the set flow temperature at a constant value which can be adjusted by means of the parameter **TFlowset**.

Set flow temperature = TFlowset + remote control + day correction or night correction

If the **Curve** mode is selected, the controller calculates a set flow temperature by means of the outdoor temperature and the heating curve selected. In both cases, the dial setting of the remote control and the controller day correction or night correction will be added.

Set flow temperature = heating curve temperature + remote control + day correction or night correction

The calculated set flow temperature is limited by the adjusted values for the maximum flow temperature and the minimum flow temperature.

Maximum flow temperature ≥ set flow temperature ≥ minimum flow temperature

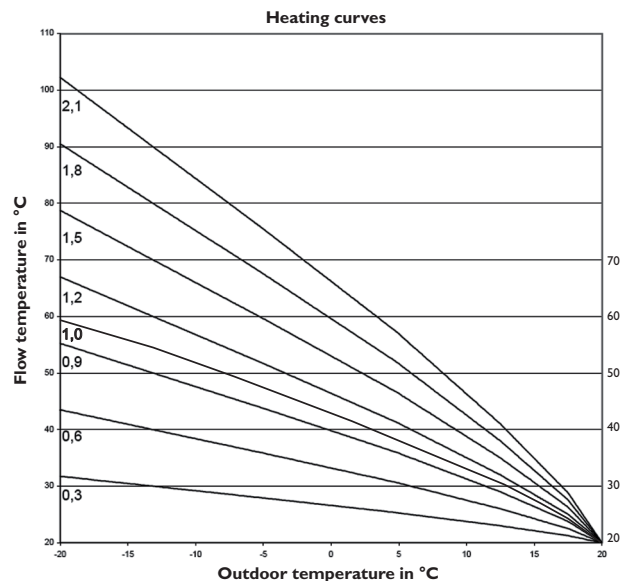
By means of the adjustment channels **TFlowmax** and **TFlowmin** the maximum and minimum values for the set flow temperature can be defined.

If the outdoor temperature sensor is defective, an error message will be indicated. For the duration of this condition, the maximum flow temperature -5 K is assumed as the set flow temperature in the **Curve** and **Linear** mode.



### Note

The controller uses an averaged outdoor temperature.



In the **Linear** mode the flow temperature curve will be calculated by means of 2 points depending on the outdoor temperature. At a temperature of **TOutdoor 1** the set flow temperature is **TFlow 1**. At a temperature of **TOutdoor 2** the set flow temperature is **TFlow 2**. The controller automatically calculates the characteristic curve resulting from these values.

|             |            |
|-------------|------------|
| Heat. sys.  | E ▼        |
| ► Mode      | Room infl. |
| Curve       | 1.0        |
| Room factor | 5          |

In the **Room influence** mode, the weather-compensated set flow temperature will be expanded by a demand-based room control. The parameter **Room factor** can be used for determining the intensity of the room influence.

The controller calculates the set flow temperature as in the curve mode plus the room influence: Set flow temperature = set temperature + remote control + day correction or night correction + room influence

In order to calculate the deviation of the room temperature from the adjusted set value, at least one sensor-type room is required. The adjustments can be made in the **Room control** submenu.

|            |       |
|------------|-------|
| Heat. sys. | E ▾   |
| ▶ Mode     | Room  |
| TStart     | 40 °C |
| TFlowmin   | 20 °C |

In the **Room** mode, the controller will calculate the set flow temperature by means of the room temperature, the outdoor temperature will not be taken into account. Day/Night correction and timer will not be indicated.

The start value of the set flow temperature can be influenced by the parameter **TStart**.

In order to calculate the deviation of the room temperature from the adjusted set value, at least one room is required (see page 39). The adjustments can be made with the **Room (1 ... 5)** parameter. For this purpose, select **Sensor** in the **Type** adjustment channel.

The adjustments of all activated room will be taken into account. The controller will calculate the average value of the deviations measured and correct the set flow temperature correspondingly.

### Timer

With the timer, the day/correction operation can be adjusted. During day phases, the set flow temperature is increased by the adjusted day correction.

|            |           |
|------------|-----------|
| Heat. sys. | E ⬆⬆      |
| ☑ Timer    |           |
| Mode       | Day/Night |
| ▶ Timer    | ➡➡        |

The parameter **Mode** is used for selecting between the following correction modes:

**Day/Night:** A reduced set flow temperature (night correction) is used during night operation.

**Day/Off:** The heating circuit and the optionally activated backup heating are switched off during night operation.

The timer can be used for adjusting the time frames for day operation.

### Summer operation

|                  |       |
|------------------|-------|
| Heat. sys.       | E ⬆⬆  |
| ▶ ☑ Summer oper. |       |
| Mode             | Day   |
| TDay off         | 20 °C |

In summer mode, the heating circuit is switched off.

For summer operation, the following modes are available:

**Day:** If the outdoor temperature exceeds the summer temperature day, the heating circuit switches off.

**Day/Night:** The parameters **Daytime on** and **Daytime off** can be used for adjusting a time frame for the summer operation. If the outdoor temperature exceeds the summer temperature night outside the adjusted time frame, the heating circuit switches off as well.

**Date:** In this mode, a date with start and stop can be adjusted for the summer operation.

**Date/Day:** In this mode, a date with start and stop can be adjusted for the summer operation. If the outdoor temperature exceeds the summer temperature day outside the adjusted period, the heating circuit switches off as well.

**Dt./d/n:** In this mode, a date with start and stop can be adjusted for the summer operation additionally to the day/night temperature.

## Backup heating

For the backup heating of the heating circuit, 3 modes are available:

**Therm.:** In this mode, the set flow temperature is compared to a store reference sensor.

**Zone:** In this mode, the set flow temperature is compared to 2 store reference sensors. The switching conditions have to be fulfilled at both reference sensors.

**On/Off:** In this mode, the backup heating is activated when the heating circuit pump is switched on for heating.

|                |       |   |
|----------------|-------|---|
| Backup heating |       | E |
| Mode           | Zone  |   |
| Output         | Dem.1 |   |
| Sensor 1       | S4    |   |

In the **Output** submenu, the modes **Standard** and **Demand** are available. If **Standard** is selected, the output can be adjusted.

If **Demand** is selected, a demand has to be activated and adjusted in the **Heating /Shared rel.** menu first. If **Adj. values** is selected, the **Heating /Shared rel./Demand** will open.

In the correction mode **Day/Off** (see page 35) the heating circuit and the backup heating will be completely switched off during the night operation. The starting optimisation can be used for activating the backup heating before the day operation in order to heat the store to a sufficiently high temperature. The stopping optimisation can be used for deactivating the backup heating before the start of the night operation.

|                                      |   |   |
|--------------------------------------|---|---|
| Backup heating                       |   | E |
| Loading pump                         | A |   |
| <input type="checkbox"/> Start. opt. |   |   |
| <input type="checkbox"/> Stopp. opt. |   |   |

With an extension module, the **SFB off** function is available. If **SFB off** is activated, backup heating is suppressed when a selected solid fuel boiler is active.

|                                             |           |   |
|---------------------------------------------|-----------|---|
| Backup heating                              |           | E |
| <input checked="" type="checkbox"/> SFB off |           |   |
| SFB                                         | 1         |   |
| Funct.                                      | Activated |   |

## Heating / HCs / new HC... / Heat. sys.

| Adjustment channel | Description                                                        | Adjustment range / selection              | Factory setting |
|--------------------|--------------------------------------------------------------------|-------------------------------------------|-----------------|
| Heat. sys.         | Heating system submenu                                             | -                                         | -               |
| Mode               | Heating system operating mode                                      | Linear, Constant, Curve, Room, Room infl. | Curve           |
| Curve              | Heating curve                                                      | 0.3 ... 3.0                               | 1.0             |
| Room factor        | Room influence factor                                              | 1 ... 9                                   | 5               |
| TFlowset           | Set flow temperature                                               | 10 ... 90 °C                              | 45 °C           |
| TOutdoor 1         | Lower outdoor temperature                                          | -20 ... +20 °C                            | +20 °C          |
| TFlow 1            | Lower set flow temperature                                         | 20 ... 90 °C                              | 20 °C           |
| TOutdoor 2         | Upper outdoor temperature                                          | -20 ... +20 °C                            | -20 °C          |
| TFlow 2            | Upper set flow temperature                                         | 20 ... 90 °C                              | 70 °C           |
| TStart             | Starting temperature                                               | 20 ... 60 °C                              | 40 °C           |
| TFlowmin           | Minimum flow temperature                                           | 20 ... 89 °C                              | 20 °C           |
| TFlowmax           | Maximum flow temperature                                           | 21 ... 90 °C                              | 50 °C           |
| Pump off           | Deactivation of the heating circuit pump when TFlowmax is exceeded | Yes, No                                   | No              |
| Day corr.          | Correction for day operation                                       | -5 ... +45 K                              | 0 K             |
| Night corr.        | Correction for night operation                                     | -20 ... +30 K                             | -5 K            |
| Timer              | Timer function correction mode                                     | Yes, No                                   | No              |
| Mode               | Correction mode                                                    | Day/Night, Day/Off                        | Day/Night       |
| Timer              | Timer function submenu                                             | -                                         | -               |
| Summer oper.       | Summer operation option                                            | Yes, No                                   | Yes             |
| Mode               | Summer operating mode                                              | Day, Day/Night, Date, Date/Day, Dt./d/n   | Day             |
| Start              | Date adjustment                                                    | 01.01 ... 31.12.                          | 01.04.          |
| Stop               | Date adjustment                                                    | 01.01 ... 31.12.                          | 30.09.          |
| TDay off           | Summer temperature day                                             | 0 ... 40 °C                               | 20 °C           |
| TNight off         | Summer temperature night                                           | 0 ... 40 °C                               | 14 °C           |
| Daytime on         | Day time frame on                                                  | 00:00 ... 23:45                           | 09:00           |
| Daytime off        | Day time frame off                                                 | 00:00 ... 23:45                           | 21:00           |

| Adjustment channel | Description                                    | Adjustment range / selection   | Factory setting  |
|--------------------|------------------------------------------------|--------------------------------|------------------|
| Backup heating     | Backup heating option                          | Yes, No                        | No               |
| Backup heating     | Backup heating submenu                         | -                              | -                |
| Mode               | Backup heating mode selection                  | Therm., Zone, On/Off           | Therm.           |
| Output             | Output selection                               | system dependent               | system dependent |
| Mode               | Relay or shared relay                          | Standard, Demand               | Standard         |
| Sensor 1           | Allocation reference sensor 1                  | system dependent               | system dependent |
| Sensor 2           | Allocation reference sensor 2 (if Mode = Zone) | system dependent               | system dependent |
| $\Delta T_{On}$    | Switch-on temperature difference               | -15.0 ... 44.5 K               | 5.0 K            |
| $\Delta T_{Off}$   | Switch-off temperature difference              | -14.5 ... 45.0 K               | 15.0 K           |
| Loading pump       | Boiler loading pump output selection           | system dependent               | system dependent |
| Start. opt.        | Starting optimisation option                   | Yes, No                        | No               |
| Time               | Starting optimisation time                     | 0 ... 300 min                  | 60 min           |
| Stopp. opt.        | Stopping optimisation option                   | Yes, No                        | No               |
| Time               | Stopping optimisation time                     | 0 ... 300 min                  | 60 min           |
| SFB off            | Solid fuel boiler off option                   | Yes, No                        | No               |
| SFB                | Allocation solid fuel boiler                   | all solid fuel boilers         | -                |
| Funct.             | De/activation of the heating circuit           | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection                         | -                              | -                |

### 8.2.3 Cooling system submenu

In this menu, the cooling logic can be adjusted.

For the cooling logic, 2 modes are available:

- Linear
- Constant

| Cooling system | E ▼      | Cooling system | E ▼    |
|----------------|----------|----------------|--------|
| ► Mode         | Constant | ► Mode         | Linear |
| TFlowset       | 20 °C    | TOutdoor 1     | 20 °C  |
| TFlowmin       | 10 °C    | TFlow 1        | 20 °C  |

In the **Linear** mode, the set flow temperature will be calculated as in the heating system mode **Linear**.

The **Constant** mode aims to keep the set flow temperature at a constant value which can be adjusted by means of the parameter **TFlowset**.

For activating cooling, 3 modes are available:

- Outdoor
- External switch
- Outdoor/Switch

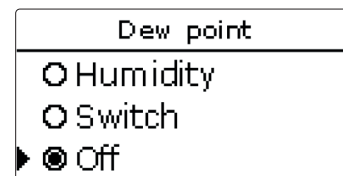
In the **Outdoor** mode, cooling is activated if the outdoor temperature cooling is exceeded.

In the **Ext. switch** mode, cooling is activated by means of an external switch.

In the **Outd./Switch** mode, both switching conditions are valid for cooling.

If the **Timer** option is activated, a time frame can be adjusted in which the cooling will be active.

#### Dew point



The **Dew point** option is used for avoiding condensation. For this function, 3 variants are available:

- Humidity
- Switch
- Off

When **Humidity** is selected, the controller calculates the dew point by means of the humidity sensor.

The minimum flow temperature results from the dew point plus the adjustable correction value. The **emergency shutdown** option is used for switching off the cooling, if the adjustable relative humidity is exceeded. The re-energise hysteresis for this function can be adjusted. An output can be selected which is activated during an emergency shutdown, e.g. to switch on a fan.

When **Switch** is selected, an input as well as an output can be allocated to a dew point switch. If the dew point switch detects condensation, cooling is interrupted. If **Off** is selected, the **Dew point** option is switched off.

## Backup cooling

|                |        |
|----------------|--------|
| Backup cooling | E      |
| Mode           | Therm. |
| Output         | R4     |
| Sensor         | S5     |

For the backup cooling of the heating circuit, 4 modes are available:

**Therm.:** In this mode, the set flow temperature is compared to a store reference sensor.

**Zone:** In this mode, the set flow temperature is compared to 2 store reference sensors. The switching conditions have to be fulfilled at both reference sensors.

**On/Off:** In this mode, the backup cooling is activated when the heating circuit pump is switched on for heating.

**Absolute:** In this mode, a switch-on and a switch-off temperature for a reference store sensor can be adjusted.

The backup cooling is activated when the switch-on temperature at sensor 1 is exceeded. The backup cooling switches off when the switch-off temperature is reached.

In the **Output** submenu, the modes **Standard** and **Demand** are available. If **Standard** is selected, the output can be adjusted.

If **Demand** is selected, a demand has to be activated and adjusted in the **Heating / Shared rel.** menu first. If **Adj. values** is selected, the **Heating / Shared rel. / Demand** will open.

## Heating / HCs / new HC... / Cooling system

| Adjustment channel | Description                  | Adjustment range / selection | Factory setting  |
|--------------------|------------------------------|------------------------------|------------------|
| Cooling system     | Cooling system submenu       | -                            | -                |
| Mode               | Cooling mode                 | Linear, Constant             | Constant         |
| TFlowset           | Cooling set flow temperature | 5 ... 25 °C                  | 20 °C            |
| TFlowmin           | Minimum flow temperature     | 5 ... 29 °C                  | 10 °C            |
| TOutdoor 1         | Lower outdoor temperature    | 15 ... 45 °C                 | 20 °C            |
| TFlow 1            | Lower set flow temperature   | 5 ... 25 °C                  | 20 °C            |
| TOutdoor 2         | Upper outdoor temperature    | 15 ... 45 °C                 | 40 °C            |
| TFlow 2            | Upper set flow temperature   | 5 ... 25 °C                  | 10 °C            |
| TFlowmin           | Minimum flow temperature     | 5 ... 29 °C                  | 10 °C            |
| TFlowmax           | Maximum flow temperature     | 6 ... 30 °C                  | 25 °C            |
| Output             | Output selection             | system dependent             | system dependent |

| Adjustment channel | Description                                    | Adjustment range / selection       | Factory setting  |
|--------------------|------------------------------------------------|------------------------------------|------------------|
| Mode               | Cooling mode                                   | Outdoor, Ext. switch, Outd./Switch | Outdoor          |
| Sensor             | Switch input selection                         | system dependent                   | -                |
| Inverted           | Inverted switching option                      | Yes, No                            | No               |
| TDay off           | Outdoor temperature cooling                    | 20 ... 40 °C                       | 28 °C            |
| Timer              | Timer function cooling                         | Yes, No                            | No               |
| tOn                | Switch-on time cooling                         | 00:00 ... 23:45                    | 00:00            |
| tOff               | Switch-off time cooling                        | 00:00 ... 23:45                    | 00:00            |
| Dew point          | Dew point monitoring option                    | Humidity, Switch, Off              | Off              |
| Sensor             | Sensor input selection                         | system dependent                   | system dependent |
| Output             | Output selection                               | system dependent                   | system dependent |
| Correction         | Correction value                               | 0 ... 10 K                         | 2 K              |
| Emerg. shutd.      | Emergency shutdown option                      | Yes, No                            | No               |
| Humidity           | Relative humidity                              | 5 ... 100 %                        | 95 %             |
| Hysteresis         | Re-energise hysteresis                         | 1 ... 10 %                         | 5 %              |
| Output             | Output selection                               | system dependent                   | system dependent |
| Backup cooling     | Backup cooling option                          | Yes, No                            | No               |
| Backup cooling     | Backup cooling submenu                         | -                                  | -                |
| Mode               | Backup cooling mode selection                  | Absolute, Therm., Zone, On/Off     | Therm.           |
| Output             | Output selection                               | system dependent                   | system dependent |
| Sensor 1           | Allocation reference sensor 1                  | system dependent                   | system dependent |
| Sensor 2           | Allocation reference sensor 2 (if Mode = Zone) | system dependent                   | system dependent |
| ΔTOn               | Switch-on temperature difference               | -44,5 ... +15,0 K                  | -2.0 K           |
| ΔTOff              | Switch-off temperature difference              | -45,0 ... +14,5 K                  | -7.0 K           |
| TOn                | Switch-on temperature                          | -13 ... +44 °C                     | +12 °C           |
| TOff               | Switch-off temperature                         | -14 ... +43 °C                     | +8 °C            |
| Loading pump       | Boiler loading pump output selection           | system dependent                   | system dependent |
| Start. opt.        | Starting optimisation option                   | Yes, No                            | No               |
| Time               | Starting optimisation time                     | 0 ... 300 min                      | 60 min           |
| Stopp. opt.        | Stopping optimisation option                   | Yes, No                            | No               |
| Time               | Stopping optimisation time                     | 0 ... 300 min                      | 60 min           |
| Funct.             | De/activation of the heating circuit           | Activated, Deactivated, Switch     | Activated        |
| Sensor             | Switch input selection                         | -                                  | -                |

## 8.2.4 Room control submenu

|              |        |
|--------------|--------|
| Room control | E      |
| Room 1       |        |
| Type         | Sensor |
| Sen. room    | S5     |

Up to 5 rooms can be integrated into the control logic.

To each room, a sensor input can be allocated. If the measured temperature exceeds the adjusted set room temperature in all activated rooms and if the parameter **HC off** is activated, the heating circuit switches off.

When a room control unit of the RC type is used (see page 57), the set room temperature has to be adjusted directly at the room control unit, the parameter **TAmb.set** is then hidden. The RC type room control unit also measure the relative humidity as well as the room temperature. The controller uses these values for calculating the dew point.

Common room thermostats with potential-free outputs can be used alternatively. In this case, **Switch** must be selected in the **Type** channel.

When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted. Outside these time frames, the adjusted room temperature is decreased by the correction value.

If the heating circuit is in cooling mode, the set room temperature is increased by the correction value.



### Note

For information on timer adjustment see page 13.

To each room, an additional output can be allocated. The output switches on when the temperature falls below the adjusted room temperature. This way, the room in question can be excluded from the heating circuit via a valve as long as the desired room temperature is reached.

## Heating / HCs / new HC... / Room control

| Adjustment channel | Description                | Adjustment range / selection | Factory setting  |
|--------------------|----------------------------|------------------------------|------------------|
| Room control       | Room control submenu       | -                            | -                |
| Room 1...5         | Room option (1...5)        | Yes, No                      | No               |
| Type               | Room sensor type selection | Sensor, Switch               | Sensor           |
| Sen. room          | Room sensor allocation     | system dependent             | system dependent |

| Adjustment channel | Description                   | Adjustment range / selection   | Factory setting  |
|--------------------|-------------------------------|--------------------------------|------------------|
| TAmb.set           | Set room temperature          | 10...30 °C                     | 18 °C            |
| Hysteresis         | Hysteresis                    | 0,5...20,0K                    | 0,5 K            |
| Timer              | Timer function                | Yes, No                        | No               |
| Timer              | Timer function submenu        | -                              | -                |
| Correction         | Correction value              | 1...20 K                       | 5 K              |
| Output             | Output selection              | system dependent               | system dependent |
| Funct.             | De/activation of the function | Activated, Deactivated, Switch | Activated        |
| HC off             | Heating circuit off option    | Yes, No                        | No               |

## 8.2.5 Special functions submenu

In this menu, special functions for the heating circuit can be adjusted.

### Remote access

With the parameter **Remote access** different types of remote access to the controller can be activated.

|                   |     |
|-------------------|-----|
| Special functions | E   |
| Remote access     |     |
| Mode              | BAS |
| Sen. BAS          | S5  |



### Note

In the sensor selection menu, only outputs which have previously been selected as the input for remote access in the **Basic settings** menu will be available. In the **Sensor config.** channel, sensors not used and not registered can be selected.

The following types of remote access are possible:

**Remote control:** A device which allows manual adjustment of the heating curve, thus influencing the set flow temperature.

→ In order to use a remote control, set the **Mode** to **Fern**.

The remote control allows manual adjustment of the heating curve ( $\pm 15K$ ). Furthermore, the heating circuit can be switched off or a rapid heat-up can be carried out by means of the remote control.

Heating circuit switched off means that the heating circuit pump is switched off and the mixer closed. The flow temperature is boosted to maximum for rapid heat-up when the remote control is set to rapid heat-up.

**Room control unit:** A device incorporating a remote control as well as an additional operating mode switch.

→ In order to use a room control unit, set the **Mode** to **BAS**.

The operating mode switch of the room control unit is used for adjusting the operating mode of the controller. If a room control unit is used, the operating mode can be adjusted by means of the room control unit only. The status menu will only allow the activation of the operating mode **Holiday**.

**App:** If **App** is selected, remote access as with a remote control or room control unit via an app is possible.

If **Fern** or **BAS** is adjusted, read access is possible with the app.

→ In order to use an app, set the **Mode** to **App**.

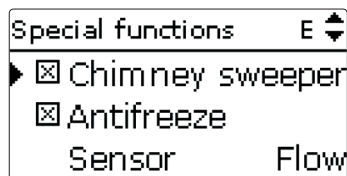
If you use an app, the operating mode can be adjusted in the controller menu as well as in the app.

### DHW priority

If the parameter **DHW priority** is activated, the heating circuit will be switched off and the backup heating be suppressed as long as DHW heating takes place which has previously been activated in the **Heating / Optional functions** menu.

### Chimney sweeper function

The chimney sweeper function can be used for enabling a quick access to measurement conditions without menu operation for the chimney sweeper.



The chimney sweeper function is activated in all heating circuits by default. The chimney sweeper mode can be activated by pressing microbutton .

In the chimney sweeper mode, the heating circuit mixer opens, the heating circuit pump and the backup heating contact are activated. While the chimney sweeper mode is active, the operating control LED is flashing red. Additionally, **Chimney sweeper** and a countdown of 30 min are indicated on the display.

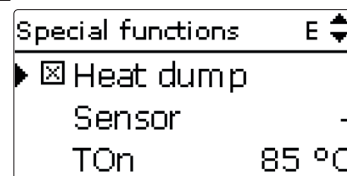
When the countdown has elapsed, the chimney sweeper mode is automatically deactivated. If, during the countdown, microbutton  is pressed again, the chimney sweeper mode will stop.

### Antifreeze function

The antifreeze function of the heating circuit can be used to temporarily activate an inactive heating circuit during sudden temperature drop in order to protect it against frost damage.

The temperature at the sensor selected will be monitored. If the temperature falls below the adjusted antifreeze temperature, the heating circuit will be activated until the antifreeze temperature is exceeded by 2 K, but at least for 30 min.

### Heat dump option



This option is used for diverting excess heat to the heating circuit in order to keep the system temperatures within the operating range. If the temperature at the allocated sensor exceeds the switch-on temperature, the set flow temperature is controlled to reach the adjusted value. If the temperature falls below the adjusted switch-off temperature, the heat dump function switches off.

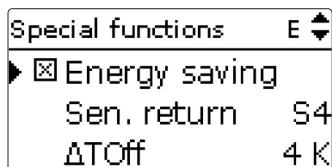
This option is not available, if a heating circuit mode for cooling or cooling and heating has been selected.

### Holiday option

If the **Holiday** option is activated, the heating circuit switches into the correction mode.

→ In order to adjust the days of absence, press and hold down microbutton  for 3 s.

## Energy saving operation



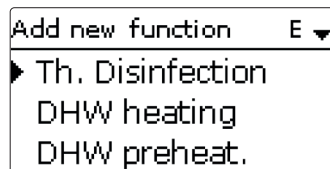
This option is used for optimising the energy consumption of the heating circuit pump. For this purpose an additional sensor in the heating circuit return is required. The controller monitors the temperature difference between the flow and the return of the heating circuit. If the temperature difference falls below the switch-off difference, the controller deactivates the heating circuit pump for the adjusted break time. After the break time has elapsed, the pump is activated for the runtime. If the temperature difference is higher than the switch-off difference, the pump remains active. If the temperature difference is below the switch-off difference, the break time will start again.

### HC linking

Beginning with the second heating circuit, all heating circuits offer the parameter **HC linking**. Using this parameter, the heating circuits adopt the operating mode of the first heating circuit. If you wish to adjust the operating mode of the heating circuits separately, deactivate the linking option.

## Heating / HCs / new HC... / Special funct.

| Adjustment channel | Description                                                | Adjustment range / selection | Factory setting  |
|--------------------|------------------------------------------------------------|------------------------------|------------------|
| Special funct.     | Special functions submenu                                  | -                            | -                |
| Remote access      | Remote access option                                       | Yes, No                      | No               |
| Mode               | Remote access mode                                         | BAS, Fern, App               | BAS              |
| Sen. BAS           | Allocation operating mode switch input                     | all inputs type = BAS        | -                |
| Sen. RC            | Allocation remote control input                            | all inputs type = Fern       | -                |
| DHW priority       | DHW priority option                                        | Yes, No                      | No               |
| Chimney sweeper    | Chimney sweeper option                                     | Yes, No                      | Yes              |
| Antifreeze         | Antifreeze option                                          | Yes, No                      | Yes              |
| Sensor             | Antifreeze sensor                                          | Flow, Outdoor                | Flow             |
| TAntifr.           | Antifreeze temperature                                     | -20 ... +10 °C (Outdoor)     | +2 °C (Outdoor)  |
|                    |                                                            | 4 ... 10 °C (Flow)           | +5 °C (Flow)     |
| TFlowset           | Set flow temperature antifreeze                            | 20 ... 50 °C                 | 20 °C            |
| Heat dump          | Heat dump option                                           | Yes, No                      | No               |
| Sensor             | Allocation heat dump sensor                                | system dependent             | system dependent |
| TOn                | Switch-on temperature heat dump                            | 25 ... 95 °C                 | 85 °C            |
| TOff               | Switch-off temperature heat dump                           | 20 ... 90 °C                 | 50 °C            |
| TFlowset           | Set flow temperature heat dump                             | 5 ... 90 °C                  | 50 °C            |
| Holiday            | Heating in correction mode when holiday function is active | Yes, No                      | No               |
| Energy saving      | Energy saving operation option                             | Yes, No                      | No               |
| Sen. return        | HC return sensor allocation                                | system dependent             | system dependent |
| ΔTOff              | Switch-off temperature difference energy saving operation  | 1 ... 49 K                   | 4 K              |
| Break              | Break time energy saving operation                         | 0 ... 60 min                 | 15 min           |
| Runtime            | Runtime energy saving operation                            | 0 ... 60 min                 | 2 min            |
| HC linking         | Linking option Operating mode (HC2 ... 7)                  | Yes, No                      | Yes              |



In this menu, optional functions can be selected and adjusted for the heating part of the arrangement.

In combination with extension modules, up to 16 optional functions can be selected and adjusted.

The kind and number of optional functions offered depends on the previous adjustments.

In the **Demand** submenu (if available), the modes **Standard** and **Demand** are available. If **Standard** is selected, the output can be adjusted.

If **Demand** is selected, a demand has to be activated and adjusted in the **Heating / Shared rel.** menu first.



#### Note

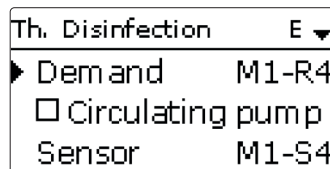
For further information about adjusting optional functions, see page 15.



#### Note

For information on the output selection see page 17.

### Thermal disinfection



This function helps to contain the spread of Legionella in DHW stores by systematically activating the backup heating.

One sensor and one output or demand respectively can be selected for this function.

For thermal disinfection, the temperature at the allocated sensor has to be monitored. Protection is ensured when, during the monitoring period, the disinfection temperature is continuously exceeded for the entire disinfection period.

The monitoring period starts as soon as the temperature at the allocated sensor falls below the disinfection temperature. If the monitoring period ends, the demand activates the backup heating. The disinfection period starts when the temperature at the allocated sensor exceeds the disinfection temperature.

Thermal disinfection can only be completed when the disinfection temperature is exceeded for the duration of the disinfection period without any interruption.

The parameter **Cancellation** is used for adjusting the period after which the backup heating is cancelled. If the backup heating is cancelled, an error message is displayed. Thermal disinfection is cancelled.

### Starting time delay

If the starting delay option is activated, a starting time for the thermal disinfection with starting delay can be adjusted. The activation of the backup heating is then delayed until that starting time after the monitoring period has ended.

If the monitoring period ends, for example, at 12:00 o'clock, and the starting time has been set to 18:00, the reference relay will be energised with a delay of 6 hours at 18:00 instead of 12:00 o'clock.

With the **TD hold. off** option, thermal disinfection can be deactivated for a phase of absence.

➔ In order to adjust the days of absence, press and hold down microbutton  for 3 s.

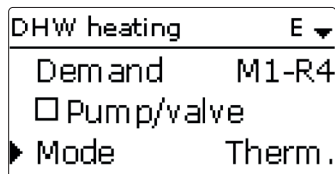
With the **BAS off** option, the thermal disinfection can be switched from automatic mode to **Off** by means of the operating mode switch.

### Heating / Opt. functions / Add new function / Th. Disinfection

| Adjustment channel | Description                       | Adjustment range / selection | Factory setting  |
|--------------------|-----------------------------------|------------------------------|------------------|
| Demand             | Demand relay selection            | system dependent             | system dependent |
| Mode               | Demand mode                       | Standard, Demand             | Standard         |
| Circulating pump   | Circulating pump option           | Yes, No                      | No               |
| Output             | Circulating pump output selection | system dependent             | system dependent |
| Sensor             | Disinfection sensor selection     | system dependent             | system dependent |
| Interval           | Monitoring period                 | 0 ... 30, 1 ... 23 (dd:hh)   | 1d 0h            |
| Temperature        | Disinfection temperature          | 45 ... 90 °C                 | 60 °C            |
| Duration           | Disinfection period               | 0.5 ... 24.0 h               | 1.0 h            |
| Cancellation       | Cancellation option               | Yes, No                      | No               |
| Cancellation       | Cancellation interval             | 1.0 ... 48.0 h               | 2.0 h            |
| Start. time        | Starting delay option             | Yes, No                      | No               |

| Adjustment channel | Description                                  | Adjustment range / selection   | Factory setting  |
|--------------------|----------------------------------------------|--------------------------------|------------------|
| Start. time        | Starting time                                | 00:00 ... 23:30                | 20:00            |
| Hyst. off          | Switch-off hysteresis                        | 2 ... 20 K                     | 5 K              |
| Hyst. on           | Switch-on hysteresis                         | 1 ... 19 K                     | 2 K              |
| TD hold. off       | Function off when holiday function is active | Yes, No                        | No               |
| BAS off            | Operating mode switch off option             | Yes, No                        | No               |
| Sensor             | Allocation operating mode switch input       | system dependent               | system dependent |
| Funct.             | Activation / Deactivation                    | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection                       | -                              | -                |

## DHW heating



This function is used for demanding backup heating for heating the DHW store.

If the **Pump/valve** option is activated, another adjustment channel appears, in which an output can be allocated to the pump/valve. The allocated output will switch on and off with the demand relay.

If the **Overrun** time option is activated, the loading pump remains switched on for the adjusted duration after the demand relay has been switched off.

For the DHW heating, 2 modes are available:

### Thermal mode

The allocated demand relay switches on when the temperature at the allocated sensor 1 falls below the adjusted switch-on temperature. If the temperature at the allocated sensor 1 exceeds the adjusted switch-off temperature, the relay switches off.

### Zone mode

In this mode, a further sensor can be selected. The switch-on, or the switch-off conditions respectively, then have to be fulfilled at both sensors in order for the output to be switched on or off.

When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.



### Note

For information on timer adjustment see page 13.

With the **Man. heating** option, DHW heating can be activated outside the adjusted time frame once by means of a switch, if the temperature has fallen below the switch-off value.

With the **DHW hold. off** option, DHW heating can be deactivated for a phase of absence.

➔ In order to adjust the days of absence, press and hold down microbutton  for 3 s.

With the **BAS off** option, DHW heating can be switched from automatic mode to **Off** by means of the operating mode switch.

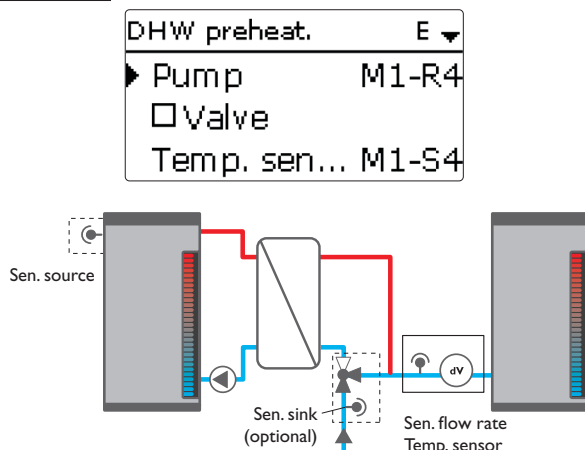
If **SFB off** is activated, DHW heating is suppressed when a selected solid fuel boiler is active.

## Heating / Opt. functions / Add new function / DHW heating

| Adjustment channel | Description                                    | Adjustment range / selection | Factory setting  |
|--------------------|------------------------------------------------|------------------------------|------------------|
| Demand             | Output selection demand                        | system dependent             | -                |
| Mode               | Demand mode                                    | Standard, Demand             | Standard         |
| Pump/valve         | Loading pump/valve option                      | Yes, No                      | No               |
| Output             | Output selection loading pump                  | system dependent             | -                |
| Overrun time       | Overrun option                                 | Yes, No                      | No               |
| Duration           | Overrun time                                   | 1 ... 10 min                 | 1 min            |
| Mode               | Operating mode                                 | Zone, Therm.                 | Therm.           |
| Sensor 1           | Allocation reference sensor 1                  | system dependent             | system dependent |
| Sensor 2           | Allocation reference sensor 2 (if Mode = Zone) | system dependent             | system dependent |
| TO <sub>on</sub>   | Switch-on temperature                          | 0 ... 94 °C                  | 40 °C            |
| TO <sub>off</sub>  | Switch-off temperature                         | 1 ... 95 °C                  | 45 °C            |
| Timer              | Timer function                                 | Yes, No                      | No               |
| Man. heating       | Manual heating option                          | Yes, No                      | No               |
| Sensor             | Switch input selection                         | system dependent             | system dependent |
| DHW hold. off      | Function off when holiday function is active   | Yes, No                      | No               |

| Adjustment channel | Description                            | Adjustment range / selection   | Factory setting  |
|--------------------|----------------------------------------|--------------------------------|------------------|
| BAS off            | Operating mode switch off option       | Yes, No                        | No               |
| Sensor             | Allocation operating mode switch input | system dependent               | system dependent |
| SFB off            | Solid fuel boiler off option           | Yes, No                        | No               |
| SFB                | Allocation solid fuel boiler           | all solid fuel boilers         | -                |
| Funct.             | Activation / Deactivation              | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection                 | -                              | -                |

## DHW preheating



This function uses heat from a buffer store to heat the cold water inlet of the DHW store.

The controller monitors the flow rate at the selected flow rate sensor. If a flow rate is detected, the pump switches on with the starting speed.

If the temperature at the temperature sensor selected exceeds the adjusted DHW maximum temperature, the speed decreases by the increment value. The interval to the next measurement and adaptation can be adjusted by means of the parameter **Delay**.

If the DHW maximum temperature is not reached after the delay time has elapsed, the speed is increased by the increment value. The speed is not increased or decreased respectively within the hysteresis.

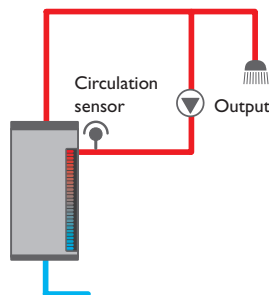
If the  **$\Delta T$  function** is activated, the pump switches on only if  **$\Delta T_{on}$**  is exceeded, and switches off if the temperature difference falls below  **$\Delta T_{off}$** .

If the **Valve** option is activated, the output selected is activated when the pump is activated.

## Heating / Opt. functions / Add new function / DHW preheat.

| Adjustment channel  | Description                       | Adjustment range / selection   | Factory setting |
|---------------------|-----------------------------------|--------------------------------|-----------------|
| Pump                | Output selection pump             | system dependent               | -               |
| Valve               | Valve option                      | Yes, No                        | No              |
| Valve               | Output selection valve            | system dependent               | -               |
| Temp. sensor        | Temperature sensor                | system dependent               | -               |
| Sen. flow rate      | Flow rate sensor                  | system dependent               | -               |
| TMax DHW            | DHW maximum temperature           | 20 ... 90 °C                   | 60 °C           |
| Start. speed        | Starting speed DHW preheating     | 20 ... 100%                    | 50%             |
| Increment           | Increment speed adaptation        | 1 ... 100%                     | 10%             |
| Hysteresis          | Hysteresis speed adaptation       | 0,5 ... 10,0 K                 | 5,0 K           |
| Delay               | Delay time                        | 1 ... 10 s                     | 5 s             |
| $\Delta T$ function | Activation $\Delta T$ function    | Yes, No                        | No              |
| $\Delta T_{on}$     | Switch-on temperature difference  | 1,0 ... 50,0 K                 | 5,0 K           |
| $\Delta T_{off}$    | Switch-off temperature difference | 0,5 ... 49,5 K                 | 3,0 K           |
| Sen. source         | Heat source sensor selection      | system dependent               | -               |
| Sen. sink           | Heat sink sensor selection        | system dependent               | -               |
| Funct.              | Activation / Deactivation         | Activated, Deactivated, Switch | Activated       |
| Sensor              | Switch input selection            | -                              | -               |

|             |         |
|-------------|---------|
| Circulation | E ▼     |
| ► Output    | M1-R4   |
| Type        | Thermal |
| Sensor      | M1-S4   |



This function can be used for controlling a circulation pump.

For the control logic, 5 variants are available:

- Thermal
- Timer
- Thermal + Timer
- Demand
- Demand + Timer

### Thermal

The temperature at the allocated sensor is monitored. The allocated output switches on when the temperature falls below the adjusted switch-on temperature. If the temperature exceeds the switch-off temperature, the output switches off.

### Timer

The output switches on during the adjusted time frames, outside of them it switches off.

### Thermal + Timer

The output operates when the switch-on conditions of both above-mentioned variants are fulfilled.

## Demand

The allocated flow switch is monitored for circuit continuity. If circuit continuity is detected at the flow switch, the output switches on for the adjusted runtime. After the runtime has ended, the output switches off. During the adjusted break time, the output remains switched off even if continuity is detected at the allocated sensor.

### Demand + Timer

The output operates when the switch-on conditions of both above-mentioned variants are fulfilled.

When the **Timer**, **Therm.+Timer** or **Dem.+Timer** variant is activated, a timer is indicated in which time frames for the function can be adjusted.



#### Note

If the flow switch is connected to the input S1 ... S4, continuity must be detected for at least 5 s for the controller to react, 1 s if the flow switch is connected to the impulse input.

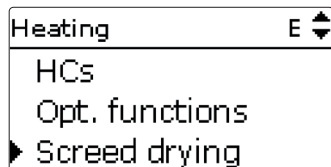


#### Note

For information on timer adjustment see page 13.

## Heating / Opt. functions / Add new function / Circulation

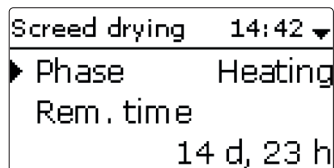
| Adjustment channel | Description                  | Adjustment range / selection                     | Factory setting  |
|--------------------|------------------------------|--------------------------------------------------|------------------|
| Output             | Output selection             | system dependent                                 | system dependent |
| Type               | Variant                      | Demand, Thermal, Timer, Therm.+Timer, Dem.+Timer | Thermal          |
| Sensor             | Circulation sensor selection | system dependent                                 | system dependent |
| TOn                | Switch-on temperature        | 10 ... 59 °C                                     | 40 °C            |
| TOff               | Switch-off temperature       | 11 ... 60 °C                                     | 45 °C            |
| Timer              | Timer function               | Yes, No                                          | No               |
| Delay              | Demand switch-on delay       | 0 ... 3 s                                        | 0 s              |
| Runtime            | Circulation pump runtime     | 01:00 ... 15:00 min                              | 03:00 min        |
| Break time         | Circulation pump break time  | 10 ... 60 min                                    | 30 min           |
| Funct.             | Activation / Deactivation    | Activated, Deactivated, Switch                   | Activated        |
| Sensor             | Switch input selection       | -                                                | -                |



This function is used for time- and temperature-controlled screed drying in selectable heating circuits.

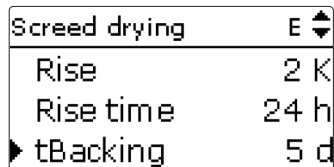
The heating circuits can be selected in the **Heating / Screed drying** menu. At the end of this menu, the function can be triggered by using **Start**.

The controller will automatically change to the screed drying status menu. The current **Phase** will be indicated on the display and the **Remaining time** will be indicated as a countdown (dd:hh). During this process, the operating control LED flashes yellow.



At the end of the menu, **Cancel** will be indicated instead of start. If Cancel is selected, screed drying will be cancelled immediately.

At the beginning of the screed drying function, the heating circuits selected are put into operation for the adjusted rise time with the starting temperature as the set flow temperature. Afterwards, the set flow temperature increases in steps by the adjustable rise value for the duration of the adjustable rise time until the holding temperature is reached. After the holding time has elapsed, the set flow temperature is reduced in steps until the starting temperature is reached again.



If the set flow temperature is not reached within 24 hours or after the rise time respectively, or if it is constantly exceeded, the screed drying function will be cancelled.

The heating circuit switches off and an error message is displayed. The operating control LED glows red.

Error 1: flow sensor defective

Error 2: the flow temperature is higher than the maximum flow temperature + 5 K for over 5 min

Error 3: the flow temperature is higher than the holding temperature + rise value for over 30 min

Error 4: the flow temperature is higher than the set flow temperature + rise value for over 2 h

Error 5: the flow temperature is lower than the set flow temperature - rise value for over a rise time period

During screed drying of the heating circuits selected, the other heating circuits run corresponding to their operating modes.

The escape button can be used any time for changing to the home screen of the controller in order to carry out adjustments.

When the screed drying function has been successfully completed, the corresponding heating circuits will change to the operating mode **Off**.

Screed drying will automatically be deactivated.



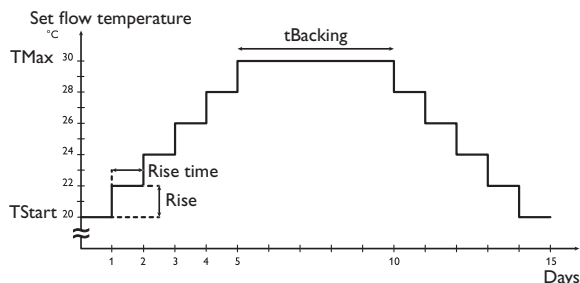
#### Note

Make sure the heating circuits are supplied with heat from a heat source (backup heating).



#### Note

If a MicroSD card has been inserted into the slot, a screed protocol will be generated.



The diagram shows the parameters of the screed drying with the factory settings.

### Heating / Screed drying

| Adjustment channel | Description               | Adjustment range / selection | Factory setting  |
|--------------------|---------------------------|------------------------------|------------------|
| HCS                | Heating circuit selection | HC 1 ... 7                   | system dependent |
| TStart             | Starting temperature      | 10 ... 30 °C                 | 20 °C            |
| TMax               | Holding temperature       | 20 ... 60 °C                 | 30 °C            |
| Rise               | Rise value                | 1 ... 10 K                   | 2 K              |
| Rise time          | Rise duration             | 1 ... 24 h                   | 24 h             |
| tBacking           | TMax holding time         | 1 ... 20 d                   | 5 d              |
| Start              | Activation / Deactivation | Yes, No                      | No               |

## 9 Arrangement

Arr./Opt. funct. E

► Add new function  
back

In this menu, all adjustments for the non-heating part of the arrangement can be made.

In combination with extension modules, up to 16 optional functions can be selected and adjusted.

### 9.1 Optional functions

Add new function E ▼

► Parallel relay  
Mixer  
Zone loading

In this menu, optional functions can be selected and adjusted for the arrangement. The kind and number of optional functions offered depends on the previous adjustments.



#### Note

For further information about adjusting optional functions, see page 15.

### Parallel relay

Parallel relay E ▼

► Output M1-R4  
Ref. relay R1  
☐ Overrun

This function can be used for operating an allocated output alongside a selected reference relay. With this function, e.g. a valve can be controlled in parallel to the pump via a separate output.

If the **Overrun** option is activated, the output remains switched on for the adjusted overrun time after the reference relay has been switched off.

If the **Delay** option is activated, the output is energised after the adjusted duration has elapsed. If the reference relay is switched off again during the delay time, the parallel output is not be switched on at all.



### Note

If a relay is in the manual mode, the selected output will not be energised.

## Arrangement / Opt. functions / Add new function / Parallel relay

| Adjustment channel | Description               | Adjustment range / selection   | Factory setting  |
|--------------------|---------------------------|--------------------------------|------------------|
| Output             | Output selection          | system dependent               | system dependent |
| Ref. relay         | Reference relay selection | system dependent               | -                |
| Overrun            | Overrun option            | Yes, No                        | No               |
| Duration           | Overrun time              | 1 ... 30 min                   | 1 min            |
| Delay              | Delay option              | Yes, No                        | No               |
| Duration           | Delay time                | 1 ... 30 min                   | 1 min            |
| Funct.             | Activation / Deactivation | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection    | -                              | -                |

## Mixer

|             |       |
|-------------|-------|
| Mixer       | E ▼   |
| ▶ Mixer cl. | M1-R3 |
| Mixer op.   | M1-R4 |
| Sensor      | S4    |

This function can be used to adjust the actual flow temperature to the desired mixer target temperature. The mixer will be opened or closed in pulses depending on this deviation. The mixer will be controlled with the adjustable interval. The pause is determined by the difference between the actual value and the set value.

## Arrangement / Opt. functions / Add new function / Mixer

| Adjustment channel | Description                   | Adjustment range / selection | Factory setting  |
|--------------------|-------------------------------|------------------------------|------------------|
| Mixer cl.          | Output selection mixer closed | system dependent             | system dependent |
| Mixer op.          | Output selection mixer open   | system dependent             | system dependent |
| Sensor             | Sensor selection              | system dependent             | system dependent |

| Adjustment channel | Description               | Adjustment range / selection   | Factory setting |
|--------------------|---------------------------|--------------------------------|-----------------|
| TMixer             | Mixer target temperature  | 0 ... 130 °C                   | 60 °C           |
| Interval           | Mixer interval            | 1 ... 20 s                     | 4 s             |
| Funct.             | Activation / Deactivation | Activated, Deactivated, Switch | Activated       |
| Sensor             | Switch input selection    | -                              | -               |

## Zone loading

|              |       |
|--------------|-------|
| Zone loading | E ▼   |
| ▶ Output     | M1-R5 |
| Sensor top   | S3    |
| Sensor base  | S4    |

This function can be used for loading a store zone between 2 sensors. For monitoring the switch-on and switch-off conditions, 2 sensors are used. The switch-on and switch-off temperatures are used as reference parameters.

If the measured temperatures at both allocated sensors fall below the adjusted switch-on temperature, the output will be energised. The output will be switched off again if the temperature at both sensors has exceeded the switch-off temperature. If one of the two sensors is defective, zone loading is cancelled or suppressed.



### Note

For information on timer adjustment see page 13.

## Arrangement / Opt. functions / Add new function / Zone loading

| Adjustment channel | Description               | Adjustment range / selection   | Factory setting  |
|--------------------|---------------------------|--------------------------------|------------------|
| Output             | Output selection          | system dependent               | system dependent |
| Sensor top         | Top sensor selection      | system dependent               | system dependent |
| Sensor base        | Base sensor selection     | system dependent               | system dependent |
| TO <sub>on</sub>   | Switch-on temperature     | 0 ... 94 °C                    | 45 °C            |
| TO <sub>off</sub>  | Switch-off temperature    | 1 ... 95 °C                    | 60 °C            |
| Timer              | Timer function            | Yes, No                        | No               |
| Funct.             | Activation / Deactivation | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection    | -                              | -                |

## Error relay

| Error relay   | E         |
|---------------|-----------|
| ► Output      | M1-R5     |
| Funct.        | Activated |
| Save function |           |

This function can be used for operating an output in case of an error. Thus, e.g. a signalling device can be connected in order to signal errors.

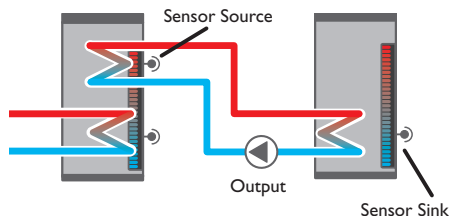
If the error relay function is activated, the allocated output will operate when a fault occurs. If the flow rate monitoring and/or pressure monitoring function is additionally activated, the allocated output will also operate in case of a flow rate or pressure error.

### Arrangement / Opt. functions / Add new function / Error relay

| Adjustment channel | Description               | Adjustment range / selection   | Factory setting  |
|--------------------|---------------------------|--------------------------------|------------------|
| Output             | Output selection          | system dependent               | system dependent |
| Funct.             | Activation / Deactivation | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection    | -                              | -                |

## Heat exchange

| Heat exchange | E     |
|---------------|-------|
| ► Output      | M1-R4 |
| Sen. source   | S3    |
| Sen. sink     | S4    |



This function can be used for transferring heat from a heat source to a heat sink.

The allocated output is energised when all switch-on conditions are fulfilled:

- the temperature difference between the allocated sensors has exceeded the switch-on temperature difference
- the temperature difference between the allocated sensors has not fallen below the switch-off temperature difference
- the temperature at the heat source sensor has exceeded the minimum temperature
- the temperature at the heat sink sensor is below the maximum temperature
- one of the adjusted time frames is active (if the **Timer** option is selected)

If the temperature difference exceeds the adjusted set value by 1/10 of the rise value, the pump speed increases by one step (1 %).

When the **Timer** option is activated, a timer is indicated in which time frames for the function can be adjusted.



### Note

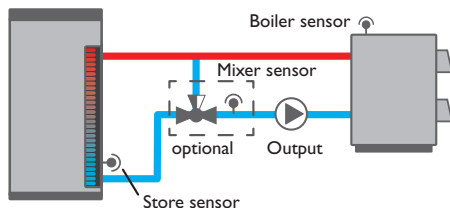
For information on timer adjustment see page 13.

### Arrangement / Opt. functions / Add new function / Heat exchange

| Adjustment channel | Description                                       | Adjustment range / selection   | Factory setting  |
|--------------------|---------------------------------------------------|--------------------------------|------------------|
| Output             | Output selection                                  | system dependent               | system dependent |
| Sen. source        | Heat source sensor selection                      | system dependent               | system dependent |
| Sen. sink          | Heat sink sensor selection                        | system dependent               | system dependent |
| ΔTOn               | Switch-on temperature difference                  | 1.0 ... 30.0 K                 | 6.0 K            |
| ΔTOff              | Switch-off temperature difference                 | 0.5 ... 29.5 K                 | 4.0 K            |
| ΔTSet              | Set temperature difference                        | 1.5 ... 40.0 K                 | 10.0 K           |
| TMax               | Maximum temperature of the store to be loaded     | 10 ... 95 °C                   | 60 °C            |
| TMin               | Minimum temperature of the store to be discharged | 10 ... 95 °C                   | 10 °C            |
| Timer              | Timer function                                    | Yes, No                        | No               |
| Funct.             | Activation / Deactivation                         | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection                            | -                              | -                |

## Solid fuel boiler

|                   |       |
|-------------------|-------|
| Solid fuel boiler | E ▼   |
| ► Output          | M1-R4 |
| Sen. boiler       | S3    |
| Sen. store        | S4    |



This function can be used for transferring heat from a solid fuel boiler to a store. The allocated output is energised when all switch-on conditions are fulfilled:

- the temperature difference between the allocated sensors has exceeded the switch-on temperature difference
- the temperature difference between the allocated sensors has not fallen below the switch-off temperature difference
- the temperature at the solid fuel boiler sensor has exceeded the minimum temperature
- the temperature at the store sensor is below the maximum temperature

When the set temperature difference is exceeded, pump speed control starts. For every deviation by 1 / 10 of the adjusted rise value, the pump speed will be adjusted by 1%.

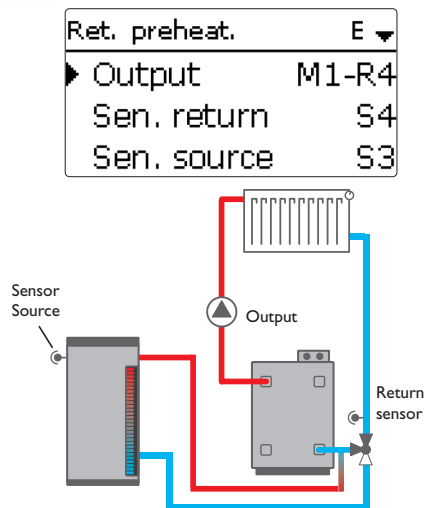
If the **Target temp.** option is activated, the pump speed control logic will change. The controller will remain at the minimum pump speed until the temperature at the allocated sensor exceeds the adjusted target temperature.

The **Mixer** option can be used to keep the boiler return temperature above **TMin boiler**. The mixer will be controlled with the adjustable interval.

## Arrangement / Opt. functions / Add new function / Solid fuel boiler

| Adjustment channel | Description                         | Adjustment range / selection   | Factory setting  |
|--------------------|-------------------------------------|--------------------------------|------------------|
| Output             | Output selection                    | system dependent               | system dependent |
| Sen. boiler        | Solid fuel boiler sensor selection  | system dependent               | system dependent |
| Sen. store         | Store sensor selection              | system dependent               | system dependent |
| ΔTOn               | Switch-on temperature difference    | 2.0 ... 30.0 K                 | 6.0 K            |
| ΔTOff              | Switch-off temperature difference   | 1.0 ... 29.0 K                 | 4.0 K            |
| ΔTSet              | Set temperature difference          | 3.0 ... 40.0 K                 | 10.0 K           |
| TStoremax          | Maximum temperature                 | 4 ... 95 °C                    | 60 °C            |
| TMin boiler        | Minimum temperature                 | 4 ... 95 °C                    | 60 °C            |
| Target temp.       | Target temperature option           | Yes, No                        | No               |
| Targ. temp.        | Target temperature                  | 30 ... 85 °C                   | 65 °C            |
| Sensor             | Target temperature reference sensor | system dependent               | system dependent |
| Mixer              | Mixer option                        | Yes, No                        | No               |
| Mixer cl.          | Output selection mixer closed       | system dependent               | system dependent |
| Mixer op.          | Output selection mixer open         | system dependent               | system dependent |
| Sensor             | Mixer sensor allocation             | system dependent               | system dependent |
| ΔTOpen             | Temperature difference mixer open   | 0.5 ... 30.0 K                 | 5.0 K            |
| ΔTClosed           | Temperature difference mixer closed | 0.0 ... 29.5 K                 | 2.0 K            |
| Interval           | Mixer interval                      | 1 ... 20 s                     | 4 s              |
| Funct.             | Activation / Deactivation           | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection              | -                              | -                |

## Return preheating



This function can be used for transferring heat from a heat source to the heating circuit return.

The allocated output is energised when all switch-on conditions are fulfilled:

- the temperature difference between the allocated sensors has exceeded the switch-on temperature difference
- the temperature difference between the allocated sensors has not fallen below the switch-off temperature difference
- if **Summer off** is activated, the temperature at the outdoor temperature sensor falls below the adjusted outdoor temperature value

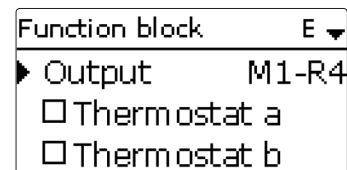
With the summer switch-off option, the return preheating can be suppressed outside the heating period.

### Arrangement / Opt. functions / Add new function / Ret. preheat.

| Adjustment channel | Description             | Adjustment range / selection | Factory setting  |
|--------------------|-------------------------|------------------------------|------------------|
| Output             | Output selection        | system dependent             | system dependent |
| Sen. return        | Return sensor selection | system dependent             | system dependent |

| Adjustment channel | Description                       | Adjustment range / selection   | Factory setting  |
|--------------------|-----------------------------------|--------------------------------|------------------|
| Sen. source        | Heat source sensor selection      | system dependent               | system dependent |
| $\Delta T_{on}$    | Switch-on temperature difference  | 2.0 ... 30.0 K                 | 6.0 K            |
| $\Delta T_{off}$   | Switch-off temperature difference | 1.0 ... 29.0 K                 | 4.0 K            |
| Summer off         | Summer switch-off option          | Yes, No                        | No               |
| Sensor             | Outdoor sensor selection          | system dependent               | system dependent |
| TOff               | Switch-off temperature            | 10 ... 60 °C                   | 20 °C            |
| Funct.             | Activation / Deactivation         | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection            | -                              | -                |

## Function block



In addition to the pre-defined optional functions, function blocks consisting of thermostat functions, timer, differential, reference output and flow rate functions are available. With the help of these function blocks, further components and functions respectively can be controlled.

To each function block, sensors and outputs available can be allocated.

Within a function block the functions are interconnected (AND gate). This means that the switching conditions of all the activated functions have to be fulfilled for switching the allocated output. As soon as one condition is not fulfilled, the output will switch off.

### Thermostat function

The switching condition for the thermostat function is considered fulfilled when the adjusted switch-on temperature ( $Th(x)$  on) is reached.

The switching condition for the thermostat function is considered unfulfilled when the adjusted switch-off temperature ( $Th(x)$  off) is reached.

Allocate the reference sensor in the **Sensor** channel.

Adjust the maximum temperature limitation with ( $Th(x)$  off) > ( $Th(x)$  on) and the minimum temperature limitation with ( $Th(x)$  on) > ( $Th(x)$  off). The temperatures cannot be set to an identical value.

## $\Delta T$ function

The switching condition for the  $\Delta T$  function is considered fulfilled when the adjusted switch-on temperature ( $\Delta T_{on}$ ) is reached.

The switching condition for the  $\Delta T$  function is no longer considered fulfilled when the adjusted switch-off temperature ( $\Delta T_{off}$ ) is reached.

The  $\Delta T$  function is equipped with a speed control function. A set temperature difference and a minimum speed can be adjusted. The non-adjustable rise value is 2 K.

## Reference output

Up to 5 Reference outputs can be selected. Whether the reference outputs are to be switched in series (AND), in parallel (OR), in series + inverted (NAND) or in parallel + inverted (NOR) can be adjusted in the **Mode** channel.

### OR mode

If at least one of the reference outputs is switched on, the switching condition for the reference output function is considered fulfilled.

If none of the reference outputs is switched on, the switching condition for the reference output function is considered unfulfilled.

### NOR mode

If none of the reference outputs is switched on, the switching condition for the reference output function is considered fulfilled.

If at least one of the reference outputs is switched on, the switching condition for the reference output function is considered unfulfilled.

### AND mode

If all reference outputs are switched on, the switching condition for the reference output function is considered fulfilled.

If at least one of the reference outputs is switched off, the switching condition for the reference output function is considered unfulfilled.

### NAND mode

If at least one of the reference outputs is switched off, the switching condition for the reference output function is considered fulfilled.

If all reference outputs are switched on, the switching condition for the reference output function is considered unfulfilled.

## Flow rate

If the adjusted switch-on flow rate is exceeded, the switching condition for the flow rate function is considered fulfilled.

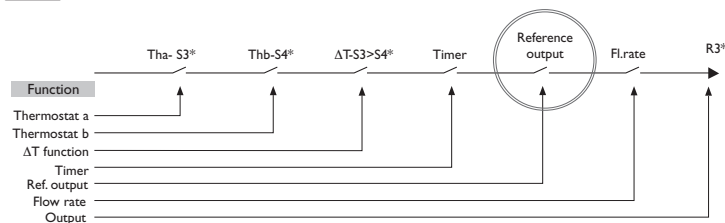
If the flow rate falls below the adjusted switch-off value, the condition for the flow rate function is no longer considered fulfilled.

The flow rate sensor for this function can be selected.

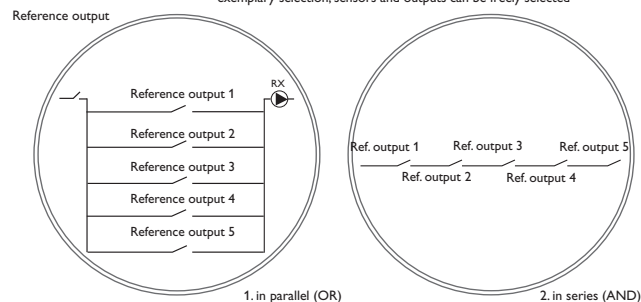


## Note

For information on timer adjustment see page 13.



\* exemplary selection, sensors and outputs can be freely selected

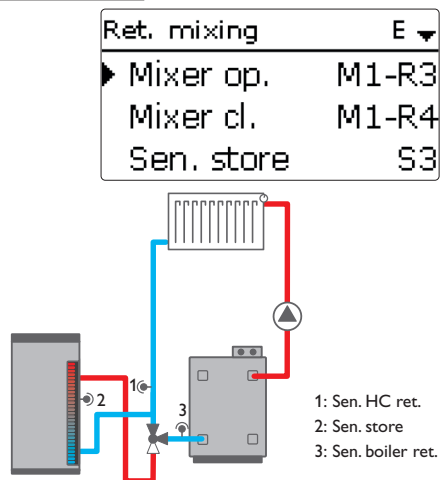


## Arrangement / Opt. functions / Add new function / Function block

| Adjustment channel  | Description                         | Adjustment range / selection | Factory setting  |
|---------------------|-------------------------------------|------------------------------|------------------|
| Output              | Output selection                    | system dependent             | system dependent |
| Thermostat a        | Thermostat function a               | Yes, No                      | No               |
| Th-a on             | Switch-on temperature thermostat a  | -40...+250 °C                | +40 °C           |
| Th-a off            | Switch-off temperature thermostat a | -40...+250 °C                | +45 °C           |
| Sensor              | Sensor thermostat a                 | system dependent             | system dependent |
| Thermostat b        | Thermostat function b               | Yes, No                      | No               |
| Th-b on             | Switch-on temperature thermostat b  | -40...+250 °C                | +40 °C           |
| Th-b off            | Switch-off temperature thermostat b | -40...+250 °C                | +45 °C           |
| Sensor              | Sensor thermostat b                 | system dependent             | system dependent |
| $\Delta T$ function | Differential function               | Yes, No                      | No               |
| $\Delta T_{on}$     | Switch-on temperature difference    | 1.0...50.0 K                 | 5.0 K            |
| $\Delta T_{off}$    | Switch-off temperature difference   | 0.5...49.5 K                 | 3.0 K            |

| Adjustment channel | Description                | Adjustment range / selection   | Factory setting  |
|--------------------|----------------------------|--------------------------------|------------------|
| $\Delta T_{Set}$   | Set temperature difference | 3 ... 100 K                    | 10 K             |
| Sen. source        | Heat source sensor         | system dependent               | system dependent |
| Sen. sink          | Heat sink sensor           | system dependent               | system dependent |
| Timer              | Timer function             | Yes, No                        | No               |
| Ref. output        | Reference output function  | Yes, No                        | No               |
| Mode               | Reference output mode      | OR, AND, NOR, NAND             | OR               |
| Output             | Reference output 1         | all outputs                    | -                |
| Output             | Reference output 2         | all outputs                    | -                |
| Output             | Reference output 3         | all outputs                    | -                |
| Output             | Reference output 4         | all outputs                    | -                |
| Output             | Reference output 5         | all outputs                    | -                |
| Flow rate          | Flow rate function         | Yes, No                        | No               |
| Fl. on             | Switch-on flow rate        | 1.0 ... 999.0 l/min            | 8.0 l/min        |
| Fl. off            | Switch-off flow rate       | 0.5 ... 998.5 l/min            | 7.5 l/min        |
| Sen. flow rate     | Flow rate sensor           | system dependent               | -                |
| Funct.             | Activation / Deactivation  | Activated, Deactivated, Switch | Activated        |
| Sensor             | Switch input selection     | -                              | -                |

## Return mixing function



This function can be used for heating backup.

Heat from the store is mixed into the heating circuit return by means of a mixing valve in order to add heat to the heating circuit. The controller compares the temperature at the selected store sensor to the heating circuit return temperature. If the store temperature exceeds the heating circuit return temperature by the switch-on temperature difference, the mixer will be used to add heat from the store to the heating circuit return. The mixer will be opened or closed in pulses depending on this deviation. The mixer will be controlled with the adjustable interval. The pause is determined by the difference between the actual value and the set value.

Thus, the heating circuit return temperature increases by the  $\Delta T_{Set}$  value. The adjustable maximum boiler return temperature limits the mixing temperature. If the store temperature falls below the heating circuit return temperature by the switch-off temperature difference, the mixer will close.

## Heating circuit Internal

If **Internal** is selected in the **HC** parameter, the return mixing function will only become active when the selected heating circuit of the controller is active, too. For this purpose, the heating circuit selected has to be controlled by the controller or by a module connected.

## Heating circuit External

If **External** is selected in the **HC** parameter, the controller calculates the status of the external heating circuit by means of the following parameters. The runtime defines the time needed for the mixer to switch from its initial position to the end position. The **Detection** parameter determines the opening angle of the mixer when the heating circuit is to be checked for activity. The **Time** defines the point in time at which the mixer is completely closed for adjustment every 24 hours.

## Arrangement / Opt. functions / Add new function / Ret. mixing

| Adjustment channel | Description                       | Adjustment range / selection | Factory setting  |
|--------------------|-----------------------------------|------------------------------|------------------|
| Mixer op.          | Output selection mixer open       | system dependent             | system dependent |
| Mixer cl.          | Output selection mixer closed     | system dependent             | system dependent |
| Sen. store         | Store sensor allocation           | system dependent             | system dependent |
| Sen. HC ret.       | HC return sensor allocation       | system dependent             | system dependent |
| Sen. boiler ret.   | Boiler return sensor allocation   | system dependent             | system dependent |
| $\Delta T_{On}$    | Switch-on temperature difference  | 1.0 ... 25.0 K               | 5.0 K            |
| $\Delta T_{Off}$   | Switch-off temperature difference | 0.5 ... 24.0 K               | 3.0 K            |
| $\Delta T_{Set}$   | Set temperature difference        | -20 ... +25 K                | +7 K             |
| TMax               | Maximum boiler return temperature | 10 ... 80 °C                 | 60 °C            |
| Interval           | Mixer interval                    | 1 ... 20 s                   | 2 s              |

| Adjustment channel | Description                                 | Adjustment range / selection   | Factory setting |
|--------------------|---------------------------------------------|--------------------------------|-----------------|
| HC                 | Detection controller heating circuit active | Internal, External             | Internal        |
| HC                 | Heating circuit allocation                  | HC 1...7                       | -               |
| Runtime            | Mixer runtime                               | 10 ... 600 s                   | 105 s           |
| Detection          | Mixer opening degree                        | 50 ... 90%                     | 60%             |
| Time               | Time of automatic adjustment                | 00:00 ... 23:45                | 00:00           |
| Funct.             | Activation / Deactivation                   | Activated, Deactivated, Switch | Activated       |
| Sensor             | Switch input selection                      | -                              | -               |

### Flow rate monitoring

|                |      |
|----------------|------|
| Flow rate mon. | E ▼  |
| ▶ Sensor       | IMP  |
| Ref. relay     | R4   |
| Time           | 30 s |

This function can be used to detect malfunctions that impede the flow rate and to switch off the corresponding output. This will prevent system damage, e.g. through a dry run of the pump.

If the flow rate monitoring function is activated, an error message will appear when no flow rate is detected at the allocated flow rate sensor after the delay time has elapsed.

If a reference relay has been selected, the flow rate monitoring function will become active when the allocated relay switches on. In the case of an error, the reference relay will be blocked.

The error message will appear both in the **Status / Messages** menu and in the **Status / Arrangement / Flow rate mon.** menu. It can be acknowledged in the **Status / Arrangement / Flow rate mon.** menu only.

### Arrangement / Opt. functions / Add new function / Flow rate mon.

| Adjustment channel | Description                | Adjustment range / selection   | Factory setting |
|--------------------|----------------------------|--------------------------------|-----------------|
| Sensor             | Flow rate sensor selection | system dependent               | -               |
| Ref. relay         | Reference relay selection  | system dependent               | -               |
| Time               | Delay time                 | 1 ... 300 s                    | 30 s            |
| Funct.             | Activation / Deactivation  | Activated, Deactivated, Switch | Activated       |
| Sensor             | Switch input selection     | -                              | -               |

## 10 HQM

|                    |                 |
|--------------------|-----------------|
| HQM                | E               |
| ▶ Add new function | ▶ HQM           |
| back               | Impulse counter |
|                    | back            |

In this menu, up to 7 calorimeters including 1 impulse counter can be activated and adjusted.



### Note

The adjustment of the functions is similar to the adjustment of optional functions, see page 15.

### Calorimeter

|                                         |     |
|-----------------------------------------|-----|
| HQM                                     | E ▼ |
| ▶ Sen. flow                             | S2  |
| Sen. ret.                               | S4  |
| <input type="checkbox"/> Sen. flow rate |     |

If the Flow rate sensor option is activated, an impulse input or, if available, a Grundfos Direct Sensor™ can be selected. Additionally, the **Reference relay** option can be activated. Heat quantity balancing is then only takes place if the allocated relay is active.

The Grundfos Direct Sensor™ is only available if it has been previously registered in the **Basic settings** menu. The impulse rate must be adjusted in that menu as well.

If the flow rate sensor option is deactivated, the controller calculates the heat quantity by means of a fixed flow rate value. This is called heat quantity balancing. For this purpose, the flow rate must be read from the flowmeter at 100% pump speed and adjusted in the adjustment channel **Fl.rate**. In addition to that, a relay must be allocated. Heat quantity balancing is in effect whenever the allocated relay is active.

In the adjustment channel **Fluid type** the heat transfer fluid must be selected. If either propylene glycol or ethylene glycol is selected, the adjustment channel **Concentration** is indicated in which the antifreeze ratio of the heat transfer fluid can be adjusted.

If a calorimeter is being configured for the first time or after the overall quantity has been reset, the parameter **Carryover** appears. A former value which is to be added to the overall quantity can be entered.

When the **Alternative unit** is activated, the controller converts the heat quantity into the quantity of fossil fuels (coal, oil or gas) saved, or the CO<sub>2</sub> emission saved respectively. The alternative unit can be selected. A conversion factor must be adjusted for the calculation. The conversion factor depends on the arrangement in use and has to be determined individually.

### HQM / Add new function / HQM

| Adjustment channel | Description                                                                                                | Adjustment range / selection    | Factory setting  |
|--------------------|------------------------------------------------------------------------------------------------------------|---------------------------------|------------------|
| Sen. flow          | Flow sensor selection                                                                                      | system dependent                | system dependent |
| Sen. ret.          | Return sensor selection                                                                                    | system dependent                | system dependent |
| Sen. flow rate     | Flow rate sensor option                                                                                    | Yes, No                         | No               |
| Fl.rate            | Flow rate (only if Sen. flow rate = No)                                                                    | 1.0 ... 500.0 l/min             | 3.0 l/min        |
| Relay              | Relay selection                                                                                            | system dependent                | -                |
| Sen. flow rate     | Flow rate sensor selection                                                                                 | system dependent                | -                |
| Ref. relay         | Reference relay option                                                                                     | Yes, No                         | No               |
| Relay              | Reference relay allocation                                                                                 | system dependent                | system dependent |
| Fluid type         | Heat transfer fluid                                                                                        | Tyfo LS, Propyl., Ethyl., Water | Propyl.          |
| Concentr.          | Glycol concentration in the heat transfer fluid (only if fluid type = propylene glycol or ethylene glycol) | 20 ... 70 %                     | 40 %             |
| Alternative unit   | Alternative unit option                                                                                    | Yes, No                         | No               |
| Unit               | Alternative display unit                                                                                   | Coal, Gas, Oil, CO <sub>2</sub> | CO <sub>2</sub>  |
| Factor             | Conversion factor                                                                                          | 0.0000001 ... 100.0000000       | 0.5000000        |
| Carryover          | Carryover value (for the first-time configuration or after a HQM reset only)                               | -                               | -                |
| Funct.             | Activation / Deactivation                                                                                  | Activated, Deactivated, Switch  | Activated        |
| Sensor             | Switch input selection                                                                                     | -                               | -                |

### Impulse counter

|                 |           |
|-----------------|-----------|
| Impulse counter | E         |
| Input           | IMP       |
| Carryover       |           |
| Funct.          | Activated |

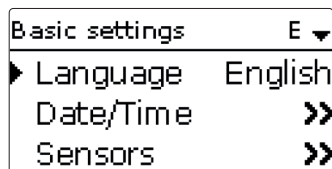
With an impulse counter, the impulses of a device with S0 output can be counted, e.g. for balancing the yield of a PV system.

For this purpose, the impulse input of the controller has to be selected in the **Input** channel. If an impulse counter is being configured for the first time or after the overall quantity has been reset, the parameter **Carryover** appears. A former value which is to be added to the overall quantity can be entered.

### HQM / Add new function / Impulse counter

| Adjustment channel | Description                                                              | Adjustment range / selection   | Factory setting |
|--------------------|--------------------------------------------------------------------------|--------------------------------|-----------------|
| Input              | Impulse input                                                            | IMP                            | -               |
| Carryover          | Carryover value (for the first-time configuration or after a reset only) | -                              | -               |
| Funct.             | Activation / Deactivation                                                | Activated, Deactivated, Switch | Activated       |
| Sensor             | Switch input selection                                                   | -                              | -               |

## 11 Basic settings

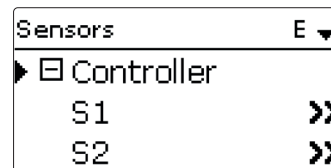


In this menu, all basic parameters for the controller can be adjusted. Normally, these settings have been made during commissioning. They can be subsequently changed in this menu.

### Basic settings

| Adjustment channel | Description                       | Adjustment range / selection                                                                                                                              | Factory setting |
|--------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Language           | Selection of the menu language    | Deutsch, English, Français, Español, Italiano, Nederlands, Türkçe, Česky, Polski, Português, Hrvatski, Română, Български, Русский, Suomi, Svenska, Magyar | Deutsch         |
| Date/Time          |                                   |                                                                                                                                                           |                 |
| Date               | Adjustment of the date            | 01.01.2001 ... 31.12.2050                                                                                                                                 | 01.01.2020      |
| Time               | Adjustment of the current time    | 00:00 ... 23:59                                                                                                                                           | -               |
| Auto DST           | Daylight savings time selection   | Yes, No                                                                                                                                                   | Yes             |
| Sensors            | Sensors submenu (see page 56)     | -                                                                                                                                                         | -               |
| Modules            | Modules submenu (see page 57)     |                                                                                                                                                           |                 |
| Devices            | Devices submenu (see page 57)     |                                                                                                                                                           |                 |
| Blocking protect.  | Blocking protection submenu       | -                                                                                                                                                         | -               |
| Start. time        | Blocking protection starting time | 00:00 ... 23:59                                                                                                                                           | 12:00           |
| Runtime            | Blocking protection runtime       | 1 ... 30 s                                                                                                                                                | 10 s            |
| Units              | Units submenu                     | -                                                                                                                                                         | -               |
| Temp. unit         | Temperature unit                  | °C, °F                                                                                                                                                    | °C              |
| Vol. unit          | Volume unit                       | Gallons, Litre                                                                                                                                            | Litre           |
| Press. unit        | Pressure unit                     | psi, bar                                                                                                                                                  | bar             |
| Energy unit        | Energy unit                       | kWh, MBTU                                                                                                                                                 | kWh             |
| Scheme             | Scheme selection                  | 0000 ... 0004                                                                                                                                             | 0000            |
| Reset              | back to factory setting           | Yes, No                                                                                                                                                   | No              |

## 11.1 Sensors



In this submenu, the type of the sensor connected can be adjusted for each individual input. The following types can be selected:

- S1 ... S5: Impulse (S5 only), Switch, Fern (remote control), BAS (operating mode switch), Pt1000, Pt500, KTY, None
- Ga1 RH, RPS, VFS, None

### ATTENTION! System damage!



Selecting the wrong sensor type will lead to unwanted control behaviour. In the worst case, system damage can occur!

→ **Make sure that the right sensor type is selected!**

If **KTY**, **Pt500** or **Pt1000** is selected, the channel **Offset** will appear, in which an individual offset can be adjusted for each sensor.



### Note

If a sensor is used as the temperature sensor of a function, the sensor types **Switch**, **Fern**, **BAS** and **None** will not be available for the corresponding input.

### ATTENTION! Damage to the device!



Sensor inputs which have been set to the sensor type switch can only be used for connecting potential-free switches.

→ **Make sure no voltage is applied!**

If **Switch** is selected, the **Inverted** option will appear and can be used for inverting the behaviour of the switch.



### Note

When Grundfos Direct Sensors™ are used, connect the sensor ground common terminal block to PE (see page 8).

## Basic settings/Sensors

| Adjustment channel | Description                       | Adjustment range / selection                                   | Factory setting |
|--------------------|-----------------------------------|----------------------------------------------------------------|-----------------|
| S1 ... S5          | Sensor input selection            | -                                                              | -               |
| Type               | Sensor type selection             | Impulse (S5 only), Switch, Fern, BAS, Pt1000, Pt500, KTY, None | Pt1000          |
| Offset             | Sensor offset                     | -15.0 ... +15.0 K                                              | 0.0 K           |
| Vol./Imp.          | Impulse rate                      | 0.1 ... 100.0 l                                                | 1.0 l           |
| Offset             | Delete offset                     | Yes, No                                                        | No              |
| Ga1                | Analogue Grundfos Direct Sensor™  | -                                                              | -               |
| Type               | Grundfos-Direct-Sensor™ type      | RH, RPS, VFS, None                                             | None            |
| Max.               | Maximum pressure (if Type = RPS)  | 0.0 ... 16.0 bar                                               | 6 bar           |
| Min.               | Minimum flow rate (if Type = VFS) | 1 ... 399 l/min                                                | 2 l/min         |
| Max.               | Maximum flow rate (if Type = VFS) | 2 ... 400 l/min                                                | 40 l/min        |
| Offset             | Sensor offset                     | -15.0 ... +15.0 K                                              | 0.0 K           |

## 11.2 Modules

Modules E ▼

☒ Module 1  
☐ Module 2  
☐ Module 3

In this menu, up to 5 extension modules can be registered.

All modules connected and acknowledged by the controller are available.

If a module is registered, all its sensor inputs and relay outputs will be available in the corresponding controller menus.

### Basic settings / Modules

| Adjustment channel | Description | Adjustment range / selection | Factory setting |
|--------------------|-------------|------------------------------|-----------------|
|--------------------|-------------|------------------------------|-----------------|

Module 1 ... 5 Registering external modules

## 11.3 Devices

Devices E ▼

☒ RC 1  
☐ RC 2  
☐ RC 3

In this menu, up to 7 RC type room control units can be registered (RTS room control unit).

All room control units connected and acknowledged by the controller are available.

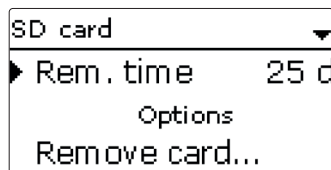
If a room control unit is registered, all its sensor inputs will be available in the corresponding controller menus.

### Basic settings/Devices

| Adjustment channel | Description | Adjustment range / selection | Factory setting |
|--------------------|-------------|------------------------------|-----------------|
|--------------------|-------------|------------------------------|-----------------|

RC 1 ... 7 Registering room control units

## 12 SD card



The controller is equipped with a MicroSD card slot for MicroSD memory cards.



### Note

The MicroSD card used must be formatted in FAT32.

### Firmware updates

The current software can be downloaded from [www.resol.com/firmware](http://www.resol.com/firmware). When a MicroSD card with a firmware update is inserted, the enquiry **Update?** is indicated on the display.

➔ To run the update, select **Yes** and confirm by pressing button (5).

The update will run automatically. The indication **Please wait...** and a progress will bar appear on the display. When the update has been completed, the controller will automatically reboot and run a short initialisation phase.



### Note

Only remove the card when the initialisation phase has been completed and the main menu is indicated on the controller display!

➔ To skip the update, select **No**.

The controller starts normal operation.



### Note

The controller will only recognise a firmware update file if it is stored in a folder named **HCM2** on the first level of the MicroSD card.

➔ Create a folder named **HCM2** on the SD card and extract the downloaded ZIP file into this folder.

### Starting the logging

1. Insert the MicroSD card into the slot.
2. Adjust the desired logging type and interval.

Logging will start immediately.

### Completing the logging process

1. Select the menu item **Remove card...**
2. After **Remove card** is displayed, remove the card from the slot.

When **Linear** is adjusted in the logging type adjustment channel, data logging will stop if the capacity limit is reached. The message **Card full** will be displayed.

If **Cyclic** is adjusted, the oldest data logged onto the card will be overwritten as soon as the capacity limit is reached.



### Note

Because of the increasing size of the data packets, the remaining logging time does not decrease linearly. The data packet size can increase, e.g. with the increasing operating hours value.

### Storing controller adjustments

➔ To store the controller adjustments on the MicroSD card, select the menu item **Save adjustments**.

While the adjustments are being stored, first **Please wait...**, then **Done!** will be indicated on the display. The controller adjustments are stored as a .SET file on the MicroSD card.

### Loading controller adjustments

1. To load controller adjustments from a MicroSD card, select the menu item **Load adjustments**.

The **file selection** window will appear.

2. Select the desired .SET file.

While the adjustments are being loaded, first **Please wait...**, then **Done!** will be indicated on the display.



### Note

The controller will only recognise .SET files if they are stored in a folder named **HCM2** on the first level of the MicroSD card.



### Note

To safely remove the MicroSD card, always select the menu item **Remove card...** before removing the card.

### SD card

| Adjustment channel | Description        | Adjustment range / selection | Factory setting |
|--------------------|--------------------|------------------------------|-----------------|
| Remove card...     | Safely remove card | -                            | -               |
| Save adjustments   | Save adjustments   | -                            | -               |
| Load adjustments   | Load adjustments   | -                            | -               |
| Logging int.       | Logging interval   | 00:01 ... 20:00 (mm:ss)      | 01:00           |
| Logging type       | Logging type       | Cyclic, Linear               | Linear          |

## 13 Manual mode

In this menu, the operating mode of all outputs in the controller and in modules connected can be adjusted.

In the **All outputs...** menu, all outputs can be simultaneously switched off (Off) or set to automatic mode (Auto):

Off = Output is switched off (manual mode)

Auto = Output is in automatic mode

The operating mode can be selected for each individual output, too. The following options are available:

Off = Output is switched off (manual mode)

On = Output is active at 100% speed (manual mode)

Auto = Output is in automatic mode

Min. = Output is active at minimum speed (manual mode)

Max. = Output is active at maximum speed (manual mode)



### Note

After service and maintenance work, the relay mode must be set back to **Auto**. In manual mode the control logic is suspended.

## Manual mode

| Adjustment channel | Description                            | Adjustment range / selection | Factory setting |
|--------------------|----------------------------------------|------------------------------|-----------------|
| All outputs...     | Selection operating mode of all relays | Auto, Off                    | Off             |
| Relay 1 ... X      | Operating mode of relay                | On, Auto, Off                | Auto            |
| Output A ... B     | Operating mode of signal output        | On, Max., Auto, Min., Off    | Auto            |
| Demand 1 (2)       | Operating mode of demand               | Max., Auto, Min., Off        | Auto            |
| Pump 1 (2)         | Operating mode of pump                 | Max., Auto, Min., Off        | Auto            |
| Valve 1 (2)        | Operating mode of valve                | Max., Auto, Min., Off        | Auto            |

## 14 User code

In this menu, a user code can be entered. Each number of the 4-digit code must be individually adjusted and confirmed. After the last digit has been confirmed, the menu automatically jumps to the superior menu level.

To access the menu areas of the installer level, the installer user code must be entered:

Installer: 0262

For safety reasons, the user code should generally be set to the customer code before the controller is handed to the customer!

Customer: 0000

## 15 Troubleshooting

If a malfunction occurs, a message will appear on the display of the controller.

### WARNING!

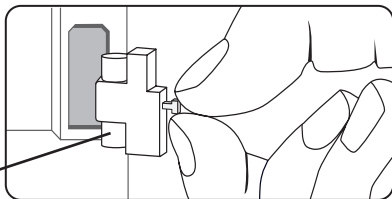
#### Danger of electric shock!

Upon opening the housing, live parts are exposed!

→ **Always disconnect the device from power supply before opening the housing!**



The controller is protected by a fuse. The fuse holder (which also holds the spare fuse) becomes accessible when the cover is removed. To replace the fuse, pull the fuse holder from the base.



Fuse

Operating control LED flashes red.

Sensor fault. The message **!Sensor fault** instead of a temperature is shown on the sensor display channel.

Short circuit or line break.

Disconnected temperature sensors can be checked with an ohmmeter. Please check if the resistance values correspond with the table.

| °C  | °F  | Ω<br>Pt500 | Ω<br>Pt1000 | Ω<br>KTY | °C  | °F  | Ω<br>Pt500 | Ω<br>Pt1000 | Ω<br>KTY |
|-----|-----|------------|-------------|----------|-----|-----|------------|-------------|----------|
| -10 | 14  | 481        | 961         | 1499     | 55  | 131 | 607        | 1213        | 2502     |
| -5  | 23  | 490        | 980         | 1565     | 60  | 140 | 616        | 1232        | 2592     |
| 0   | 32  | 500        | 1000        | 1633     | 65  | 149 | 626        | 1252        | 2684     |
| 5   | 41  | 510        | 1019        | 1702     | 70  | 158 | 636        | 1271        | 2778     |
| 10  | 50  | 520        | 1039        | 1774     | 75  | 167 | 645        | 1290        | 2874     |
| 15  | 59  | 529        | 1058        | 1847     | 80  | 176 | 655        | 1309        | 2971     |
| 20  | 68  | 539        | 1078        | 1922     | 85  | 185 | 664        | 1328        | 3071     |
| 25  | 77  | 549        | 1097        | 2000     | 90  | 194 | 674        | 1347        | 3172     |
| 30  | 86  | 559        | 1117        | 2079     | 95  | 203 | 683        | 1366        | 3275     |
| 35  | 95  | 568        | 1136        | 2159     | 100 | 212 | 693        | 1385        | 3380     |
| 40  | 104 | 578        | 1155        | 2242     | 105 | 221 | 702        | 1404        | 3484     |
| 45  | 113 | 588        | 1175        | 2327     | 110 | 230 | 712        | 1423        | 3590     |
| 50  | 122 | 597        | 1194        | 2413     | 115 | 239 | 721        | 1442        | 3695     |

The display is permanently off.

Press the right button (✓). Display illuminated?

no

yes

Controller has been in standby, everything OK

Check the power supply of the controller: Is it disconnected?

no

yes

The fuse of the controller could be blown. The fuse holder (which holds the spare fuse) becomes accessible when the cover is removed. The fuse can then be replaced.

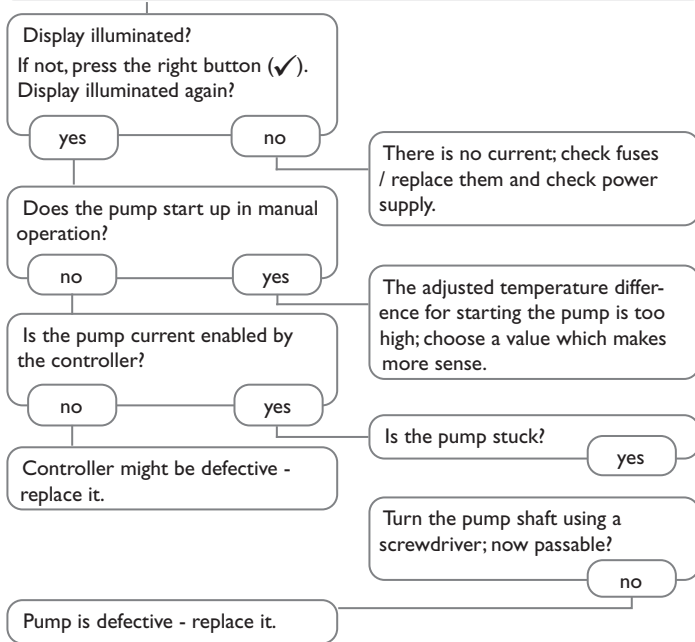
Check the supply line and reconnect it.



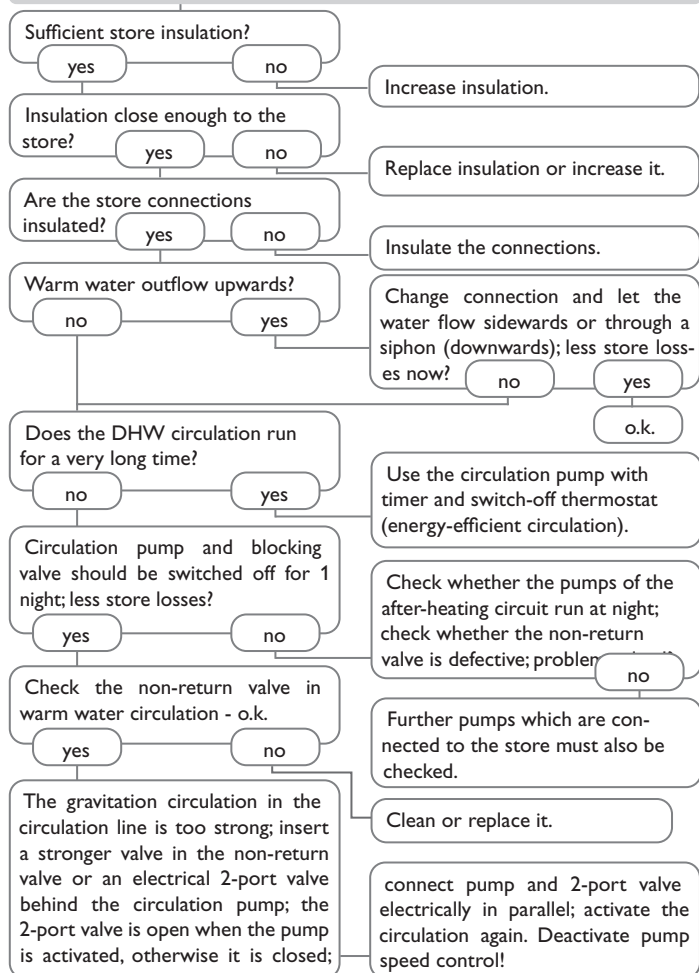
### Note

For answers to frequently asked questions (FAQ) see [www.resol.com](http://www.resol.com).

The heating circuit pump does not work, although this is indicated on the status display.



Stores cool down at night.



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Optionales Zubehör | Optional accessories | Accessoires  
optionnels | Accesorios opcionales | Accessori opzionali:  
**www.resol.de/4you**

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### **Important note**

The texts and drawings in this manual are correct to the best of our knowledge. As faults can never be excluded, please note:

Your own calculations and plans, under consideration of the current standards and directions should only be basis for your projects. We do not offer a guarantee for the completeness of the drawings and texts of this manual - they only represent some examples. They can only be used at your own risk. No liability is assumed for incorrect, incomplete or false information and / or the resulting damages.

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