Operating and installation instructions

REMKO EFS series

Fresh water station controller
Instructions for users and specialists

RS 2020

0325-2023-04 Edition 1, en_GB

Read the instructions prior to performing any task!

Read these operating instructions carefully before commissioning / using this device!

These instructions are an integral part of the system and must always be kept near or on the device.

Subject to modifications; No liability accepted for errors or misprints!

Translation of the original

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1 Safety and usage instructions

1.1 General safety notes

Carefully read the operating manual before commissioning the units for the first time. It contains useful tips and notes such as hazard warnings to prevent personal injury and material damage. Failure to follow the directions in this manual not only presents a danger to people, the environment and the system itself, but will void any claims for liability.

Keep this operating manual and the refrigerant data sheet near to the units.

1.2 Identification of notes

This section provides an overview of all important safety aspects for proper protection of people and safe and fault-free operation.The instructions and safety notes contained within this manual must be observed in order to prevent accidents, personal injury and material damage.

Notes attached directly to the units must be observed in their entirety and be kept in a fully legible condition.

Safety notes in this manual are indicated by symbols. Safety notes are introduced with signal words which help to highlight the magnitude of the danger in question.

DANGER!

Contact with live parts poses an immediate danger of death due to electric shock. Damage to the insulation or individual components may pose a danger of death.

DANGER!

This combination of symbol and signal word warns of a situation in which there is immediate danger, which if not avoided may be fatal or cause serious injury.

WARNING!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may be fatal or cause serious injury.

CAUTION!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause injury or material and environmental damage.

NOTICE!

This combination of symbol and signal word warns of a potentially hazardous situation, which if not avoided may cause material and environmental damage.

This symbol highlights useful tips and recommendations as well as information for efficient and fault-free operation.

1.3 Personnel qualifications

Personnel responsible for commissioning, operation, maintenance, inspection and installation must be able to demonstrate that they hold a qualification which proves their ability to undertake the work.

1.4 Dangers of failure to observe the safety notes

Failure to observe the safety notes may pose a risk to people, the environment and the units. Failure to observe the safety notes may void any claims for damages.

In particular, failure to observe the safety notes may pose the following risks:

- The failure of important unit functions.
- The failure of prescribed methods of maintenance and repair.
- Danger to people on account of electrical and mechanical effects.

1.5 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

1.6 Safety instructions for the operator

The operational safety of the units and components is only assured providing they are used as intended and in a fully assembled state.

- The units and components may only be set up, installed and maintained by qualified personnel.
- The existing regulations concerning accident prevention must be adhered to.
- Do not operate units or components with obvious defects or signs of damage.
- Contact with equipment parts or components can lead to burns or injury.
- Ensure that electrical energy does not pose a risk.
- Regulations of the VDE and the local energy supply company must be adhered to.

! NOTICE!

Material damage due to mineral oils!

Mineral oil products permanently damage EPDM seal elements; the sealing properties may therefore be lost. We do not take responsibility or provide warranty replacements for damage caused by seals that are damaged in this way.

- It is essential that you prevent EPDM from coming into contact with mineral oil substances.
- Use a lubricant that is free of mineral oil and has a silicone or polyalkylene basis, such as Unisilkon L250L and Syntheso Glep 1 made by Klüber, or a silicon spray.

1.7 Safety notes for installation and inspection tasks

- The operator must ensure that all inspection and installation work is carried out by authorised and qualified personnel who have thoroughly read the operating manual.
- Works on the pump/system may only be carried out whilst at a standstill as a matter of principle.
- Appropriate hazard prevention measures must be taken to prevent risks to people when performing installation, repair, maintenance or cleaning work on the units.
- The setup, connection and operation of the units and its components must be undertaken in accordance with the usage and operating conditions stipulated in this manual and comply with all applicable regional regulations.
- Regional regulations and laws as well as the Water Ecology Act must be observed.
- The power supply should be adapted to the requirements of the units.
- The units and components must be kept at an adequate distance from flammable, explosive, combustible, abrasive and dirty areas or atmospheres.
- Safety devices may not be modified or bypassed.

! NOTICE!

Malfunction!

The fresh water module must be integrated into the equipotential bonding system of the electrical installation. If this is not ensured by the pipe network, set up an approved potential equalisation connection to the main potential connection.

1.8 Unauthorised modification and changes

The operational safety of the fresh water module that was delivered is guaranteed only with intended use in accordance with section 1.8 of the operating instructions. Under no circumstances should the threshold values specified in the datasheet be exceeded.

Modifications or changes to units and components are not permitted and may cause malfunctions. Safety devices may not be modified or bypassed. Original replacement parts and accessories authorised by the manufacturer ensure safety. The use of other parts may invalidate liability for resulting consequences.

1.9 Intended use

The fresh water controller, subsequently referred to as the controller, is an independent, mounted electronic temperature controller for assembly and installation. Integration in a pump group is possible if the technical data of the controller is complied with. The maintenance-free controller is provided exclusively for controlling and monitoring a REMKO fresh water station. Use only REMKO accessories in conjunction with the controller.

Any different or additional use is a non-intended use. The manufacturer/supplier assumes no liability for damages arising from a non-intended use. The user bears the sole risk in such cases. Intended use also includes working in accordance with the operating and installation instructions and complying with the maintenance requirements.

The threshold values specified in the technical data must not be exceeded.

1.10 Safety-conscious working

The safety notes contained in this manual, the existing national regulations concerning accident prevention as well as any internal company working, operating and safety regulations must be observed.

1.11 Warranty

For warranty claims to be considered, it is essential that the ordering party or its representative complete and return the "certificate of warranty" to REMKO GmbH & Co. KG at the time when the units are purchased and commissioned.

The warranty conditions are detailed in the "General business and delivery conditions". Furthermore, only the parties to a contract can conclude special agreements beyond these conditions. In this case, contact your contractual partner in the first instance.

1.12 Transportation and packaging

The units are shipped in sturdy transport packaging or within the heat pump housing. Immediately check the units on delivery and make a note of any damage or missing parts on the delivery note. Inform the forwarding agent and contractual partner. Claims under guarantee made at a later date will not be accepted.

⚠ WARNING!

Plastic films and bags etc. are dangerous toys for children!

Why:

- Leave packaging material are not around.

- Packaging material may not be accessible to children!

1.13 Environmental protection and recycling

Disposing of packaging

All products are packed for transport in environmentally friendly materials. Make a valuable contribution to reducing waste and sustaining raw materials. Only dispose of packaging at approved collection points.

Disposing of the units and their components

For the manufacture of the units and components, only recyclable materials have been used. Help protect the environment by ensuring that the units or components (for example batteries) are not disposed of in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using authorised disposal and recycling specialists or council collection points.

2 Technical data

2.1 Unit data

Series		RS 2020
Inputs		
Ttemperature sensors		4 Pt1000
Flow rate sensor		1 (0-500-Hz-interface)
Outputs		
Semiconductor relays and 2 PWM outputs		3
Potential-free extra-low voltage relay		1
Switching capacity	V	1 (1) A 240 V~ (Semiconductor relay)
	V	1 (1) A 30 V ⎓ (Potential-free extra-low voltage relay)
Total switching capacity	A	4 A 240 V~
General		
Power supply	V/Hz	100 … 240 V~ (50 … 60 Hz)
Supply connection		Type Y attachment
Mode of operation		Type 1.B.C.Y action
Rated impulse voltage	kV	2,5
Data interface		VBus®
		Cascade bus
		MicroSD card slot
VBus® current supply	mA	60
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 / DIN EN 60529
Protection class		I
Ambient temperature	°C	0 ... 40 °C
Degree of pollution		2
Dimensions (L x W x H)	mm	166 x 110 x 47

Information provided without guarantee! We reserve the right to make technical changes within the framework of technical advancement.

2.2 Device dimensions

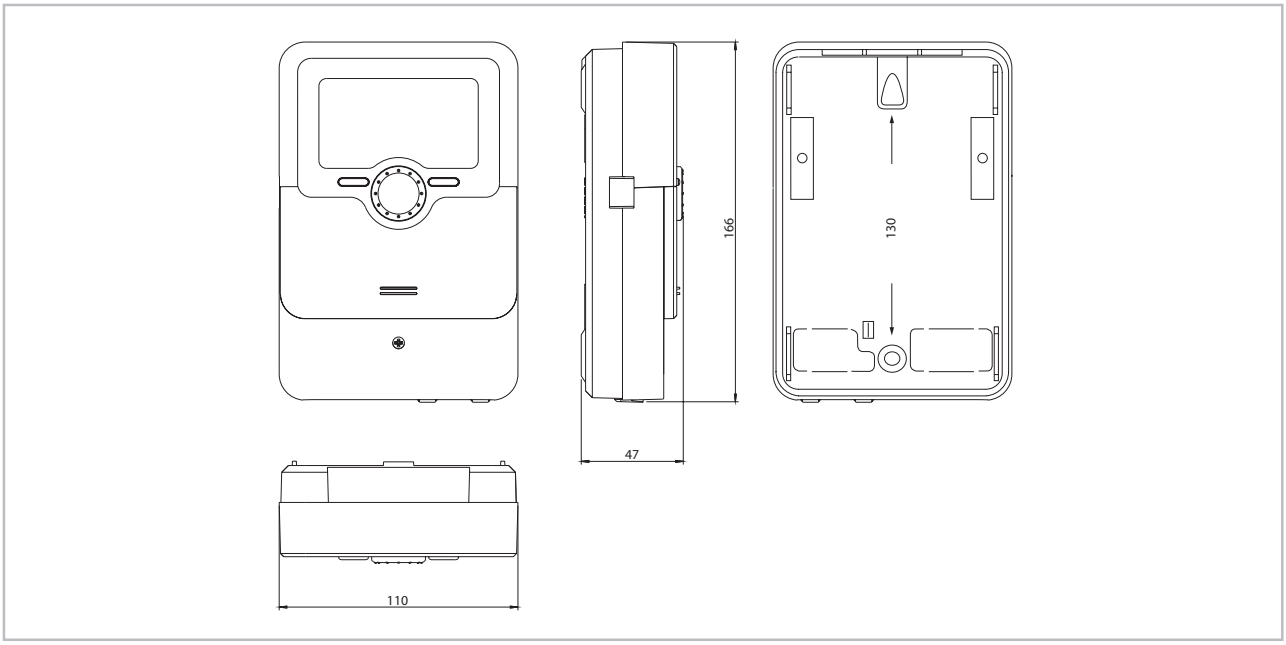


Fig. 1: Device dimensions

Information provided without guarantee! We reserve the right to make technical changes within the framework of technical advancement.

3 Unit description

The device excels:

- Customised control for systems with or without circulation
- Flexible circulation function for different user profiles, also available with thermal disinfection
- Control of PWM pumps
- Commissioning menu for easy configuration
- Clear system graphic in the status menu
- Cascades of up to 6 DHW exchange controllers or stations

4 Assembly and installation

4.1 Mounting

DANGER!

Danger of death due to electric shock!

- Disconnect the controller from the power supply before opening the housing.

- Ensure that the power supply cannot be switched on inadvertently when the housing is open.

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.

Normally, exchange controller is integrated in a DHW exchange module.

The device must only be located in dry interior rooms.

4.2 Electrical connection

DANGER!

Danger of death due to electric shock!

- Disconnect the controller from the power supply before opening the housing.

- Ensure that the power supply cannot be switched on inadvertently when the housing is open.

NOTICE!

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!

Important instructions

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

- Protective earth conductor ⏚

Relay 4 is a potential-free low voltage relay

- The pump speed must be set to 100 % when auxiliary relays or valves are connected.
- The cables of the controller are pre-connected. This chapter is for information purposes only. Make sure the hydraulic system is properly grounded!

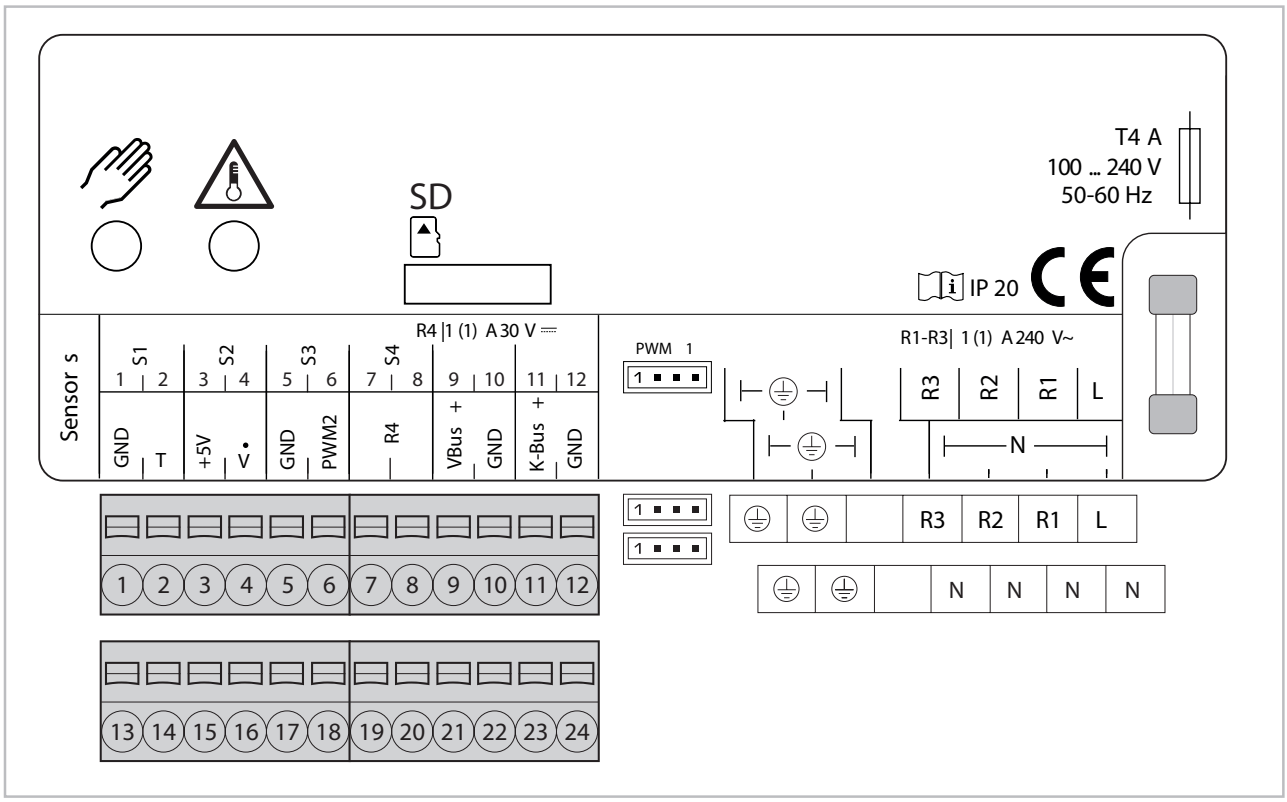
Depending on the product version, mains cables and sensor cables are already connected to the device. If that is not the case, please proceed as follows:

Temperature sensors have to be connected to the terminals S1 to S4 (either polarity).

Connect the flow rate sensor to the terminals T and V with correct polarity.

The terminals marked PWM are control outputs for a high-efficiency pump.

REMKO EFS series



NOTE

Connect the permanent phase of the line valve along with the power supply of the controller to L. Connect the switching phase of the line valve to R3.

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

The mains connection is at the terminals:

Neutral conductor N

Conductor L

Protective earth conductor ⏚

NOTE

For more details about the commissioning procedure see chapter "Commissioning".

If a cascade is installed, the following section is valid additionally:

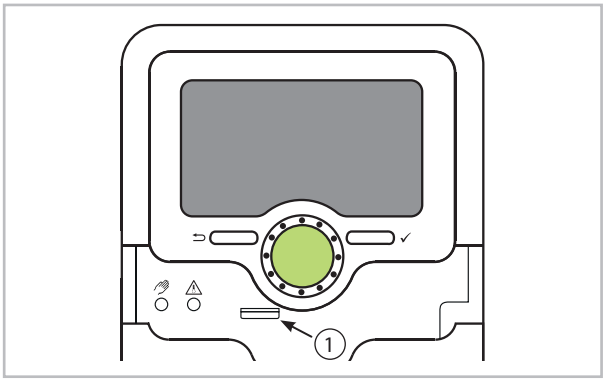
All cascade controllers are equipped with a cascade bus for data communication with each other. The connection is to be carried out at the two terminals marked K-Bus (23/24) with correct polarity. If required, use a junction box with distribution terminals.

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.



1: MicroSD card slot

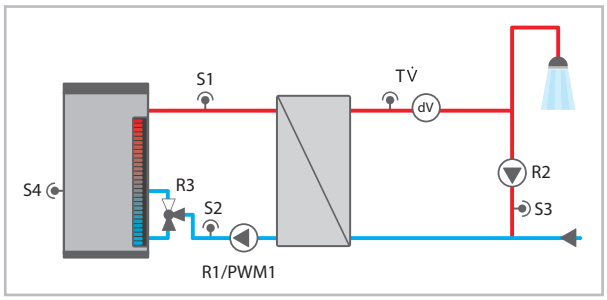
A MicroSD card is not included.

NOTE

For more information about using a MicroSD card, see chapter "SD card".

Overview of relay and sensor allocation

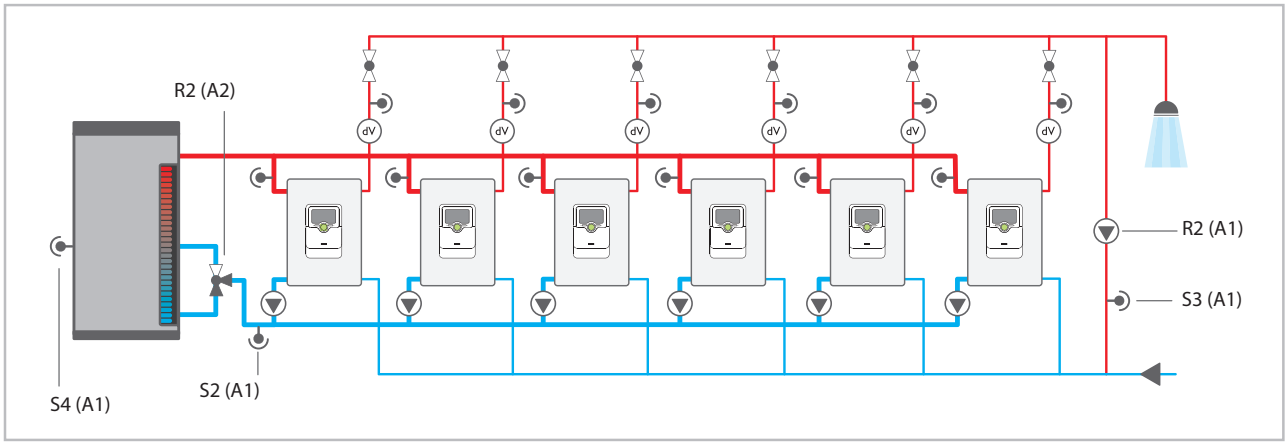
Single station



Connection terminal	Single station
S1 (1 / 2)	Flow primary circuit
S2 (3 / 4) (optional)	Stratified return source
S3 (5/ 6) (optional)	Circulation
S4 (7 / 8) (optional)	Stratified return store
T	DHW
V	DHW
R4 (19 / 20) (optional)	Error relay
VBus (21 / 22)	Visualisation
K-Bus (23 / 24)	not used
PWM1 (connector)	Speed primary pump
R3 (optional)	Stratified return
R2 (optional)	Circulation
R1	Primary pump

REMKO EFS series

Cascade



A1: Station 1 A2: Station 2

Connection terminal	Station 1	Station 2	Station 3 / 4 / 5 / 6
S1 /1/2)	Flow primary circuit	Flow primary circuit	Flow primary circuit
S2 (3/4) (optional)	Stratified return source	---	---
S3 (5/6) (optional)	Circulation	---	---
S4 (7/8) (optional)	Stratified return store	---	---
T	DHW	DHW	DHW
V	DHW	DHW	DHW
R4 (19/20) (optional)	Error relay	---	---
VBus (21/22)	Visualisation	---	---
K-Bus (23/24)	Cascade bus	Cascade bus	Cascade bus
PWM1 (connector)	Speed primary pump	Speed primary pump	Speed primary pump
R3 (optional)	Line valve	Line valve	Line valve
R2 (optional)	Circulation	Stratified return	---
R1	Primary pump	Primary pump	Primary pump

5 Operation and function

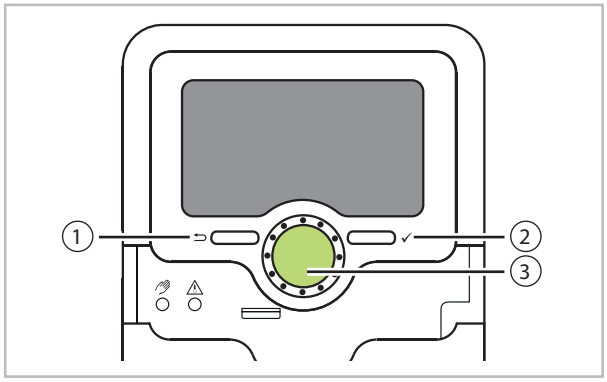
Buttons and adjustment dial

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

Left button ① - escape button for changing into the previous menu

Right button ② - confirming / selecting

Lightwheel® ③ - scrolling upwards / scrolling downwards, increasing adjustment values / reducing adjustment values



Microbuttons for manual mode and emergency operation

The controller is equipped with 2 microbuttons for quick access to the emergency operation and the manual mode. The microbuttons are located underneath the slidable housing cover, the slider.

Microbutton ✋: If the microbutton is briefly pressed, the controller changes to the manual mode menu.

Microbutton ⚠: The microbutton is used for activating the emergency operation.

Operating control LED

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

Colour	Permanently shown	Flashing
1	Everything OK	A note exists, see chapter "Messages")
2		Disturbance or warning exists (see chapter "Messages", error relay active, manual mode active
3	Parameterisation active	Storage active

1: green / 2: red / 3: yellow

Parameterisation mode

After the installer code is entered (see chapter "User code"), the controller changes to the parameterisation mode.

NOTE

In parameterisation mode, the control process stops and the message Control stopped – Parameterisation active is indicated. The LED in the Lightwheel® will glow yellow.

- In order to carry out adjustments in the menu, press the right button (②) The controller changes to the main menu in which adjustments on the installer level can be made.
- In order to save the adjustments made, press the microbutton (✋) for approx. 3 s or select the menu item Save in the main menu.
- In order to cancel the parameterisation process and to discard adjustments made, press the left button (①) for approx. 3 s.

The controller will leave the installer level and restart.

Selecting menu points and adjusting values

During normal operation of the controller, the display is in the main menu. If no button is pressed for 2 min, the display switches to standby mode. After further 10 s, the display illumination switches off.

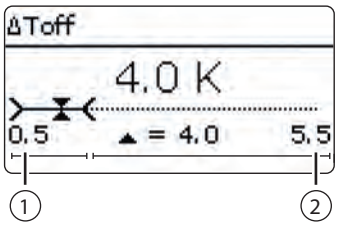
In order to get from the status menu into the main menu, press the left button (①).

Press any key to reactivate the display illumination. In order to scroll through the menu items, turn the Lightwheel®.

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.

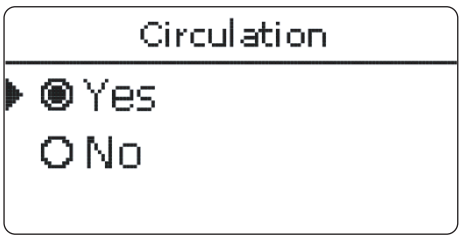
Only after the adjustment has been confirmed by pressing the right button (②) will the number below the slide bar indicate the new value. The new value will be saved if it is confirmed by pressing the right button (②) again.



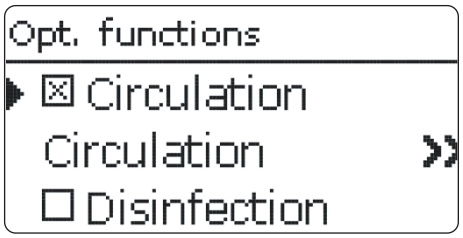
1: active area
2: inactive area

When 2 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.



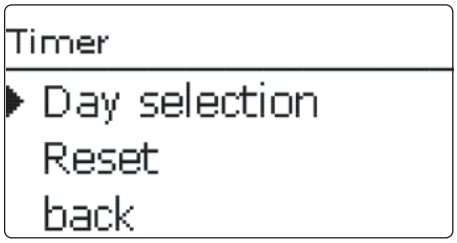
If only one item of several can be selected, they will be indicated with radio buttons. When one item has been selected, the radio button in front of it is filled.



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.

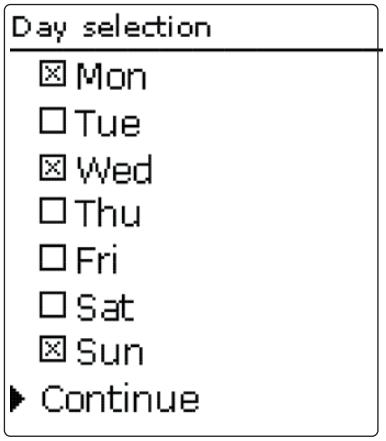
Adjusting the timer

With the **Timer** time frames for the function can be adjusted.



In the **Day selection** channel, the days of the week are available. If several days are selected, they will be merged into one combination for the following steps.

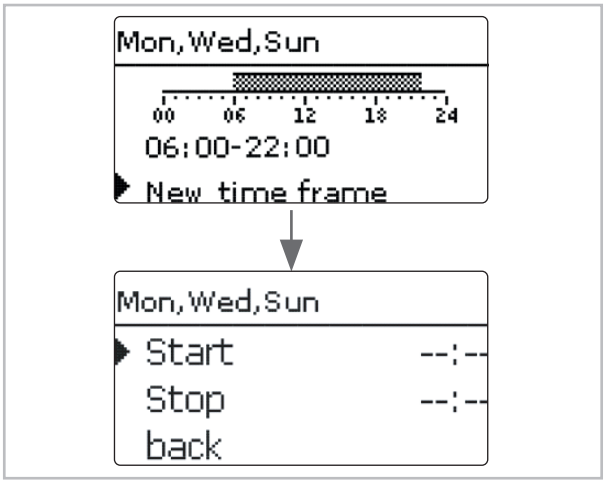
The last menu item after the list of days is **Continue**. If **Continue** is selected, the timer menu opens, in which the time frames can be adjusted.



Adding a time frame

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

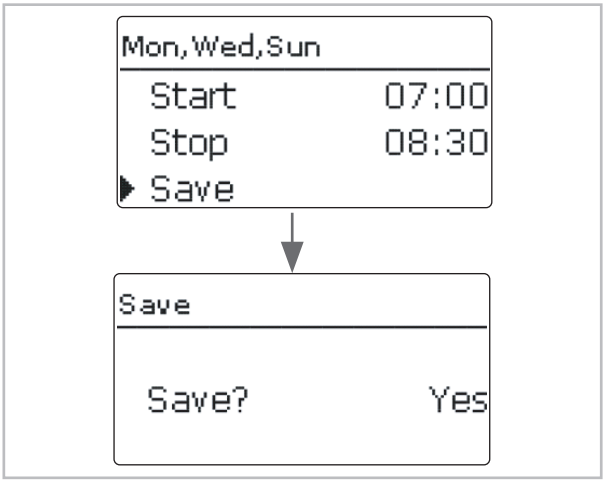
- Select **New time frame**.



- Adjust **Start** and **Stop** for the desired time frame.

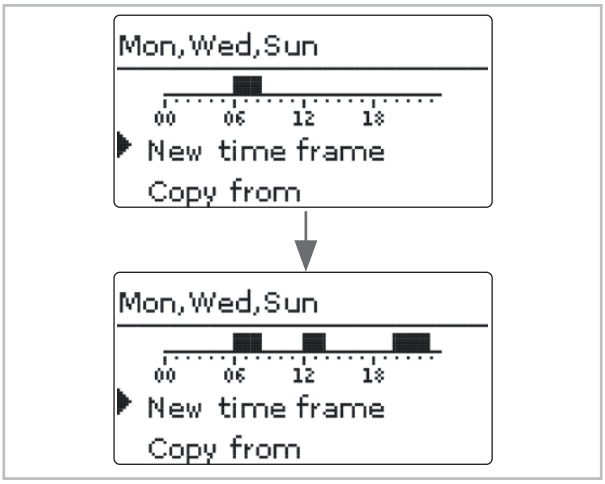
The time frames can be adjusted in steps of 10 min.

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

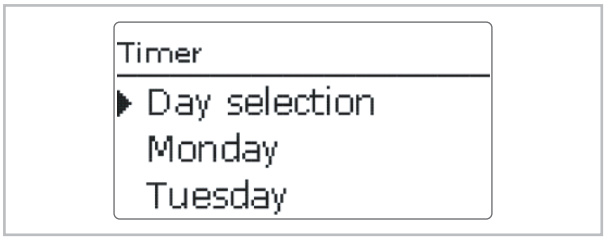


- In order to add another time frame, repeat the previous steps.

6 time frames can be adjusted per day or combination.



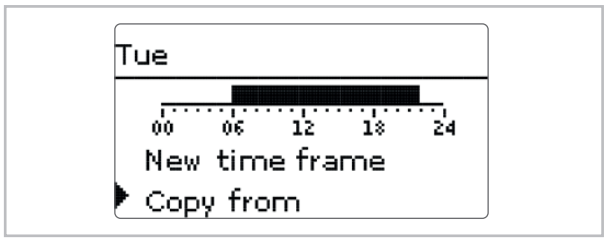
- Press the left button (①) in order to get back to the day selection.



Copying a time frame

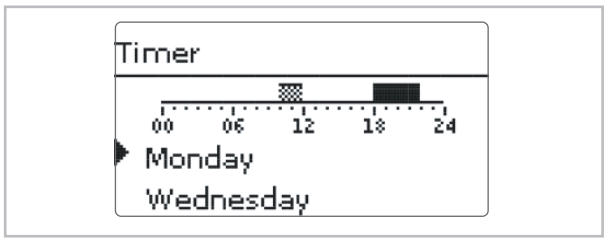
In order to copy time frames already adjusted into another day / other days, proceed as follows:

- Choose the days(s) into which the time frames are to be copied and select **Copy from**.

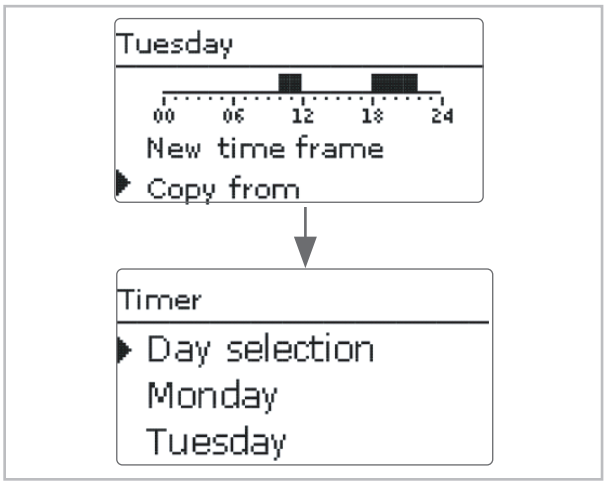


A selection of days with time frames will appear.

- Select the day from which the time frames are to be copied.



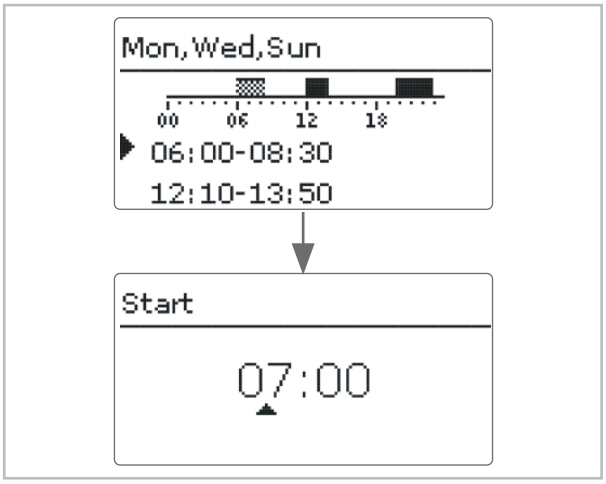
All time frames adjusted for the selected day will be copied. Existing time frames will be overwritten.



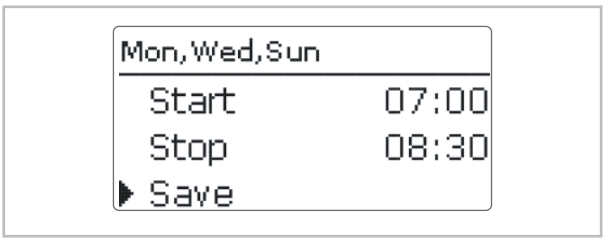
Changing a time frame

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

- Select the time frame to be changed.
- Make the desired change.



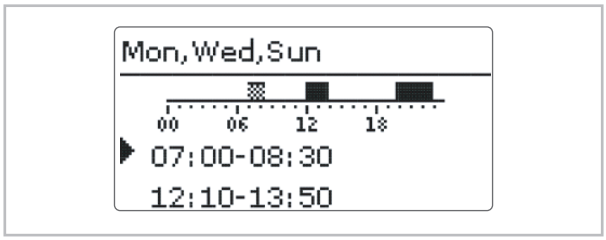
- In order to save the time frame, select **Save** and confirm the security enquiry with **Yes**.



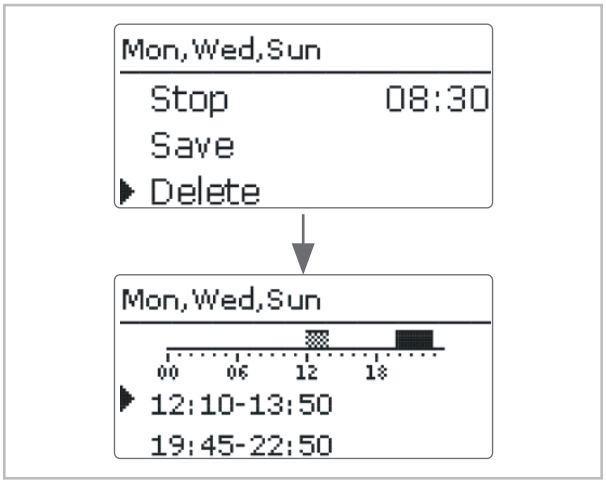
Removing a time frame

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

- Select the time frame that is to be deleted.



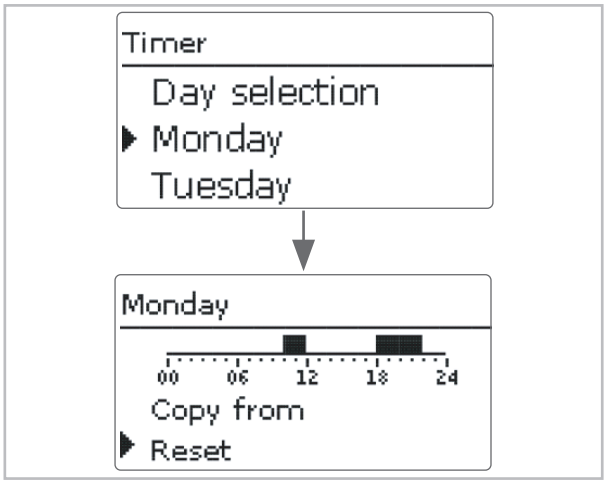
- Select **Delete** and confirm the security enquiry with **Yes**.



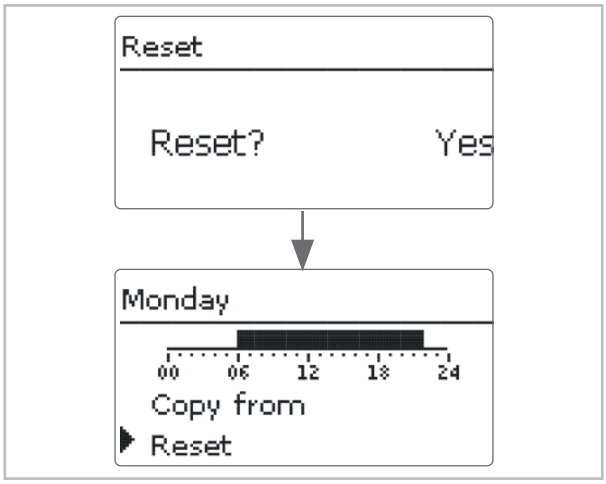
Resetting the timer

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

- Select the desired day.

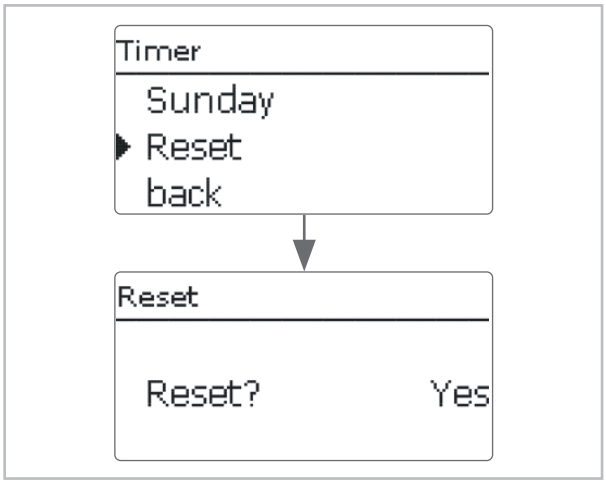


- Select **Reset** and confirm the security enquiry with **Yes**.

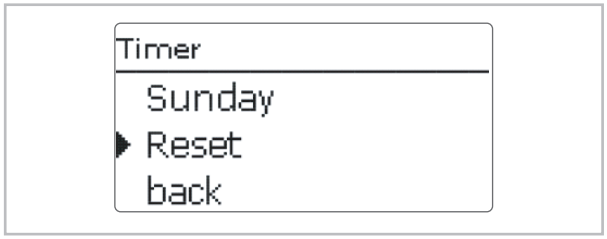


In order to reset the whole timer, proceed as follows:

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

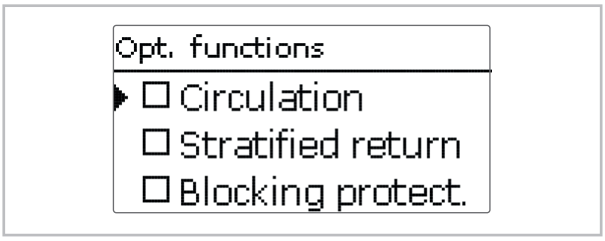


All adjustments made for the timer are deleted.

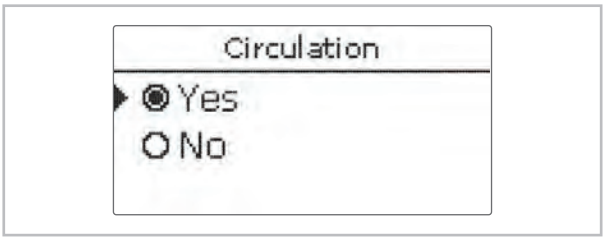


Adjusting optional functions

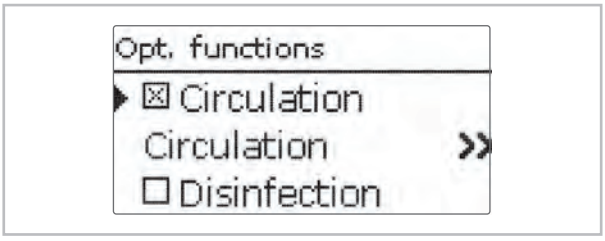
In the **Optional functions** menu, optional functions can be selected and adjusted.



In order to activate a function, select the desired function and confirm the enquiry with **Yes**.



When a function has been activated, an x within the checkbox and a new menu line with the symbol » appear.



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

In order to save the adjustments, select **Save** in the main menu or press and hold down the micro-button ✋ for approx. 3 s.

In order to delete a function, select the function in the **Optional functions** menu and answer the enquiry with **No**.

6 Commissioning

6.1 Commissioning

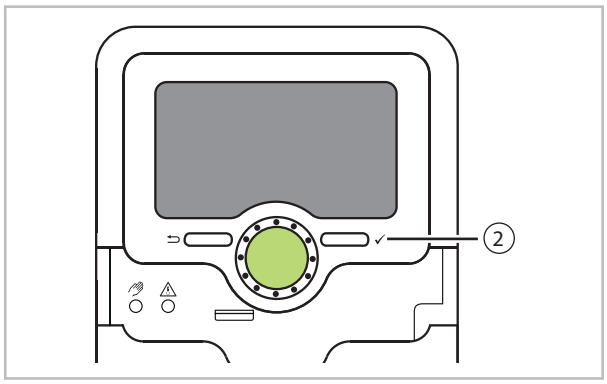
When the hydraulic system is filled and ready for operation, connect the controller to the mains.

The controller runs an initialisation phase in which the Lightwheel® glows 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.

Commissioning menu

The commissioning menu consists of the channels described in the following. In order to make an adjustment, adjust the desired value with the Lightwheel® and confirm with the right button ②. The next channel will appear in the display.

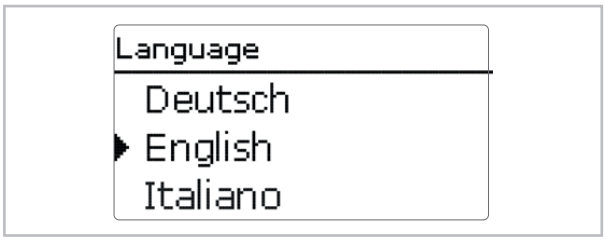


Operation
Adjustment mode
↓
Changing a value
↓
Confirming a value
↓
Next parameter

Commissioning the single station

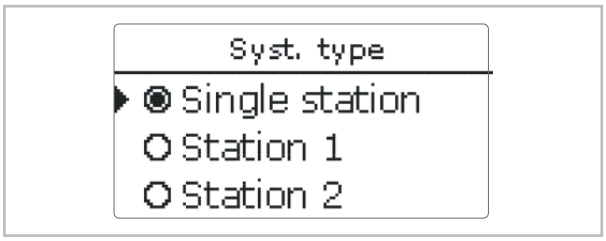
1. Language

- Adjust the desired menu language.



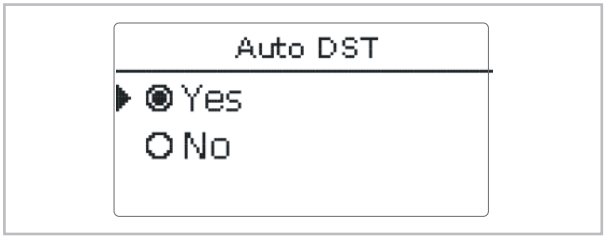
2. System type

- Select the system type **Single station**.



3. Daylight savings time adjustment

- Activate or deactivate the automatic daylight savings time adjustment.

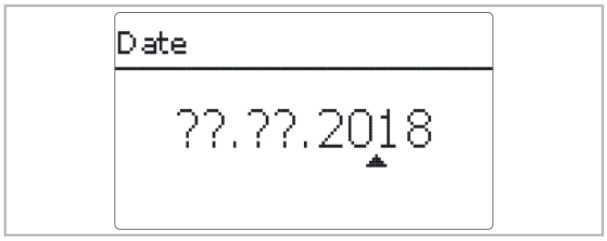


4. Time

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

5. Date

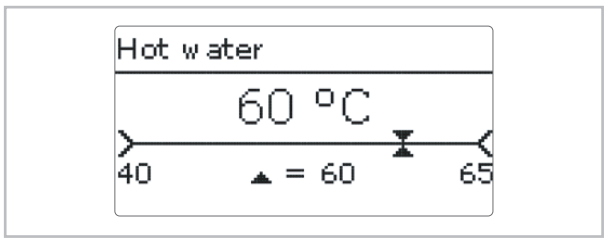
- Adjust the date. First of all adjust the year, then the month and then the day.



6. Set hot water temperature

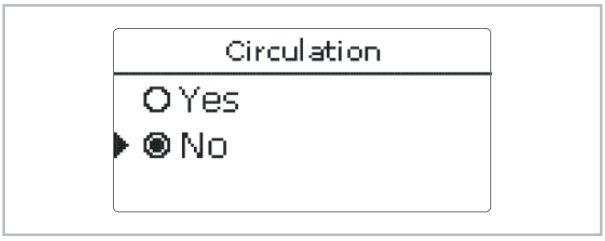
- Adjust the desired set hot water temperature.

For further information see the chapter "Hot water".



7. Circulation

- Activate or deactivate the circulation.

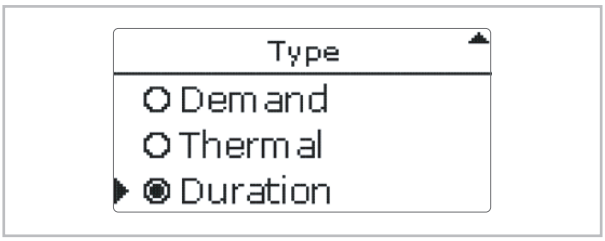


If the circulation is activated, further channels appear:

- Select the circulation type.

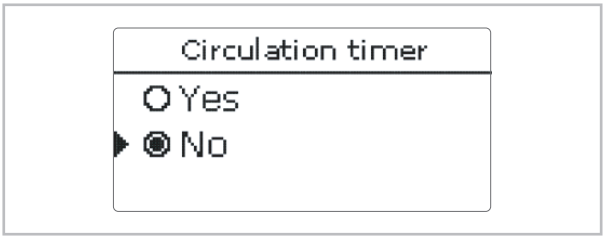
NOTE

For all circulation types, the circulation sensor S3 is required.



- Activate or deactivate the circulation timer.

For more information about the circulation, see the chapter "Optional functions".



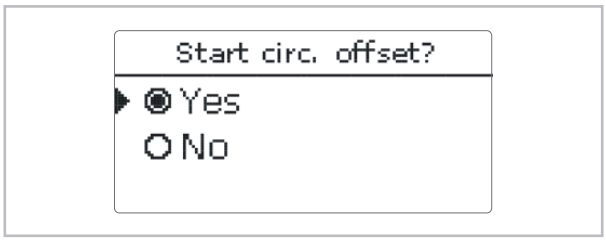
- Start the offset.

NOTE

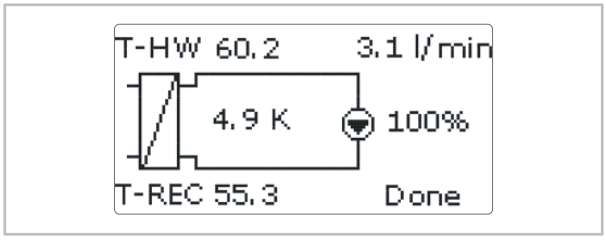
No draw-off may be carried out during the offset. All ball valves of the station must be fully opened (normal position).

The current temperature difference between the hot water sensor and the return sensor is indicated as △**T pipe** angezeigt.

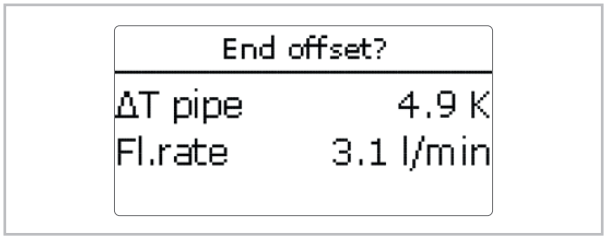
The optimum temperature difference is approx. 5 K.



- Adjust the speed at the circulation pump.
- If the desired temperature difference is reached, confirm the offset with the right button (✓).



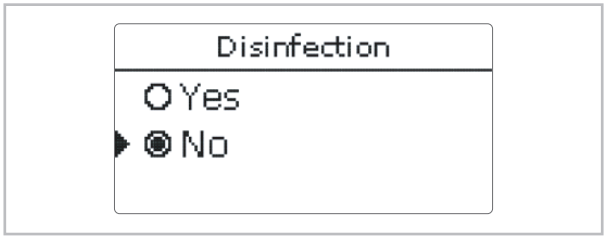
- Complete the offset by pressing the right button (✓). For more information about the offset, see the chapter "Circulation pump offset".



8. Disinfection

- Activate or deactivate the disinfection.

For more information about the disinfection, see the chapter "Disinfection".

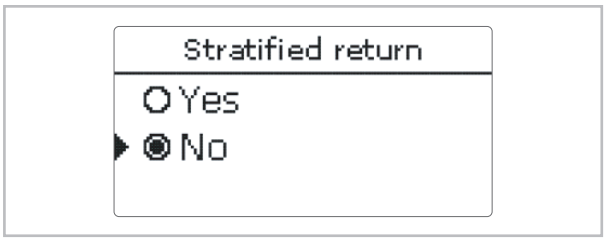


9. Stratified return

- Activate or deactivate the stratified return.

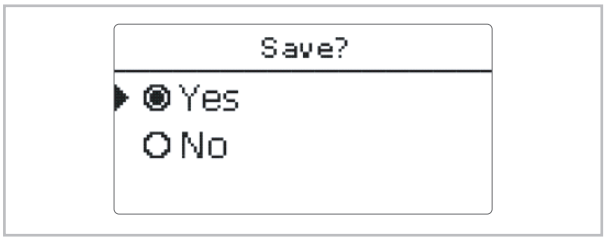
NOTE

For the stratified return function, the sensors stratified return source S2 and stratified return store S4 are required.



10. Completing the commissioning menu

- In order to save the adjustments, select the menu item **Save**. The controller is then ready for operation and normally the factory settings will give close to optimum operation of the system.



NOTE

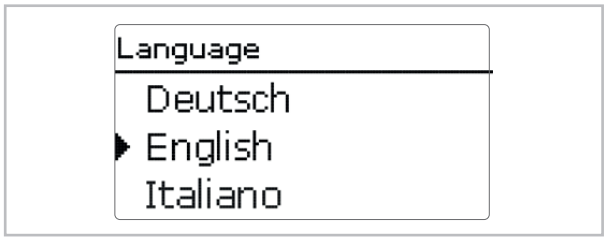
The adjustments carried out during commissioning can be changed anytime in the corresponding adjustment channel. Additional functions and options can also be activated and adjusted.

Set the code to the customer code before handing over the controller to the customer (see the chapter "User code").

Commissioning the cascade

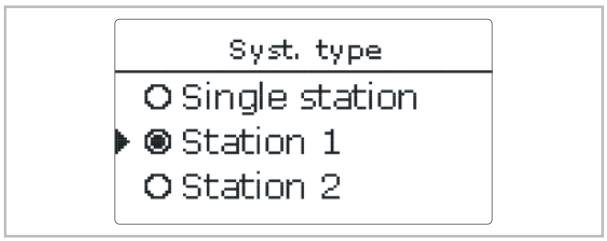
1. Language

- Adjust the desired menu language.

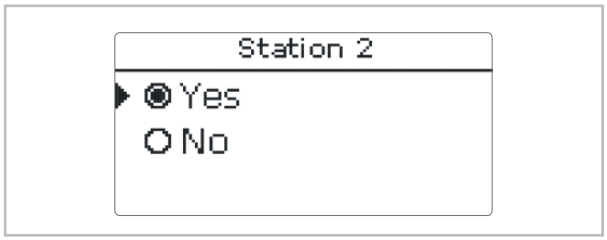


2. System type

- Select the system type **Station 1 … Station 6**.



- Activate or deactivate further stations of the cascade.

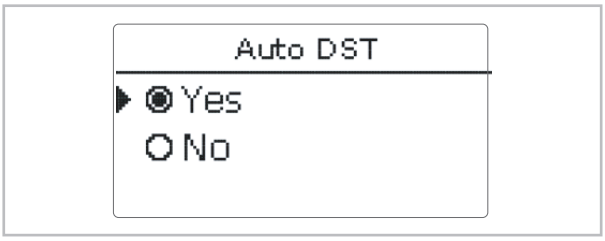


Station 1 is the cascade master, stations 2 to 6 are cascade slaves. The commissioning menu has to be run on each controller, beginning with Cascade master (station 1). The adjustments made at station 1 will be adopted by the other stations automatically.

The following setting channels appear only when **Station 1** was selected.

3. Daylight savings time adjustment

- Activate or deactivate the automatic daylight savings time adjustment.

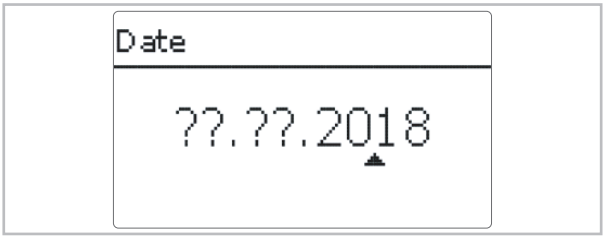


4. Time

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

5. Date

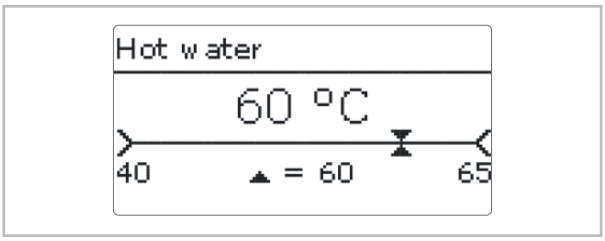
- Adjust the date. First of all adjust the year, then the month and then the day.



6. Set hot water temperature

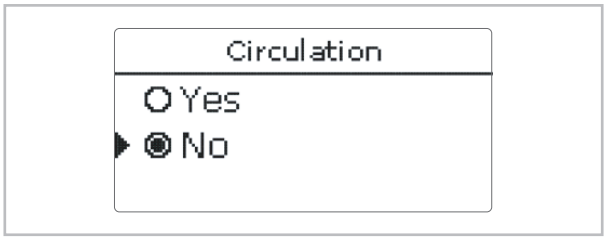
- Adjust the desired set hot water temperature.

For further information, see the chapter "Hot water".



7. Circulation

- DActivate or deactivate the circulation.

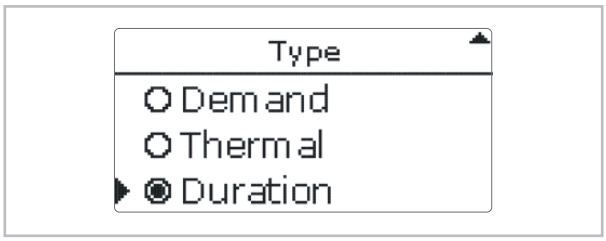


If the circulation is activated, further channels appear:

- Select the circulation type.

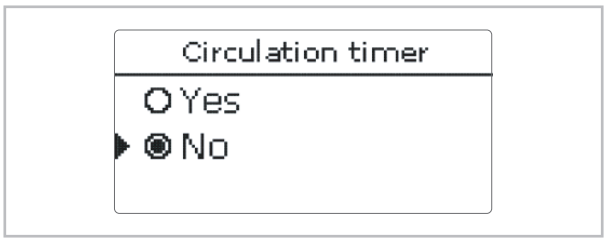
NOTE

For all circulation types, the circulation sensor S3 is required.



- Activate or deactivate the circulation timer.

For more information about the circulation, see the chapter "Optional functions/circulation".



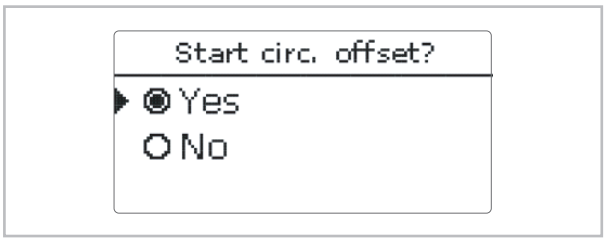
- Start the offset.

NOTE

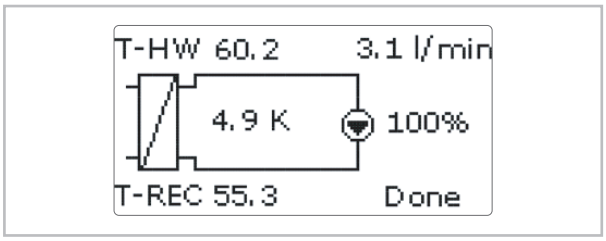
No draw-off may be carried out during the offset. All ball valves of the station must be fully opened (normal position).

The current temperature difference between the hot water sensor and the return sensor is indicated as △**T pipe**.

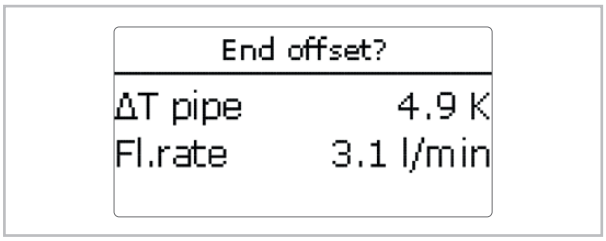
The optimum temperature difference is approx. 5 K.



- Adjust the speed at the circulation pump.
- If the desired temperature difference is reached, confirm the offset with the right button (✓).



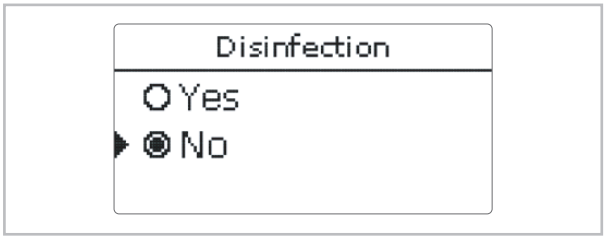
- Complete the offset by pressing the right button (✓). For more information about the offset, see the chapter "Circulation pump offset".



8. Disinfection

- Activate or deactivate the disinfection.

For more information about the disinfection, see the chapter "Disinfection".



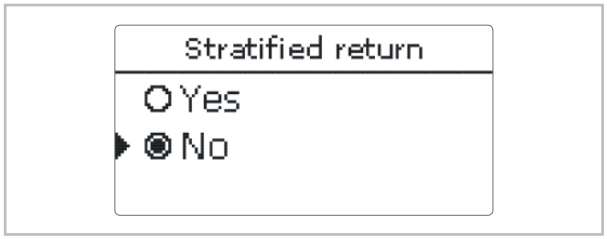
9. Stratified return

- Activate or deactivate the stratified return.

For more information about the stratified return, see the chapter "Stratified return".

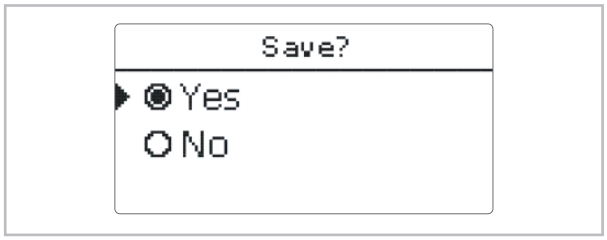
NOTE

For the stratified return function, the sensors stratified return source S2 and stratified return store S4 are required.



10. Completing the commissioning menu

- In order to save the adjustments, select the menu item **Save**. The controller is then ready for operation and normally the factory settings will give close to optimum operation of the system.



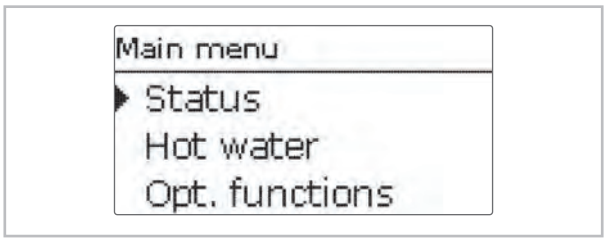
NOTE

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.

Set the code to the customer code before handing over the controller to the customer (see the chapter "User code").

6.2 Main menu

Main menu Single station

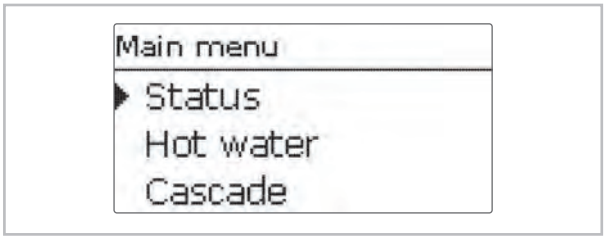


In this menu, different menu areas can be selected. The following menus are available:

- Status
- Hot water
- Optional functions
- Basic setting
- SD card
- User code
- Manual mode

> *If no button is pressed for 2 min, the display switches to standby mode. After further 10 s the display illumination switches off.*

Main menu Station 1



In this menu, different menu areas can be selected. The following menus are available in cascade operation:

- Status
- Hot water
- Cascade *)
- Optional functions
- Basic setting
- SD card
- User code
- Manual mode

*) In cascade operation, all adjustments have to be carried out at the cascade master (station 1). Stations 2 to 6 are cascade slaves and receive all information from the cascade master on which all important adjustments have to be made. The menus are available for the slaves in an shortened form.

Menu structure

Main menu	Level 1 menu item	Level 2 menu item
Status	Overview	
	Cascade *)	
	Hot water	
	Circulation	
	Disinfection	
	Stratified return	
	Error relay	
	Messages	
	Device info	
Hot water	T-HW set	
	Sliding set value	
	Comfort	
	Emergency operation	

Further see next page

Menu structure (continued)

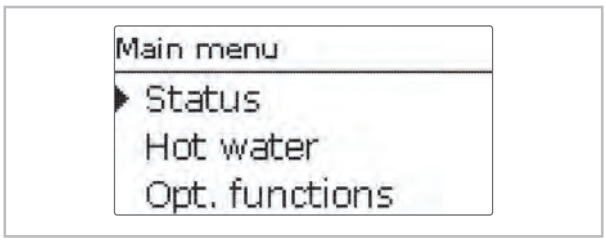
Main menu	Level 1 menu item	Level 2 menu item
Cascade *)		
Optional functions	Circulation	Type
		Timer
		Offset
		...
	Disinfection	
	Startified return	△Ton
		△Toff
	Blocking protection	Starting time
		Primary pump
		Circ. pump
		...
	Error relay	Type
		Level
Basic settings	Time	
	Date	
	Auto DST	
	Language	
	Reset	
SD card		
User code		
Manual mode		

*) Available for System type Station 1 only

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.

6.3 Status

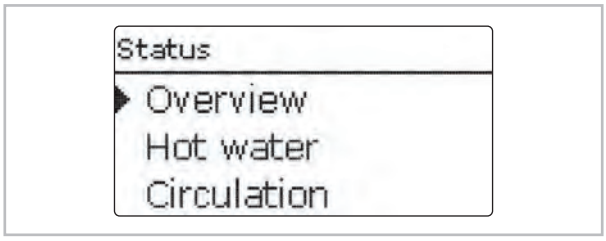
In the status menu of the controller, the status messages for every menu area can be found.



Overview of displayed values

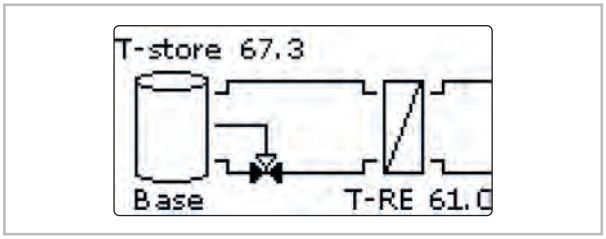
Display	Description
T-Store	Store temperature stratified return
Base / Centre	Position of the valve stratified return
T-RE	Return temperature primary circuit stratified return
T-REC	Return temperature circulation
T-FL	Flow temperature primary circuit
T-HW	Hot water temperature
T-HW set	Set hot water temperature
Fl.rate.	Flow rate hot water
Primary p.	Speed primary pump
Circ.pump	Speed circulation pump
Valve	Valve stratified return

Status / Overview Single station

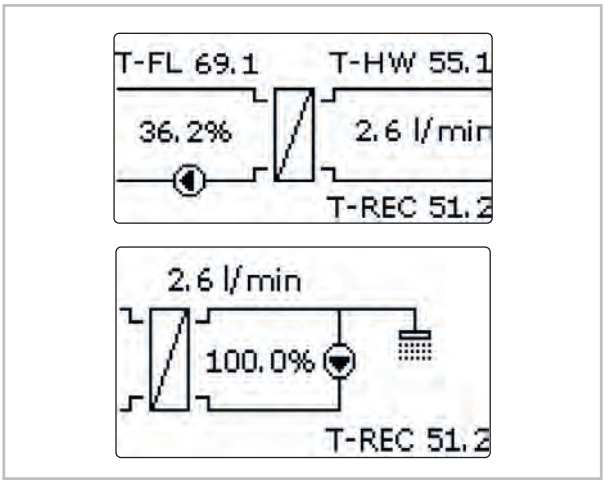


In the **Status / Overview** menu, all current measured values are indicated in a clear system graphic. Depending on the adjustments already made, the system graphic consists of up to 3 parts:

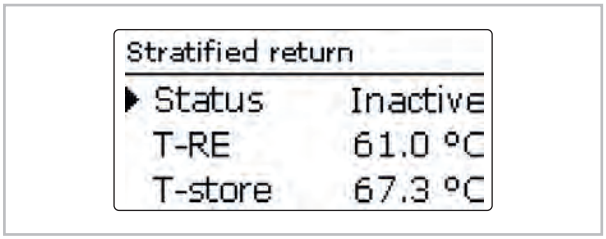
The first part shows the primary circuit with the corresponding values.



The second part shows the heat exchanger and the third part the secondary circuit with the corresponding values.

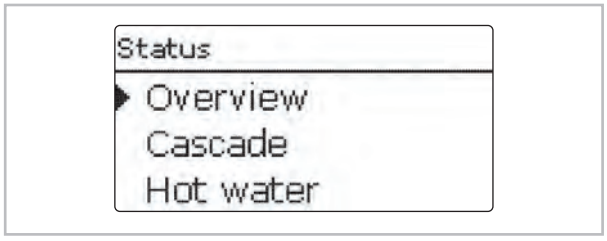


In order to scroll through the parts, turn the Lightwheel® clockwise.

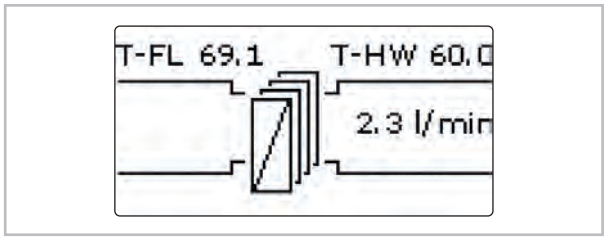


The information given in the system graphic can also be indicated as a text. For this purpose, select the desired part and press the right button (✓). In order to get back to the graphic, press the left button (⮌).

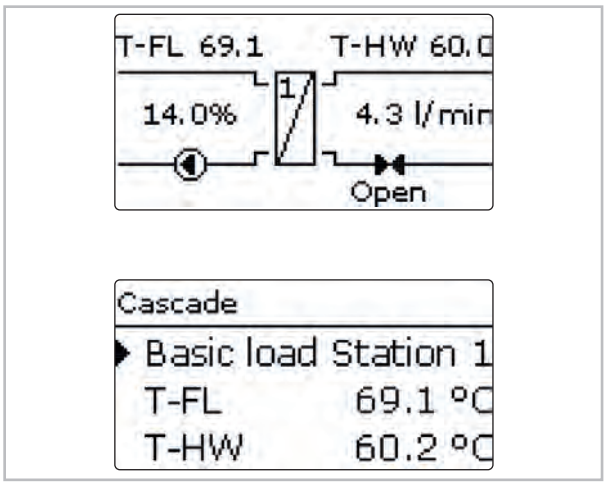
Status / Overview Cascade



In the **Status / Overview** menu, all current measured values of the stations are indicated in a clear system graphic.



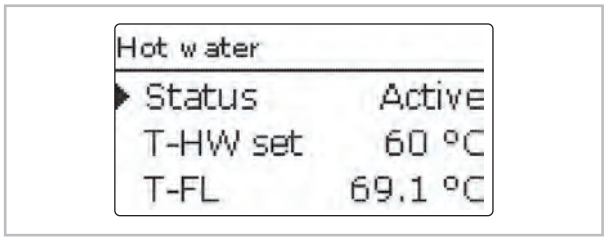
In order to show the values of the corresponding station, turn the Lightwheel® clockwise.



The information of the corresponding station can also be indicated as a text. For this purpose, press the right button (✓). In order to get back to the graphic, press the left button (⮌).

Hot water

The **Status / Hot water** menu indicates the status of the DHW heating.

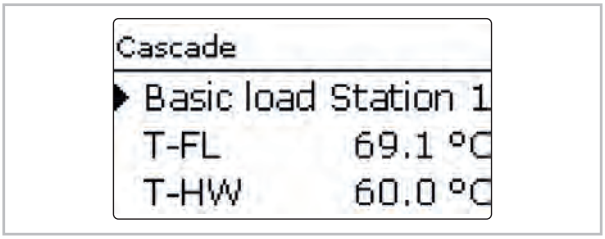


Cascade *)

*) Available for System type Station 1 only

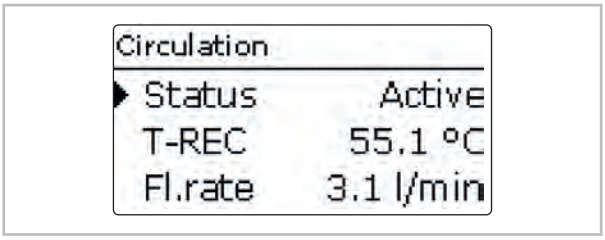
The **Status / Cascade** menu indicates different status information of the cascade.

The overview indicates the highest temperatures of the cascade as well as the overall flow rate. In order to show the values of the individual stations, turn the Lightwheel® clockwise and select the desired station.



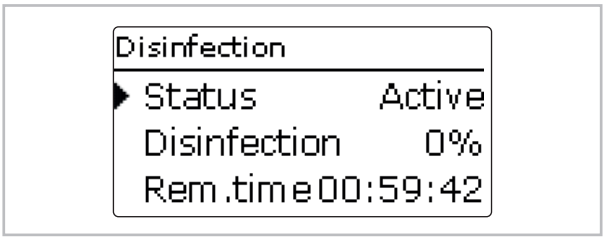
Circulation

The **Status / Circulation** menu indicates status information of the function.



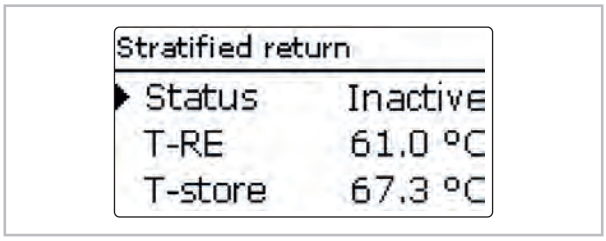
Disinfection

The **Status / Disinfection** menu indicates status information of the function.



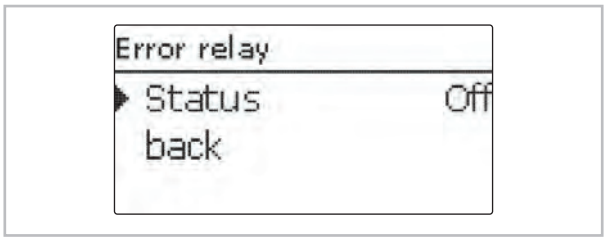
Stratified return

The **Status / Stratified** return menu indicates status information of the function.



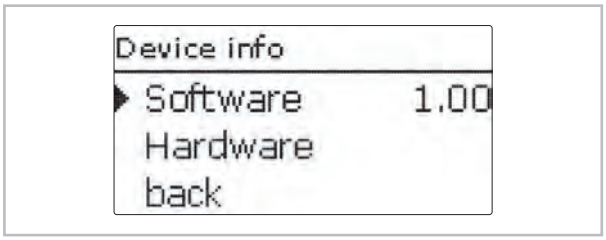
Error relay

The **Status / Error relay** menu indicates if the potential-free error relay is active or inactive.



Device info

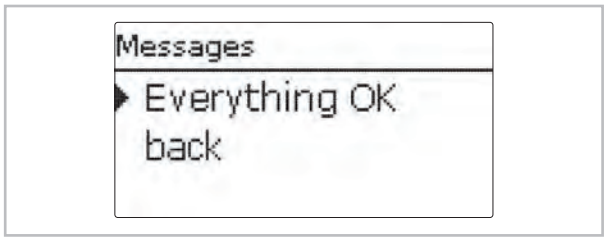
The **Status / Device info** menu indicates information about soft- and hardware.



Messages

In the **Status / Messages** menu, error and warning messages are indicated.

During normal operation, the message **Everything OK** is indicated. A line break or short circuit in a sensor line is indicated as **!Sensor fault**. In the case of an error, the LED of the Lightwheel® additionally flashes red.



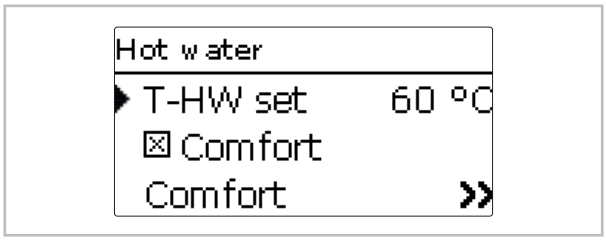
Messages are divided into Notes, Disturbances and Warnings. A **Note** is for information purposes only. In the case of a **Disturbance,** the corresponding function or station fails. In the case of a **Warning,** station 1 indicates an error because of a station failure.

Message	Category	Cause / description
!Blocking protect.	Note	Blocking protection for an output active
!Manual mode	Note	At least one relay in manual operation
!Casc. config.	Note	Incorrect cascade configuration
!Control stopped	Note	Parameterisation active
!Controller variant	Note	Different station variants available
!T-FL too low	Note	Flow temperature too low
!Date/Time	Disturbance	Real time clock defective
!T-RE	Disturbance	Sensor fault (line break, short circuit or no sensor available)
!T-REC	Disturbance	
!T-store	Disturbance	
!T-FL	Disturbance	
!T-HW	Disturbance	
Valve open	Disturbance	Flow at the station detected, although there should be none
!Disinfection	Warning	No return sensor circulation available
!Single controller	Warning	Incorrect cascade configuration
!Stratified return	Warning	Failure Station 2
!Software update	Warning	Different software variants used in the cascade
!Timeout Station 1 … 6	Warning	No K-Bus signal available, station failure
!Valve closed	Warning	No flow at the station
!HW emerg. op.	Warning	Emergency operation active
!Circ. offset	Warning	Circulation offset has not been completed
!Circulation pump	Warning	No flow rate measured, although the circulation pump is running

6.4 Hot water

In this menu, all adjustments for the DHW heating can be made. The following parameters and functions are available:

- Set hot water temperature
- Sliding set value
- Comfort mode
- Emergency operation

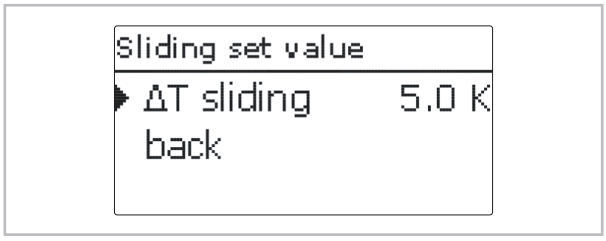


Main menu / Hot water / T-HW set

T-HW set

Adjustment channel	Description	Adjustment range / selection	Factory setting
T-HW set	Set hot water temperature	40 … 65 °C	60 °C

Sliding set value



Main menu / Hot water / Sliding set value

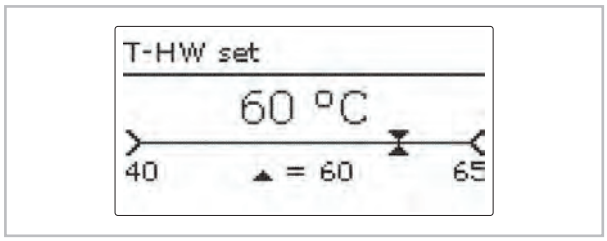
Sliding set value

Adjustment channel	Description	Adjustment range / selection	Factory setting
Sliding set value	Activation of the function	Yes, No	No
△T sliding	Temperature difference	2,0 … 20,0 K	5,0 K
back			

If the temperature measured at the flow sensor is not sufficient for reaching the set hot water temperature, the set temperature will be decreased dynamically. The speed of the primary pump will be controlled so that the dynamic set temperature is maintained at the hot water sensor.

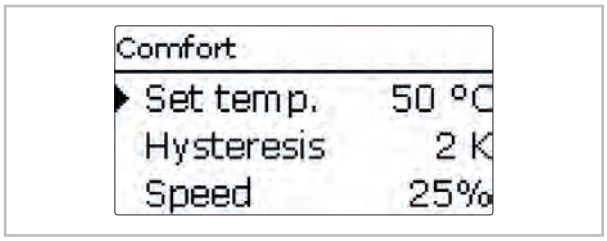
Set hot water temperature

This parameter can be used for adjusting the **Set hot water temperature** temperature which is to be reached at the hot water sensor. The controller then controls the speed of the primary pump so that the temperature at the hot water sensor in the secondary circuit continuously keeps the required set hot water temperature.



*The function is only available if the System type **Single station** has been selected.*

Comfort



Main menu / Hot water / Comfort

Comfort

Adjustment channel	Description	Adjustment range / selection	Factory setting
Comfort	Comfort function for the plate heat exchanger	Yes, No	No
Set temp.	Indication of the set temperature of the plate heat exchanger	---	---
Hysteresis	Hysteresis when the set comfort temperature is exceeded	1 … 10 K	2 K
Speed	Primary pump speed when the comfort mode is active	15 … 100 %	25 %
Wait. time	Sperrzeit für die Funktion nachdem die Funktion aktiv war	0 … 60 Min	10 Min
Timer	Blocking time for the function after having been active	---	---
back			

The **Comfort** function can be used for preheating the plate heat exchanger in order to ensure a quick DHW supply.

In the case of a draw-off, the set hot water temperature can thus be reached more quickly at the hot water sensor.

If the comfort function is active, the primary pump switches on in order to keep the plate heat exchanger permanently at the **Set temperature**. For this purpose, the current flow temperature at the flow sensor is measured.

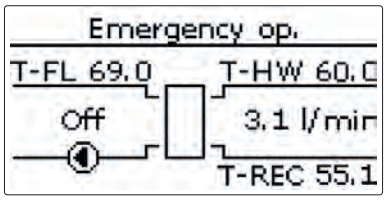
As soon as the comfort function is no longer active, it will be blocked for the adjusted **Waiting time.**

With the **Timer**, time frames can be adjusted in which the comfort function is active. Outside these time frames, the comfort function will be deactivated.

When the comfort function is activated, the risk for plate heat exchanger calcification increases.

In cascade operation the comfort function is activated by default.

Emergency operation



Main menu / Hot water / Emerg. op.

The **Emergency operation** function can be used for ensuring the hot water supply in case of a sensor fault. In this case, the primary pump runs permanently at the adjustable emergency speed. For this purpose, the emergency speed must be aligned with the resulting hot water temperature. The display channel **T-WW** allows this alignment directly in the emergency operation adjustment channel, as soon as the emergency operation has been activated.

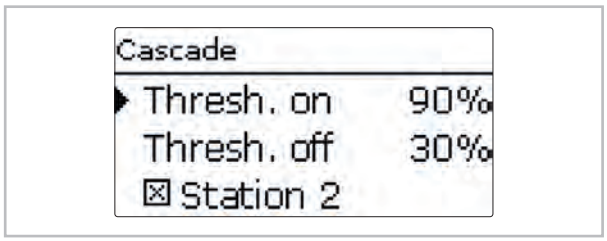
- In order to set the emergency speed, turn the Lightwheel® and confirm the adjustment with the right button (✓).

*If a sensor failure inhibiting DHW heating has occurred, activate the emergency operation in the **Emergency operation** channel.*

*In cascade operation the **emergency operation** can be activated for stations 1 to 6 individually.*

6.5 Cascade

The **Cascade** menu is only available if the **System type Station 1** has been selected.



Main menu / Cascade

Cascade

Adjustment channel	Description	Adjustment range / selection	Factory setting
Thresh. on	Threshold for activating the next station of the cascade	84 … 100 %	90 %
Thresh. off	Threshold for deactivating the station of the cascade that has been activated at last	0… 42 %	30 %
Station 2	Option Station 2 in the cascade		
Station 3	Option Station 3 in the cascade		
Station 4	Option Station 4 in the cascade		
Station 5	Option Station 5 in the cascade		
Station 6	Option Station 6 in the cascade		
back			

The parameter **Thresh. on** is used for adjusting the percentage of the maximum flow quantity that has to be exceeded for switching on the next station.

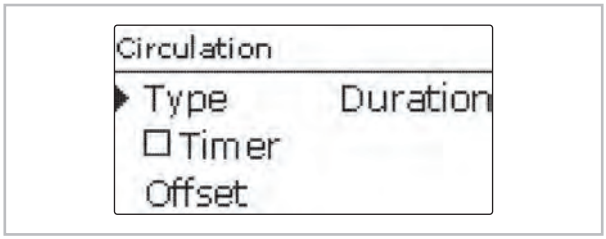
The parameter **Thresh. off** is used for adjusting the percentage of the maximum flow quantity that has to be fallen below for switching off the station activated at last. In order to prevent a further station from being switched on and off too often, reduce the value **Thresh. off**. With the parameters **Station 1** to **Station 6** the number of stations in the cascade can be adjusted.

In cascade operation, all adjustments have to be carried out at the cascade master (**Station 1**). Stations 2 to 6 are cascade slaves and receive all information from the cascade master on which all important adjustments have to be made. The menus are available for the slaves in an shortened form.

6.6 Optional functions

In this menu, optional functions can be selected and adjusted.

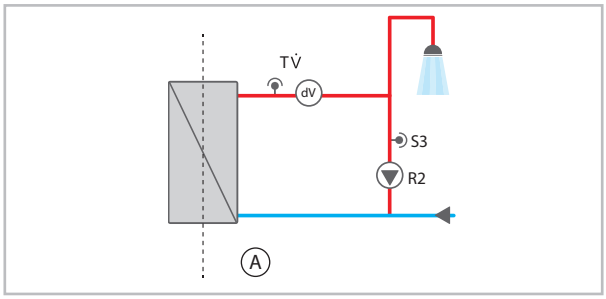
Circulation



Main menu / Opt. functions / Circulation

Circulation

Adjustment channel	Description	Adjustment range / selection	Factory setting
Circulation	Activation of the function	Yes, No	No
Type	Variant	Therm+Dem., Demand, Thermal, Duration, Off	Duration
Timer	Timer option	Yes, No	No
Ton	Switch-on temperature	10 … 59 °C	40 °C
△Toff	Ausschalttemperaturdifferenz	2 … 4 K	3 K
Runtime	Circulation pump runtime	01:00 … 15:00 min	03:00 min
Break time	Circulation pump break time	10 … 60 min	30 min
Offset	Circulation pump offset	-	-
Start offset?	Starting the offset		
End offset?	Ending the offset		
△T pipe	Indication of the temperature drop between the hot water sensor and the return sensor	-	-
Fl.rate	Indication of the circulation flow rate value stored	-	-
back			



A: Secondary circuit

Running an offset:

> **NOTICE!**
> No draw-off may be carried out during the offset. All ball valves of the station must be fully opened (normal position). The offset has to be run only once, e.g. during commissioning.

- In order to run an offset, select the parameter **Offset.**

The **Circulation** function can be used for controlling a circulation pump.

For the control logic, 5 variants are available:

- Thermal
- Duration
- Demand
- Off
- Thermal+Demand

> *For all circulation types, the circulation sensor S3 is required.*

If one of the variants is selected, the corresponding adjustment channels will appear.

Each variant has a timer by means of which time frames for the operation of the function can be adjusted. Within the adjusted time frames the variants work as follows:

Thermal

The temperature at the return sensor is monitored. The circulation pump switches on, if the temperature falls below the adjusted **Switch-on temperature**. If the temperature exceeds the **Switch-on temperature** by the **Switch-off temperature difference**, the circulation pump switches off.

Duration

The circulation pump switches on within the adjusted time frames, outside of them it switches off.

Demand

When a draw-off impulse (draw-off 1 - 4 s) is detected at the flow rate sensor, the controller switches on the circulation pump. The circulation remains switched on for the adjusted **Runtime**. If the circulation pump has been running and the runtime has elapsed, each further draw-off impulse is ignored for the **Break time** and the circulation pump remains switched off.

Off

The circulation pump is switched off.

Thermal + Demand

The temperature at the return sensor is monitored. The circulation pump switches on, if the temperature falls below the adjusted **Switch-on temperature** and if a draw-off impulse (draw-off 1 - 4 s) is detected at the flow rate sensor. The circulation remains switched on for the adjusted **Runtime**. If the **Switch-on temperature** is exceeded during this period by the **Switch-off temperature difference**, the circulation pump switches off. If the circulation pump has been running and the runtime has elapsed, each further draw-off impulse is ignored for the **Break time** and the circulation pump remains switched off.

> *For information on timer adjustment see the chapter "Adjusting the timer".*

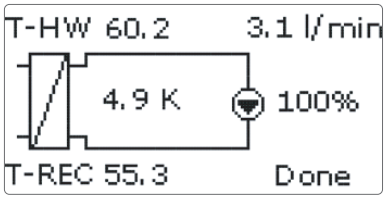
> *In cascade operation, only the types **Duration, Thermal** and **Off** are available.*

Circulation pump offset

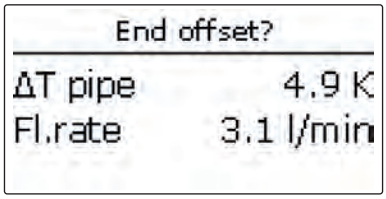
The temperature drop between the hot water sensor and the return sensor can be reduced by increasing the circulation pump speed. The current temperature difference between the hot water sensor and the return sensor is indicated as △**T pipe**.

The optimum temperature difference is approx. 5 K.

- Select the menu item **Offset**.
- In order to start the offset, select **Start offset?**.
- Adjust the speed at the circulation pump.
- If the desired temperature difference is reached, confirm the offset with the right button (✓).

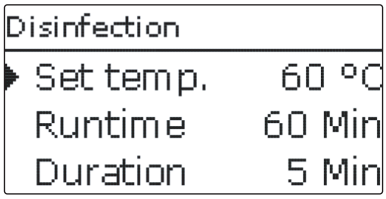


The menu **End offset?** appears.



- Complete the offset by pressing the right button (✓).

Disinfection



Main menu / Opt. functions / Disinfection

Disinfection

Adjustment channel	Description	Adjustment range / selection	Factory setting
Disinfection	Activation of the function	Yes, No	No
Start?	Manual start of the disinfection		
Set temp.	Set temperature for the disinfection	60 … 75 °C	60 °C
Runtime	Runtime of the disinfection function	30 … 240 min	60 min
Duration	Duration of the disinfection	1 … 240 min	5 min
Hysteresis	Hysteresis for the disinfection	1 … 5 K	5 K
Overrun	Overrun time of the pump	1 … 60 min	10 min
Time	Time for the automatic start of the disinfection	01:00 … 23:00	01:00
Monday … Sunday	Submenu for selecting the days for the automatic start of the disinfection	Monday … Sunday	all
back			

This function helps to contain the spread of Legionella in hot water and circulation pipes in the secondary circuit of the heat exchanger. The **Disinfection** function starts automatically, if the adjusted **Time** at the adjusted day is reached.

The function can also be started manually via the menu item **Start?**. If the disinfection starts, the circulation pump switches on. The circulation pump remains active for the adjustable **Runtime**. During disinfection, the speed of the primary pump is controlled so that the adjustable **Set temperature** is maintained at the hot water sensor. The progress of the disinfection is indicated in % in the status menu.

The disinfection is considered successfully completed, if during the adjusted **Runtime** the temperature at the return sensor has continuously exceeded the value **Set temperature - Hysteresis** for the entire adjusted **Duration**. The date of the last disinfection is indicated in the status menu.

After disinfection has ended, the circulation pump remains switched on for the adjusted **Overrun time**. When the **Disinfection** function is active, it can be cancelled by means of the menu item **Cancel?** at any time.

DANGER!

Scald danger!

Scalding may occur if the set temperature is adjusted to a value higher than 60 °C.

– Make sure that no water is drawn off by non-professionals during disinfection.

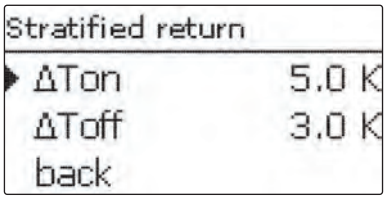
While the disinfection is active, a sufficiently high store temperature must be ensured.

– *Make sure the store is sufficiently heated before disinfection begins.*

In cascade operation, the progress is divided among the individual stations, beginning with the numerically smallest. Only if all stations available have run the disinfection, will the disinfection process be considered successfully completed.

The disinfection function is only available, if the circulating function is activated.

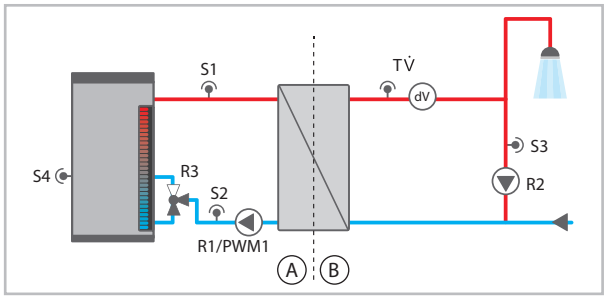
Stratified return



Hauptmenü / Wahlfunktionen / RL-Einschichtung

Stratified return

Adjustment channel	Description	Adjustment range / selection	Factory setting
Stratified return	Activation of the function	Yes, No	No
△Ton	Switch-on temperature difference	0,5 … 20,0 K	5,0 K
△Toff	Switch-off temperature difference	0,5 … 20,0 K	3,0 K
back			



A: Primary circuit
B: Secondary circuit

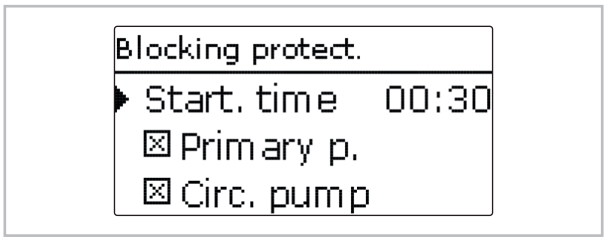
The **Stratified return** function can be used for keeping the temperature stratification inside the store from being destroyed when the circulation is running. If the temperature difference between the return sensor and the store sensor exceeds the adjustable value **Switch-on temperature difference**, the relay for the stratified return switches on. The return is then fed into the upper store zone.

If the temperature difference between the return sensor and the store sensor falls below the adjustable value **Switch-off temperature difference**, the relay switches off. The return is then fed into the lower store zone.

*The controller uses the **sensor input S4** for measuring the temperature at the store sensor. The 3-way valve has to be mounted in a way so that the flow direction is towards the lower store zone when the valve is without current. In order to protect the stratification in the upper store zone, the store sensor has to be mounted in the lower store zone.*

In cascade operation, the stratified return valve has to be connected to R2 of station 2.

Blocking protection



Main menu / Opt. functions / Blocking protect.

Blocking protection

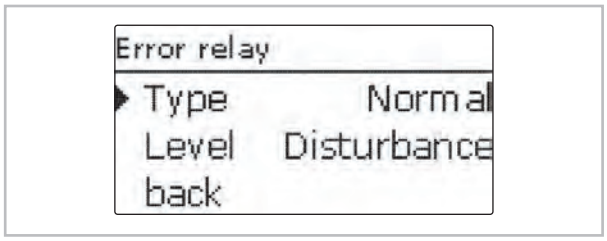
Adjustment channel	Description	Adjustment range / selection	Factory setting
Blocking protect.	Activation of the function	Yes, No	No
Start. time	Starting time of the function	00:00 … 23:50	00:30
Primary p.	Blocking protection primary pump	Yes, No	Yes
Line valve *)	Blocking protection line valve	Yes, No	Yes
Circ. pump	Blocking protection circulation pump	Yes, No	Yes
Stratified return	Blocking protection stratified return valve	Yes, No	Yes
back			

*) Available for **System type Station 1** only

The **Blocking protection** function can be used for protecting the selected pumps and valves against blocking after a standstill. The blocking protection will be carried out for the relays selected one after the other each day at the adjusted **Starting time**.

In cascade operation, the blocking protection will be carried out for all stations successively.

Error relay



Main menu / Opt. functions / Error relay

Error relay

Adjustment channel	Description	Adjustment range / selection	Factory setting
Error relay	Activation of the function	Yes, No	No
Type	Error relay type	Inverted, Normal, Off	Off
Level	Error category of the message	Disturb., Warning, Note	Disturb.
back			

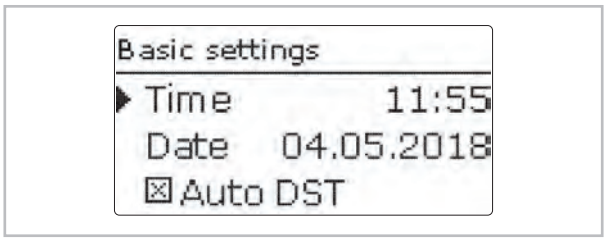
The **Error relay** function can be used for operating a relay in the case of an error. Thus, e.g. a signalling device can be connected in order to signal errors. If the **Normal** type is selected, the controller switches the potential-free relay when a fault occurs.

If the **Inverted** type is selected, the relay always remains switched on as long as no fault occurs. If a fault occurs, the controller switches off the potential-free relay.

By means of the parameter **Level**, the error category of the message can be selected, see the chapter "Messages". Depending on the selection made, the following messages are indicated:

- Disturbance = Disturbances
- Warning = Disturbances + warnings
- Note = Disturbances + warnings + notes

6.7 Basic settings



Main menu / Basic settings

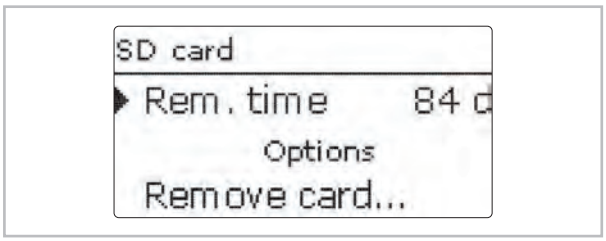
Basic settings

Adjustment channel	Description	Adjustment range / selection	Factory setting
Time	Adjustment of the current time	00:00 … 23:59	-
Date	Adjustment of the date	01.01.2001 … 31.12.2099	01.01.2010
Auto DST	Automatic daylight saving time adjustment	Yes, No	No
Language	Selection of the menu language	Deutsch, English, Français, Italiano	Deutsch
Type	System type for the controller	Single station, Station 1, Station 2, Station 3, Station 4, Station 5, Station 6	Single station
Reset	Back to factory setting	Yes, No	No
back			

In the **Basic settings** 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.

In cascade operation, a reset can be carried out on every station controller.

6.8 SD card



The controller is equipped with an SD card slot for SD memory cards. With an SD card, the following functions can be carried out:

- Logging measurement and balance values. After the transfer to a computer, the values can be opened and visualised, e.g. in a spreadsheet.

Starting the logging

- Insert the SD card into the slot.
- Adjust the desired logging type and interval. Recommended interval 1 second.

Logging will start immediately.

Completing the logging process

- Select the menu item **Remove card...**.
- 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 SD card will be overwritten as soon as the capacity limit is reached.

> *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 an SD 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 SD card.

Loading controller adjustments

- To load controller adjustments from an SD card, select the menu item **Load adjustments**.

The **File selection** window will appear.

- Select the desired .SET file.

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

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

> *In cascade operation, the **SD card** menu will be available on each station controller. In order to log cascade values, store or load controller adjustments, insert an SD card into each controller of the cascade.*

Main menu / SD 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

6.9 User code

In the **User code** 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:

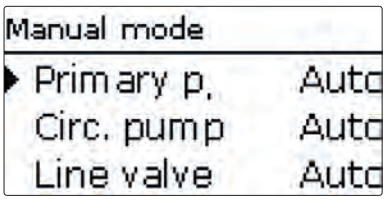
Installer: 0262

After the installer code is entered, the controller changes to the parameterisation mode, see chapter "Parameterisation mode".

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

Customer: 0000

6.10 Manual mode



In the **Manual mode** menu, the operating mode of all relays used can be adjusted.

Auto = Relay in automatic mode

0 … 100 % = Pump running at adjusted speed (manual mode)

Centre / Base = Valve in adjusted position

Open / Closed *) = Valve open or closed

Error / OK = Error relay in **Error** or **OK** mode

*After service and maintenance work, the relay mode must be set back to **Auto**. Otherwise normal operation will not be possible.*

In cascade operation, adjust the manual mode of the relays at the corresponding station.

Main menu / Manual mode

Adjustment channel	Description	Adjustment range / selection	Factory setting
Primary p.	Operating mode selection for the primary pump	Auto, 0 … 100 %	Auto
Line valve *)	Operating mode selection for the line valve	Auto, Open, Closed, Off	Auto
Circ. pump	Operating mode selection for the circulation pump	Auto, 0 … 100 %	Auto
Strat.ret.	Operating mode selection for the stratified return valve	Off, Centre, Base, Auto	Auto
Error relay	Operating mode selection for the error relay	Error, OK, Auto	Auto

*) Available in cascade operation only

7 Troubleshooting

7.1 General notes

The unit and components are manufactured using state-of-the-art production methods and tested several times to verify that they function correctly. However, if malfunctions do occur, please check the functions as detailed in the list below. For systems with an indoor unit and outdoor unit, refer to the chapter "Troubleshooting and customer service" in both operating manuals. Please inform your dealer if the unit is still not working correctly after all function checks have been performed!

DANGER!

Electric shock!

Upon opening the housing, live parts are exposed!

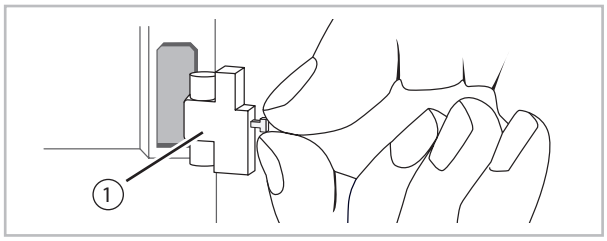
– Always disconnect the device from power supply before opening the housing!

The controller is a quality product and was designed for many years of continuous use. Therefore, note the following points:

The cause of an error is often not the controller but the configuration of the connected components.

The following notes for identifying errors refer to the most common causes of errors.

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.



1: Fuse

7.2 Troubleshooting

Lightwheel® 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.

Resistances values

°C	Ω Pt1000	°C	Ω Pt1000
-10	961	55	1213
-5	980	60	1232
0	1000	65	1252
5	1019	70	1271
10	1039	75	1290
15	1058	80	1309
20	1078	85	1328
25	1097	90	1347
30	1117	95	1366
35	1136	100	1385
40	1155	105	1404
45	1175	110	1423
50	1194	115	1442

The display is permanently off		
Press the right button (✓). Display illuminated?		
↓YES		↓NO
Controller has been in standby, everything OK		
Check the supply line and reconnect it.	YES ←	Check the power supply of the controller. Is it disconnected?
		↓NO
		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.

Pump noise can be heard, bubbling in the pipes.
System vented?
↓NO
Vent the system.

Draw-off amount is too small.		
Sufficient system pressure in the secondary circuit?		
↓YES		↓NO
Plate heat exchanger calcified?		Check system pressure in the secondary circuit; if necessary, increase pressure.
↓YES		
Clean the secondary side of the plate heat exchanger; if necessary, replace the plate heat exchanger.		

REMKO EFS series

Draw-off temperature is too low.		
Is the set HW temperature adjusted high enough on the controller?		
↓YES		↓NO
Pressure loss in the primary circuit too high?		Increase the adjustment value for the set HW temperature.
↓YES		
Check the pipework of the primary circuit; change if necessary.		

DHW heating does not work		
Controller in operation?		
↓YES		↓NO
System vented?	NO →	Check the controller; Check the fuse of and the power supply to the controller.
		Vent the system.
↓YES		
Flow rate sensor in the HW flow connected and grounded correctly? Does it work faultlessly?	NO →	Check the flow rate sensor and the cable; check the fitting for correct grounding; check the sensor integrated in the fitting; clean or, if necessary, replace the sensor.
↓YES		
Has the temperature sensor in the store flow been connected correctly? Does it work faultlessly?	NO →	Check the Pt1000 temperature sensor including the sensor cable; if necessary, replace the sensor.
↓YES		
Does the primary pump work faultlessly?	NO →	Check the primary pump including its cable; dismount and replace the pump if necessary.

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REMKO QUALITY WITH SYSTEMS

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