

## Lambdatronic S 3200 - S4 Turbo

Core module version 55.04 - Build 05.21 | Touch control version 60.01 Build 01.39



Translation of original German version of service handbook for technicians.

Read and follow all instructions and safety instructions.  
All errors and omissions excepted.

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# 1 General

## 1.1 About these instructions

Please read and follow the operating instructions, in particular the safety information contained therein. Keep them available next to the boiler.

These operating instructions include important information about operation, electrical connection and troubleshooting. The parameters shown depend on the set boiler type and the system configuration!

The constant further development of our products means that there may be minor differences from the pictures and content. If you discover any errors, please let us know: doku@froeling.com.

## 1.2 Safety information

### **DANGER**



When working on electrical components:

#### ***Risk of electrocution!***

When work is carried out on electrical components:

- ☐ Always have work carried out by a qualified electrician
- ☐ Observe the applicable standards and regulations
- ✎ Work must not be carried out on electrical components by unauthorised persons

### **WARNING**



When touching hot surfaces:

#### ***Severe burns are possible on hot surfaces and the flue gas pipe!***

When work is carried out on the boiler:



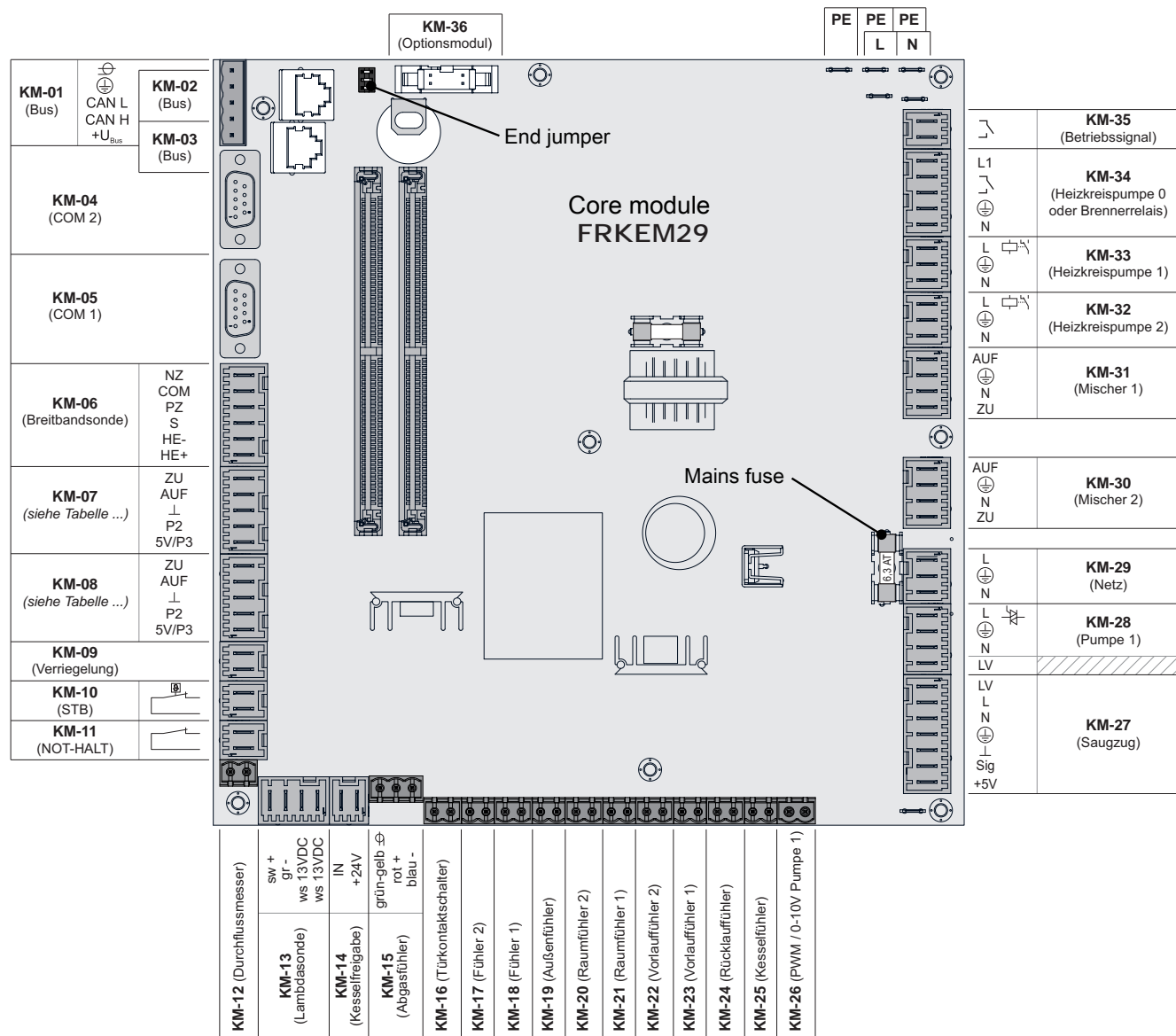
- ☐ Shut down the boiler according to procedure ("Off" operating status) and allow it to cool down
- ☐ Protective gloves must usually be worn for work on the boiler, and it should only be operated using the handles provided
- ☐ Insulate the flue gas pipes and do not touch them during operation

**The information on safety, standards and guidelines in the assembly and operating instructions for the boiler should also be observed!**

## 2 Power connection and wiring

### 2.1 Core module and connection options

#### 2.1.1 Board view - core module



Connection / Name		Note
KM-01	BUS	Connection with cable – LIYCY paired 2x2x0.5; ➡ "Connecting the bus cable" [▶ 28] Caution! CAN L and CAN H must not be connected to +U <sub>BUS</sub> !
KM-02	BUS	Patch cable CAT 5 RJ45 SFTP 1:1 Assignment: pellet module connection
KM-03		
KM-04	COM 2	Null modem cable 9-pin SUB-D; Connection is used e.g. as MODBUS interface
KM-05	COM 1	Null modem cable 9-pin SUB-D; Service interface for software updates and connection to visualisation software
KM-06	Broadband probe	Connection cable <sup>1)</sup> 5 x 0.75 mm <sup>2</sup> Connection of a Bosch (item number 69001A) or NTK (item number 69003) broadband Lambda probe
KM-07	Secondary air	Connection cable <sup>1)</sup> 5 x 0.75 mm <sup>2</sup> ;
KM-08	Primary air	Connection cable <sup>1)</sup> 5 x 0.75 mm <sup>2</sup>
KM-09	Lock	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-10	High-limit thermostat	
KM-11	EMERGENCY STOP	Caution! Do not connect the emergency stop/shutdown switch to the boiler power supply line. The switch must be a N/C switch and it must be linked to the 24V safety chain of the STL at this terminal!
KM-12	Flowmeter	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-13	Lambda probe	Connection cable <sup>1)</sup> 4 x 0.75 mm <sup>2</sup> Connection of a Bosch switching-type sensor (type LSM11) or NTK switching-type sensor (type OZA685, item number: 69400)
KM-14	Boiler release	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> Caution! The connection must be a floating connection! Boiler enable contact 24 V supply ➡ "Analogue module" [▶ 26]
KM-15	Flue gas temperature sensor	Only use connection cable of the component 24 V supply ➡ "Analogue module" [▶ 26]
KM-16	Door switch	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-17	Sensor 2	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-18	Sensor 1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> , sensor 1 in the STL housing
KM-19	Outside temperature sensor	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> , shielded from 25 m cable length
KM-20	Room temperature sensor heating circuit 2	
KM-21	Room temperature sensor heating circuit 1	
KM-22	Flow temperature sensor heating circuit 2	
KM-23	Flow temperature sensor heating circuit 1	
KM-24	Return feed sensor	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-25	Boiler sensor	
KM-26	PWM / 0-10V pump 1	
KM-27	Induced draught fan	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> for power supply, Connection cable <sup>1)</sup> 3 x 0.75 mm <sup>2</sup> for analysis of current speed

Connection / Name		Note
KM-28	Pump 1	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , max. 1.5A / 280W / 230V
KM-29	Mains connection	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , fuse provided by customer: C16A
KM-30	Mixing valve heating circuit 2	Connection cable <sup>1)</sup> 4 x 0.75 mm <sup>2</sup> , max. 0.15A / 230V
KM-31	Mixing valve heating circuit 1	
KM-32	Heating circuit pump 2	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , max. 2.5A
KM-33	Heating circuit pump 1	
KM-34	Heating circuit pump 0 or burner relay	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , max. 2A
KM-35	Potential-free contact	Connecting cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup>
KM-36	Optional module	Ignition expansion connection
1. YMM as per ÖVE-K41-5 or H05VV-F as per DIN VDE 0881-5		

## Fuses

<b>F2</b>	6.3 AT	KM-27, KM-28
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### 2.1.2 Mains connection

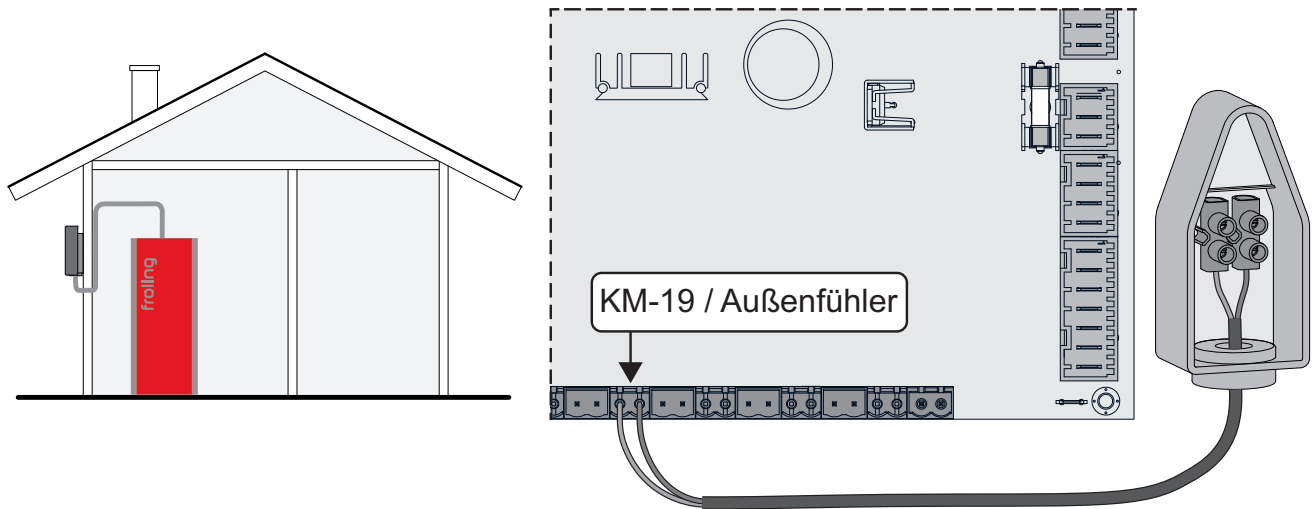
Plug the "Mains connection" plug into the power supply socket.

**NOTICE! Flexible sheathed cable must be used for the wiring; this must be of the correct size to comply with applicable regional standards and regulations**

Boiler type	Electric fuses	Fuse type
S4 Turbo	16A	C16A
S4 Turbo F	16A	C16A

### 2.1.3 Connecting the outside temperature sensor

The outside temperature sensor is included with the materials supplied for the boiler and is usually mounted on an outer wall that is not directly exposed to the sun. It continuously measures the ambient temperature and forms part of the weather-compensated heating circuit control.

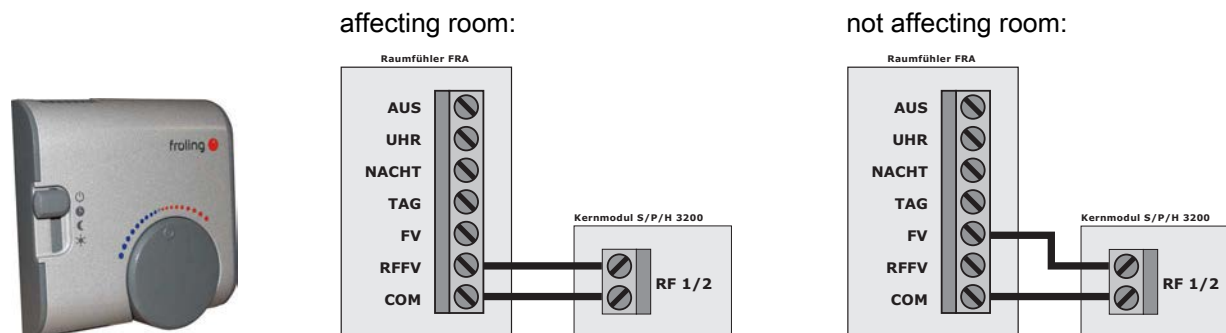


In the delivered state, the outside temperature sensor is read in by the core module ("KM-19 / outside temperature sensor" connection). Alternatively, the outside temperature sensor can be connected to an additional heating circuit module.

➡ "Heating circuit module" ► 15]

### 2.1.4 FRA room temperature sensor

In addition to recording the current room temperature, the Froling FRA room temperature sensor also has a handwheel to adjust the required room temperature and a slide switch to set the mode for the heating circuit.



Possible positions of the mode switch:

	<b>Boiler off</b>	Heating circuit deactivated, only frost protection!
	<b>Automatic mode</b>	Heating and setback phases according to the set times
	<b>Setback mode</b>	Ignores the heating phases and continuously controls the room temperature to the temperature set in setback mode
	<b>Party switch</b>	Ignores the setback phases and continuously controls the room temperature to the temperature set in heating mode
Handwheel...	Allows you to adjust the temperature by +/- 3°C	

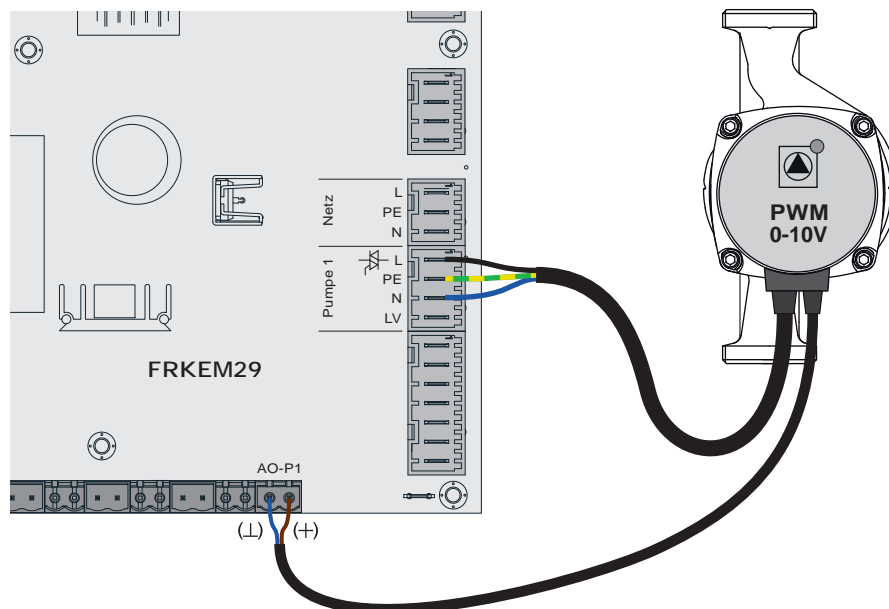
**IMPORTANT!** Refer to the supplied assembly instructions for more detailed explanations on connecting and operating the FRA room temperature sensor.

## 2.1.5 Connecting a circulating pump to the core module

Different types of wiring must be implemented depending on the type of pump:

### High efficiency pump with control line (PWM / 0-10V)

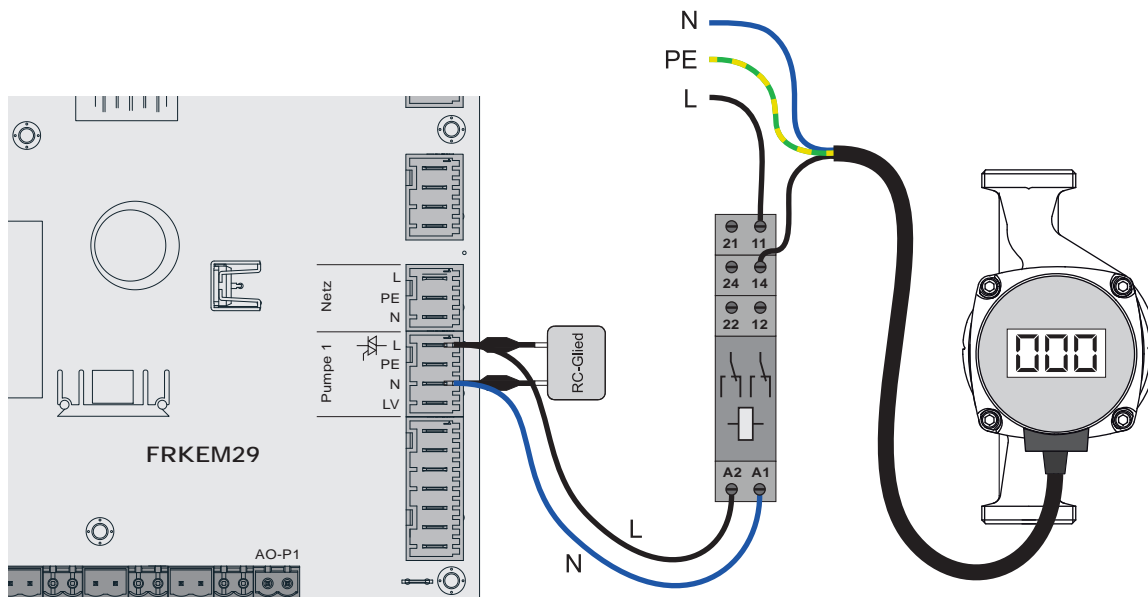
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PWM or 0-10V signal.



- ☐ Connect the power supply for the high efficiency pump to output “Pump 1” of the core module
- ☐ Connect the PWM cable of the high efficiency pump to the corresponding “PWM / 0-10V” port
  - ✎ Make sure that the cables are configured correctly (polarity) in accordance with the connection diagram of the pump!
- ☐ Set control of the pump in the relevant menu to “Field pump / PWM” or “Field pump / 0-10V”

### High efficiency pump without control signal

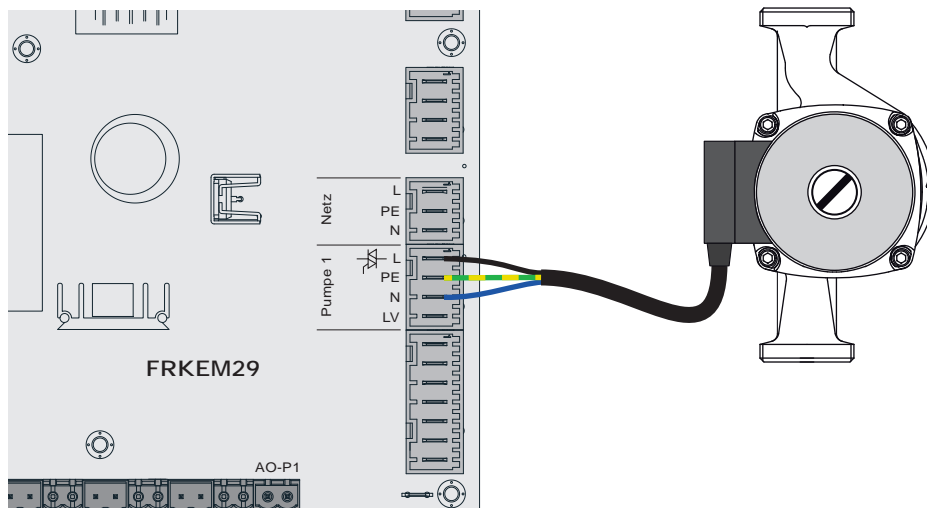
It is not possible to control the speed when using this type of pump. The use of a line regulating valve (e.g.: Setter balancing valve) is recommended.



- ☐ Connect pump with relay and RC element isolated from the output
- ☐ In the relevant menu, set the pump control to “HE pump without control signal”

### AC pump without control signal (pulse package control)

On older pumps without a control signal that are not highly efficient, the speed control is implemented via a pulse package control. Please note that the minimum speed may need to be adjusted on some pumps (default setting: 30%).



- ☐ Connect pump to output “Pump 1” of the core module
- ☐ In the relevant menu, set the pump control to “Pump without control signal”

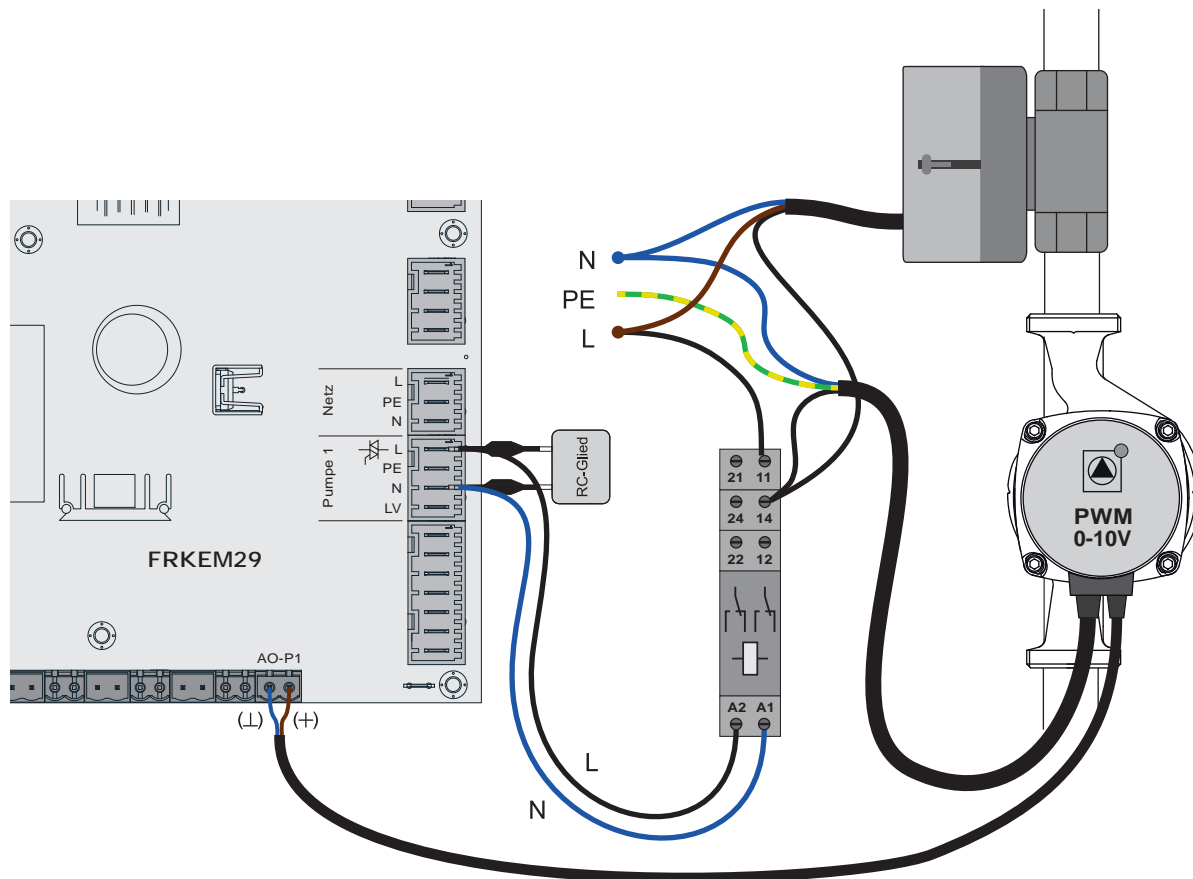


## 2.1.6 Connecting a circulating pump with valve to the core module

Different types of wiring must be implemented depending on the type of pump:

### High efficiency pump with control line (PWM / 0-10V)

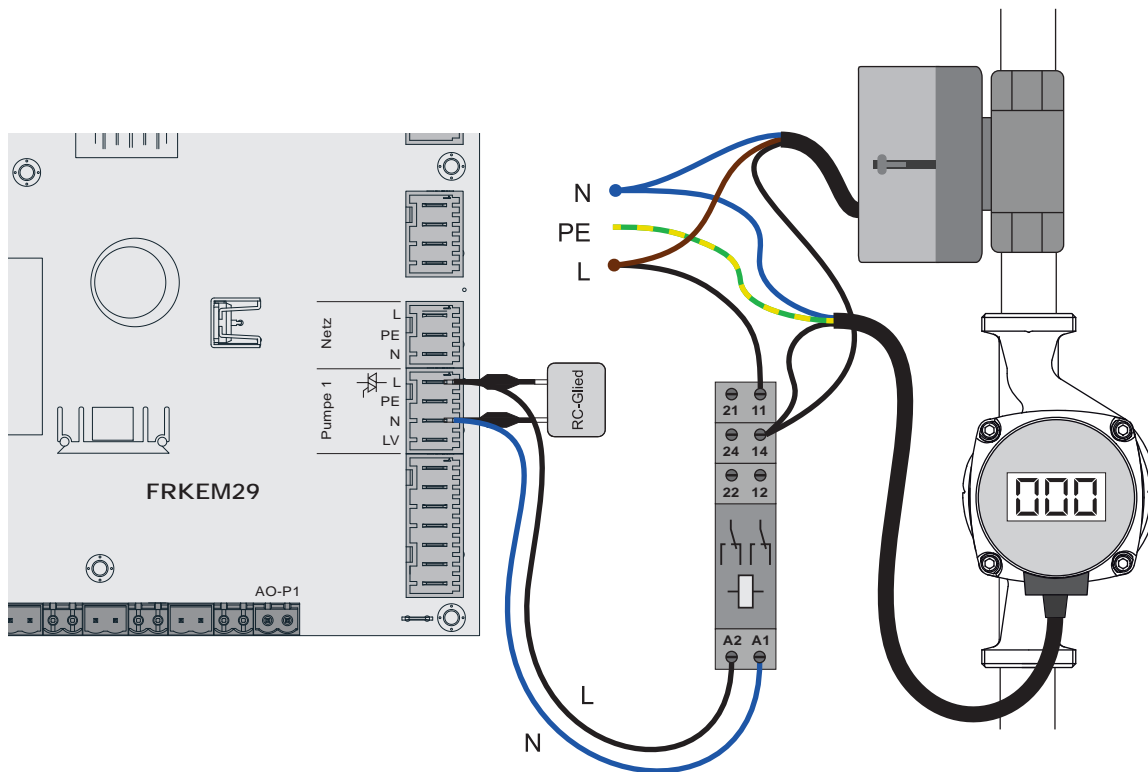
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ☐ Using the RC element, connect the relay at the "Pump 1" output
- ☐ Connect the phase (L) of the power supply to the relay and the continuous supply to the valve (this switches the valve back into the initial position)
- ☐ Connect the neutral conductor (N) of the power supply to the pump and the valve
- ☐ Connect the protective earth conductor (PE) of the power supply to the pump
- ☐ Connect the phase (L) for switching over the valves together with the phase (L) for the pump to the switched output of the relay
- ☐ Connect the PWM cable of the high efficiency pump to the corresponding "PWM / 0-10V" port
  - ⚡ Make sure that the cables are configured correctly (polarity) in accordance with the connection diagram of the pump!
- ☐ In the relevant menu, set the activation of the pump to "Field pump PDM + valve" or to "Field pump 0-10V + valve"

## High efficiency pump without control signal

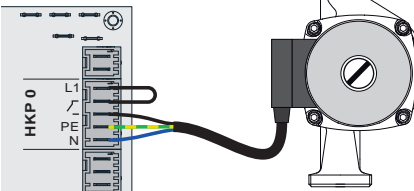
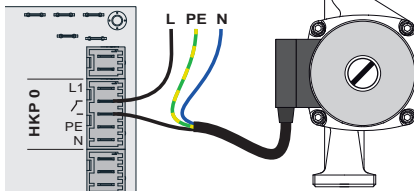
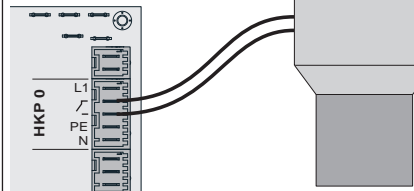
When this type of pump is used, the speed is not controllable! The use of a line regulating valve (e.g.: Setter balancing valve) is recommended!



- ☐ Using the RC element, connect the relay at the "Pump 1" output
- ☐ Connect the phase (L) of the power supply to the relay and the continuous supply to the valve (this switches the valve back into the initial position)
- ☐ Connect the neutral conductor (N) of the power supply to the pump and the valve
- ☐ Connect the protective earth conductor (PE) of the power supply to the pump
- ☐ Connect the phase (L) for switching over the valves together with the phase (L) for the pump to the switched output of the relay
- ☐ In the relevant menu, set the pump control to "HE pump without control signal"

## 2.1.7 Heating circuit pump 0 / burner relay

Depending on the system setting, the connection "Heating circuit pump 0" can be used for heating circuit pump 0 or as a burner relay. The following connection instructions must be observed:

Heating circuit pump 0	Burner relay
 <p>The pump can be supplied with up to a max. 2 Ampere directly via the output. During this process, phase (L1) of the output is connected to the switch contact.</p>	 <p>The pump must be supplied externally with 2 Ampere. Up to max. 5 Ampere, the floating contact can be used to switch the phase. At above 5 Ampere, the pump must be isolated with a relay.</p>
	 <p>Wire the floating output contact as an enabling signal to control the standby boiler.</p>

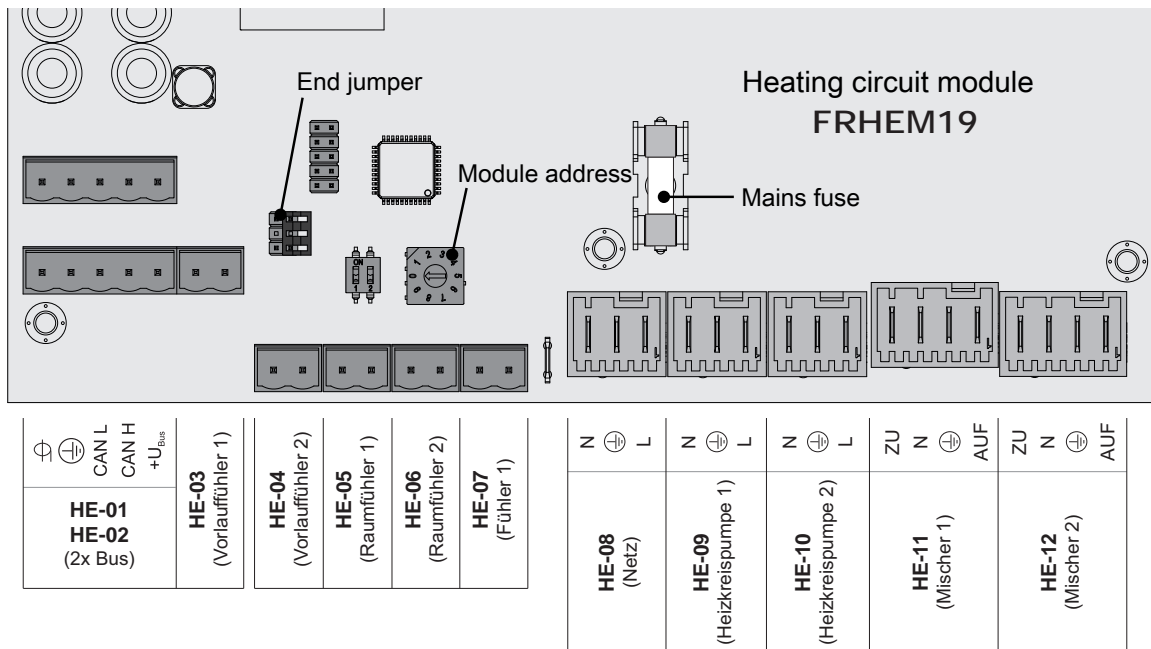
## 2.2 Expansion modules

### 2.2.1 Heating circuit module

Two heating circuits can be controlled as standard with the core module.

To add further heating circuits, the heating circuit module boards must be expanded. Expansion can include up to eight heating circuit modules (addresses 0 to 7). A total of up to 18 heating circuits can be controlled. It is important to ensure that the module address is set correctly.

➔ "Setting the module address" ► 30]



Connection / Name		Note
HE-01	BUS	Connection with cable – LIYCY paired 2x2x0.5; ➔ "Connecting the bus cable" ► 28] Caution! CAN L and CAN H must not be connected to +U <sub>BUS</sub> !
HE-02	BUS	

Connection / Name		Note
HE-03	Flow temperature sensor 1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> ;
HE-04	Flow temperature sensor 2	
HE-05	Room temperature sensor 1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> ; shielded if cable length greater than 25 m
HE-06	Room temperature sensor 2	
HE-07	Sensor 1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> ; Connection of the outside temperature sensor if it is not connected to the core module. The address of the heating circuit module to which the outside temperature sensor is connected must be set in the "Heating – General settings" menu. ➡ <a href="#">"Heating - General settings" [► 43]</a>
HE-08	Mains	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , fuse 10A
HE-09	Heating circuit pump 1	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , max. 2.5A / 230V / 500W
HE-10	Heating circuit pump 2	
HE-11	Mixing valve 1	Connection cable <sup>1)</sup> 4 x 0.75 mm <sup>2</sup> , max. 0.15A / 230V
HE-12	Mixing valve 2	

1. YMM to ÖVE-K41-5 or H05VV-F to DIN VDE 0881-5

## Fuses

<b>F2</b>	6.3 AT	HE-09, HE-10, HE-11, HE-12
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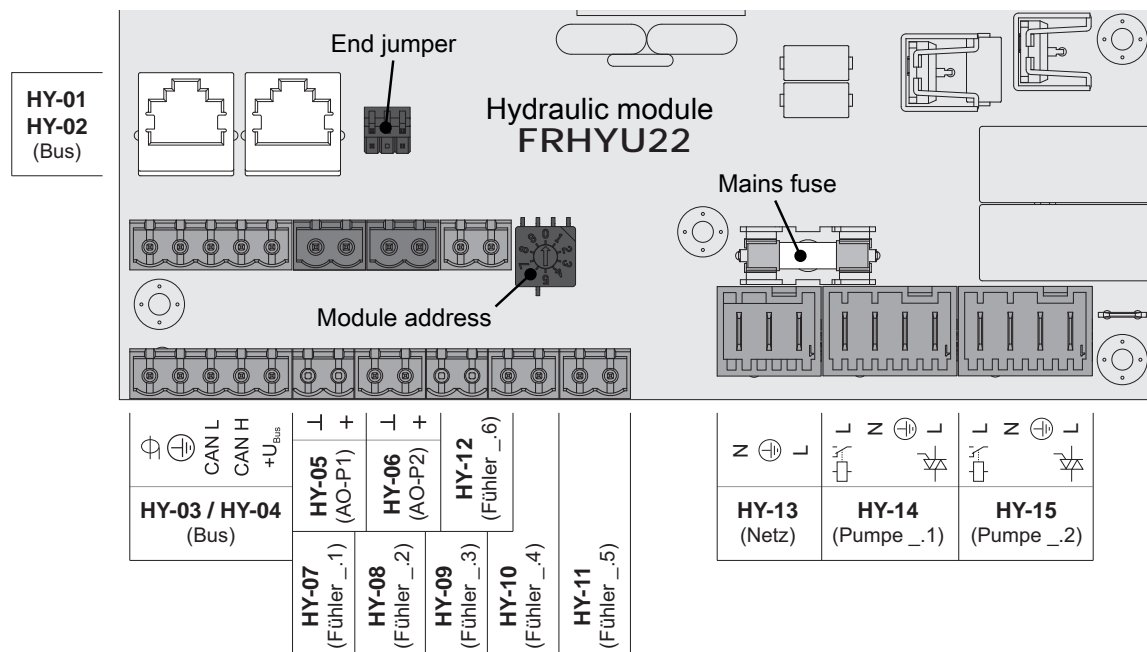
## 2.2.2 Hydraulic module

The hydraulic module makes the connections of sensors and pumps available for the hydraulic components of the system (buffer tank, DHW tank etc.).

A hydraulic module is included in the delivery as standard (address 0). A further seven modules (addresses 1 to 7) can be retrofitted.

You must ensure that the module address is assigned correctly! ➔ ["Setting the module address" \[► 30\]](#)

### Hydraulic module starting with version FRHYU22



Connection / Name		Note
HY-01	BUS	Patch cable CAT 5 RJ45 SFTP 1:1 configuration;
HY-02	BUS	
HY-03	BUS	Connection with cable – LIYCY paired 2x2x0.5; ➔ <a href="#">"Connecting the bus cable" [► 28]</a> Caution! CAN L and CAN H must not be connected to +U <sub>BUS</sub> !
HY-04	BUS	
HY-05	AO-P1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> Connection of control signal for relevant pump
HY-06	AO-P2	
HY-07	Sensor _1	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> , shielded from 25 m cable length Sensor inputs on the board. The correct sensor designation is determined by the set module address (0-7). Example: Module address "2" = sensor 2.1 to sensor 2.6
:	:	
HY-12	Sensor _6	
HY-13	Mains	
HY-14	Pump _1	
HY-15	Pump _2	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , fuse 10A Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup> , max. 1.5A / 230V / 280W Pump outlets from the board. The correct pump designation is determined by the set module address (0-7). Example: Module address "2" = pump 2.1 and pump 2.2 Depending on the type of pump, the phase (L) is either connected to the relay output or triac output. Connecting a circulating pump to the hydraulic module

1. YMM to ÖVE-K41-5 or H05VV-F to DIN VDE 0881-5

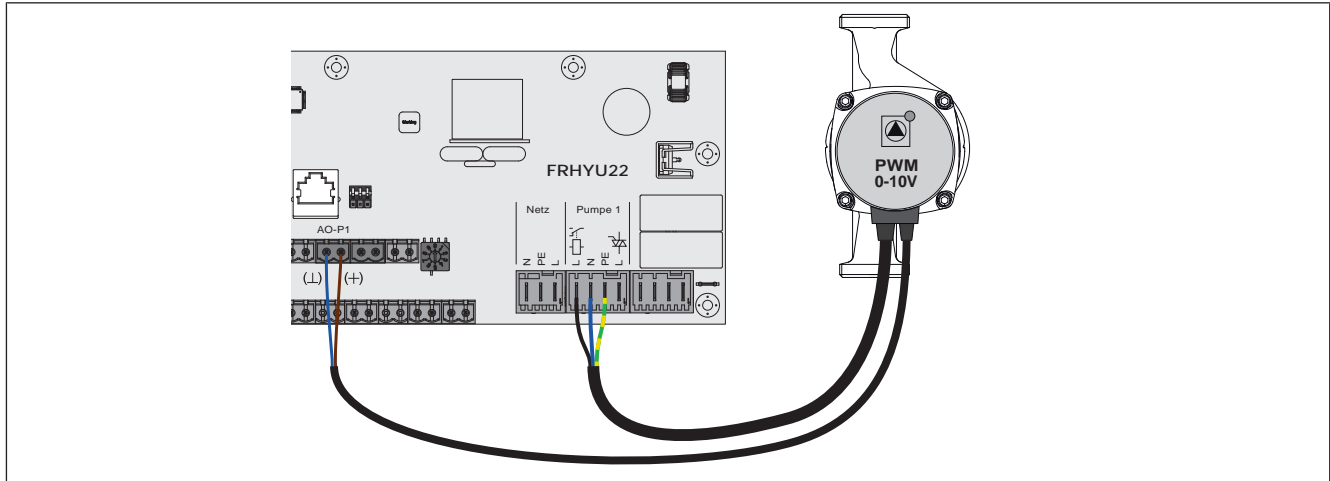
## Fuses

F1	6.3 AT	HY-14, HY-15
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## Connecting a circulating pump to the hydraulic module

### High efficiency pump with control line (PWM / 0-10V)

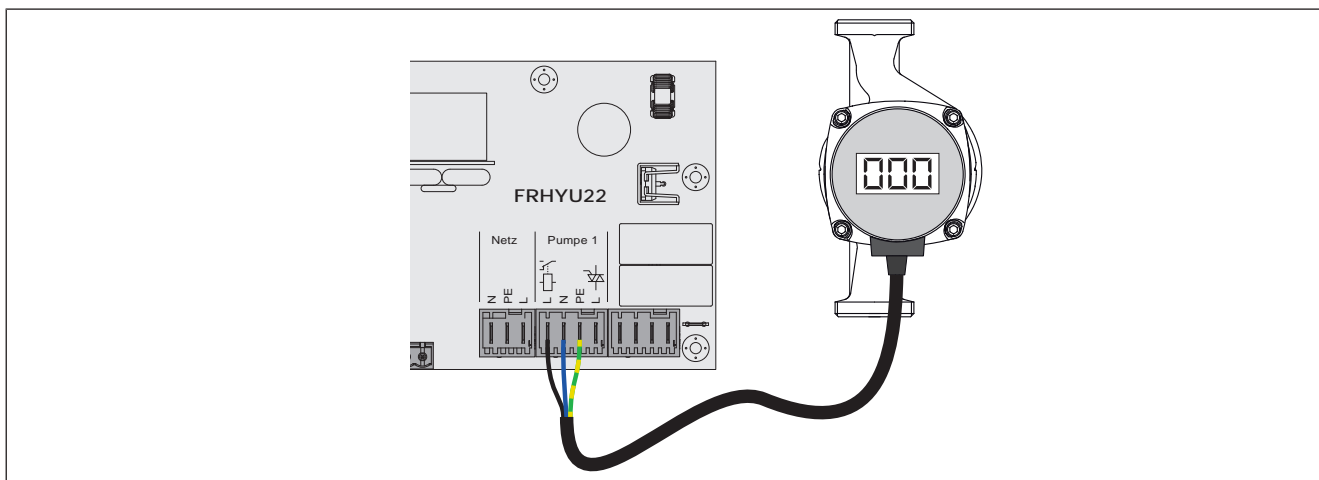
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ☐ Connect the power supply for the high efficiency pump to output “Pump 1” or “Pump 2” and use the relay output for phase (L)
- ☐ Connect the PWM cable of the high efficiency pump to the corresponding port “AO-P1” or “AO-P2”
  - ⚡ Make sure that the cables are configured correctly (polarity) in accordance with the connection diagram of the pump!
- ☐ Set control of the pump in the relevant menu to “Field pump / PWM” or “Field pump / 0-10V”

### High efficiency pump without control signal

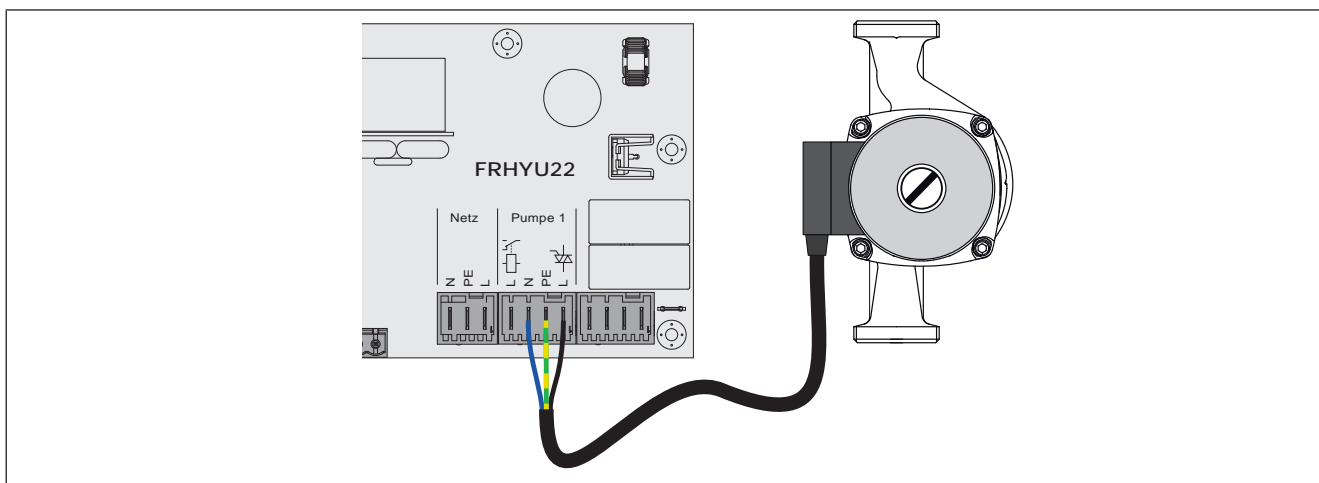
When this type of pump is used, the speed is not controllable! The use of a line regulating valve (e.g.: Setter balancing valve) is recommended!



- ☐ Connect the power supply for the high efficiency pump to output "Pump 1" or "Pump 2" and use the relay output for phase (L)
- ☐ In the relevant menu, set the pump to "HE pump without control signal"

### AC pump without control signal (pulse package control)

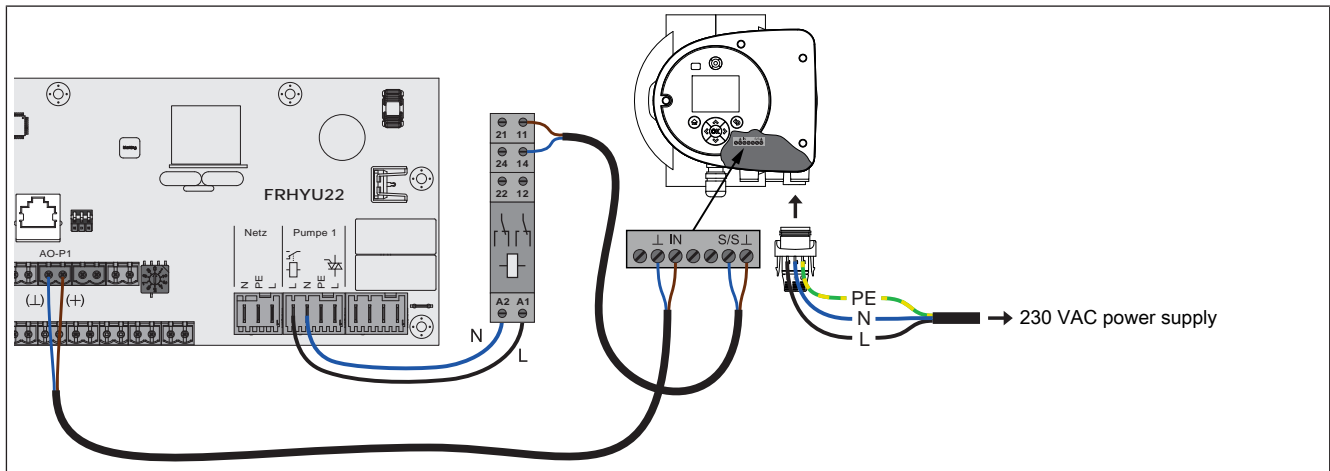
On older pumps without a control signal that are not highly efficient, the speed control is implemented via a pulse package control. Please note that the minimum speed may need to be adjusted on some pumps (default setting: 30%).



- ☐ Connect the power supply for the pump to output "Pump 1" or "Pump 2" and use the triac output for phase (L)
- ☐ In the relevant menu, set the pump to "Pump without control signal"

## High efficiency pump with control signal and release contact

When using a high efficiency pump that requires a release contact in addition to the control signal (e.g. Grundfos Magna 3), the pump outlet of the hydraulic module is used to switch the release.



- ☐ Connect the pump relay to output “Pump 1” or “Pump 2” and use the relay output for phase (L)
- ☐ Install and connect two-pole cable (2 x 0.75 mm<sup>2</sup>) from connection “AO-P1” or “AO-P2” to the pump and connect terminal “+” with terminal “IN” of the pump
- ☐ Install and connect two-pole cable (2 x 0.75 mm<sup>2</sup>) from NOC on the relay to the pump using terminal “S/S” as the release contact
- ☐ Connect power supply at pump connector
- ☐ In relevant menu, set pump to “Field pump PDM + valve” or “Field pump 0-10V + valve”

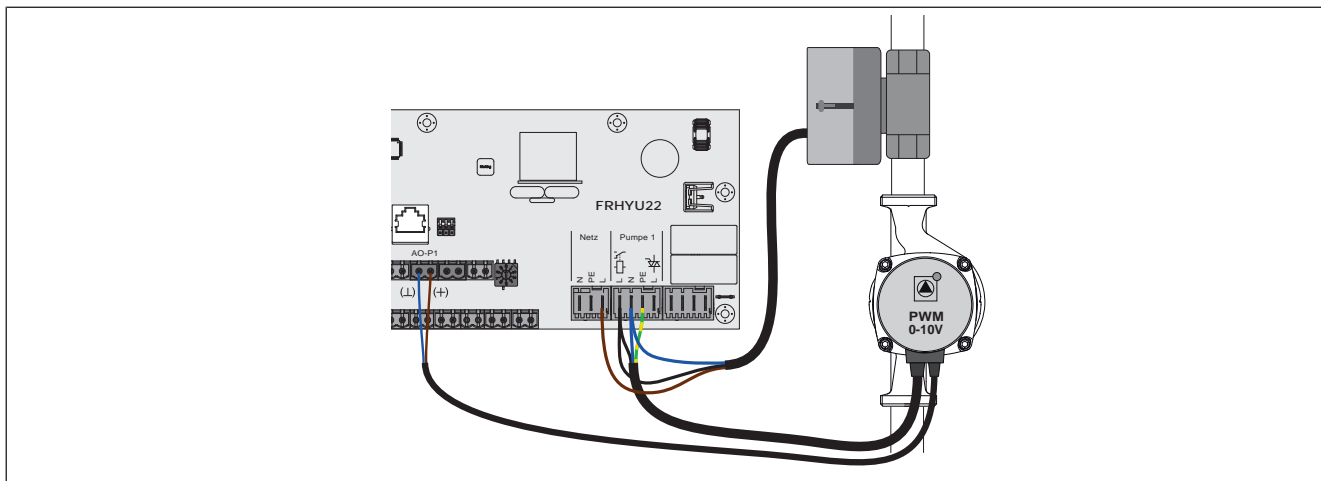


## Connecting a circulating pump with valve to the hydraulic module

**WARNING!** As of module version FRHYU22, one relay output is available at each of the pump outlets in addition to the triac output. Observe the following connection diagrams to correctly implement the wiring of the circulating pump!

### High efficiency pump with control line (PWM / 0-10V)

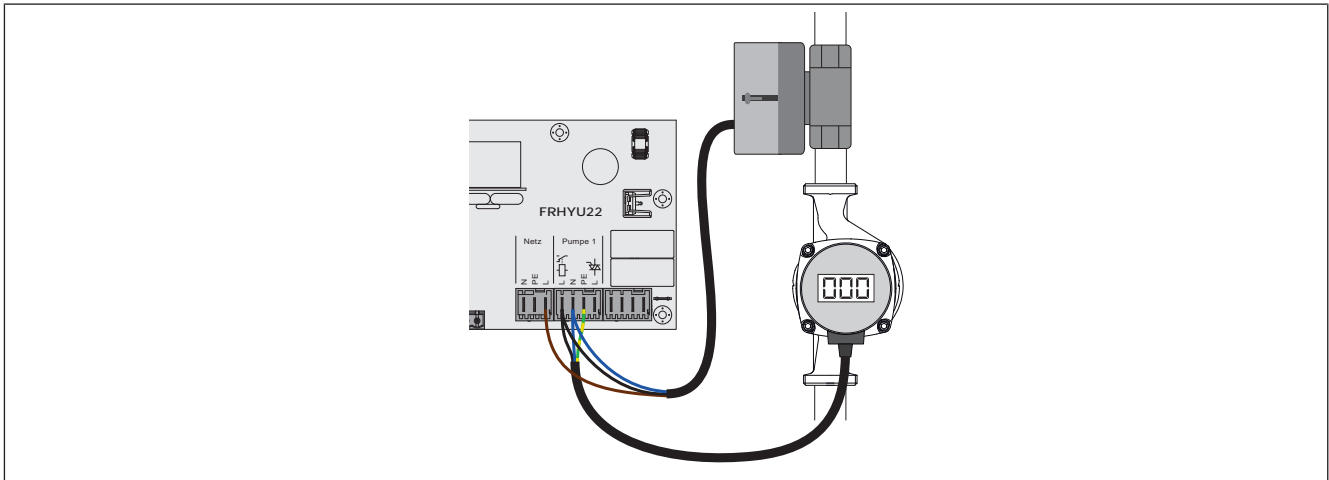
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ☐ Connect the power supply for the high efficiency pump to output "Pump 1" or "Pump 2" and use the relay output for phase (L)
- ☐ Connect the phase (L) for switching over and the neutral conductor (N) of the valve to the output "Pump 1" or "Pump 2" using the relay output for the phase (L)
- ☐ Connect the phase (L) for continuous supply of the valve (switches the valve back to the initial position) to the power supply at terminal "L"
- ☐ Connect the PWM cable of the high efficiency pump to the corresponding port "AO-P1" or "AO-P2"
  - ✎ Make sure that the cables are configured correctly (polarity) in accordance with the connection diagram of the pump!
- ☐ In the relevant menu, set the activation of the pump to "Field pump PDM + valve" or to "Field pump 0-10V + valve"

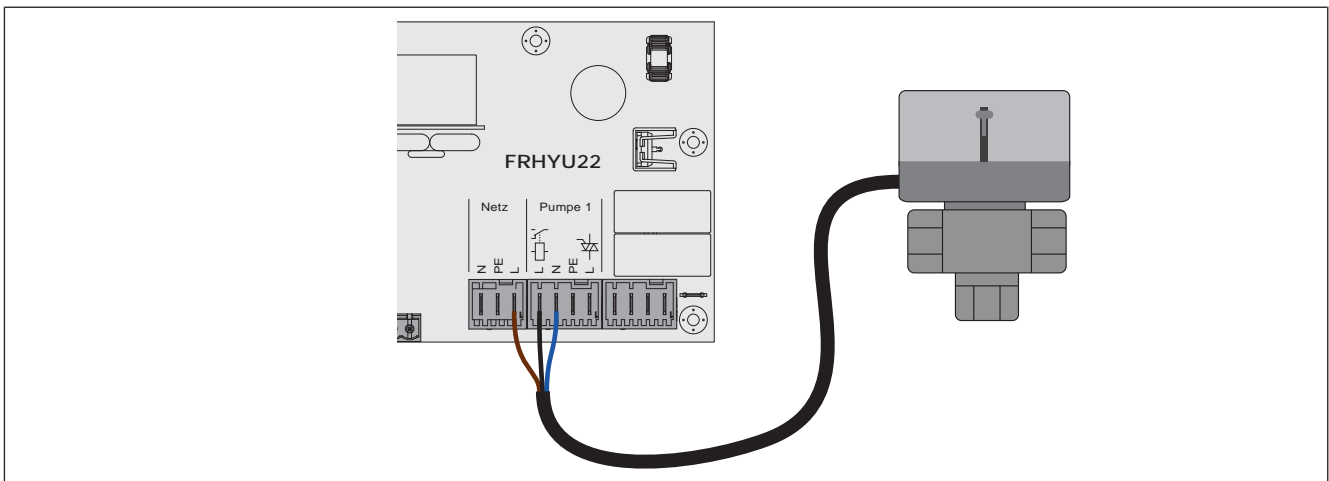
### High efficiency pump without control signal

When this type of pump is used, the speed is not controllable! The use of a line regulating valve (e.g.: Setter balancing valve) is recommended!



- ☐ Connect the power supply for the high efficiency pump to output "Pump 1" or "Pump 2" and use the relay output for phase (L)
- ☐ Using the RC element, connect the phase (L) for switching over and the neutral conductor (N) of the valve to the output "Pump 1" or "Pump 2"
- ☐ Connect the phase (L) for continuous supply of the valve (switches the valve back to the initial position) to the power supply at terminal "L"
- ☐ In the relevant menu, set the pump to "HE pump without control signal"

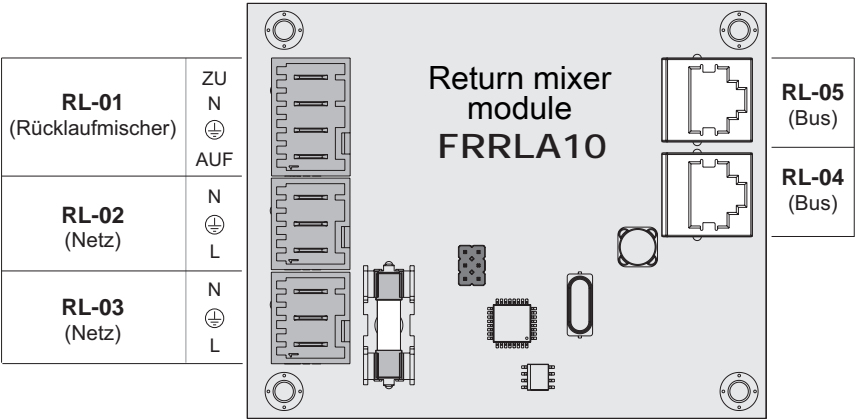
### Connecting an isolating valve to the hydraulic module



- ☐ Phase (L) for switching the valve and connecting neutral conductor (N) to output "Pump 1" or "Pump 2" using the relay output for phase (L)
- ☐ Connect the phase (L) for continuous supply (switches the valve back to the initial position) to the power supply at terminal "L"

2.2.3 Return mixer module

The return mixer module provides the connection for a return mixer. The relevant sensor is the return feed sensor on the core module. If this module is used, the "Return mixer through external mixer module" parameter ("System selection" menu => "Boiler type") must be set to "YES".



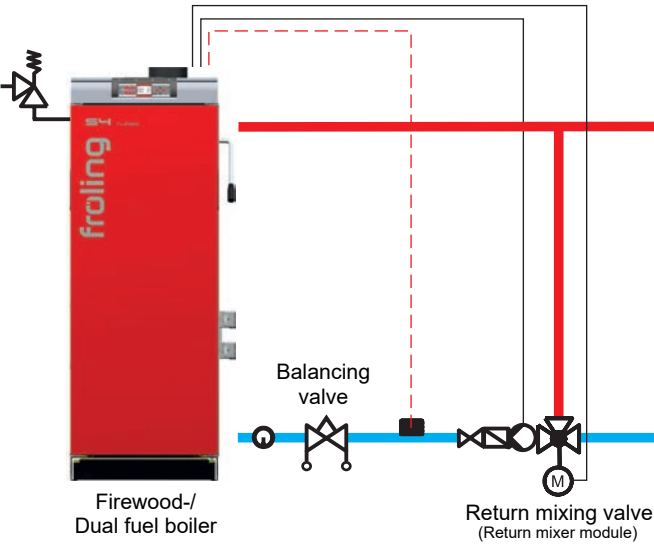
Connection / Name		Note
RL-01	Return mixer	Connection cable <sup>1)</sup> 4 x 0.75 mm², max. 0.15A / 230V
RL-02	Mains	Connection cable <sup>1)</sup> 3 x 1.5 mm²
RL-03	Mains	
RL-04	Bus	Patch cable CAT 5 RJ45 SFTP 1:1 configuration, included in delivery
RL-05	Bus	

1. YMM to ÖVE-K41-5 or H05VV-F to DIN VDE 0881-5

Fuses

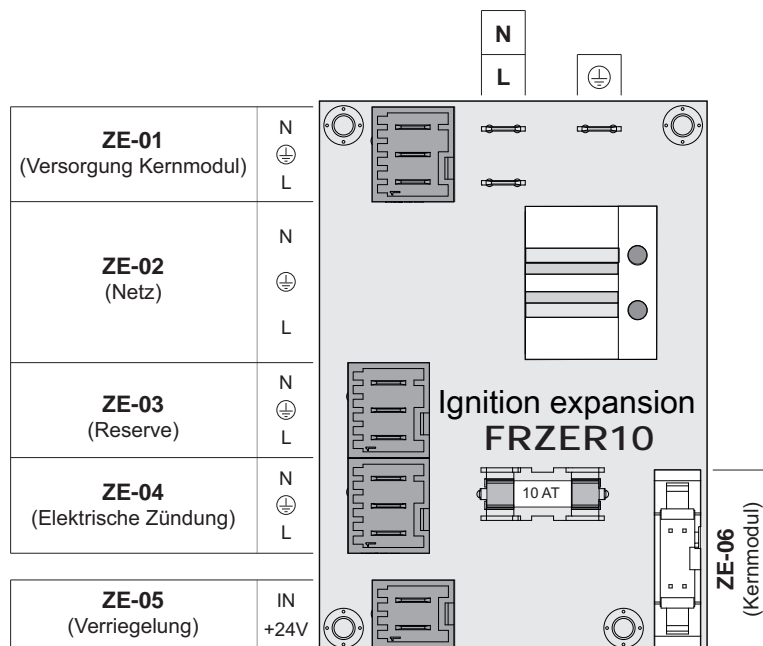
F1	6.3 AT	RL-01
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Connection example



## 2.2.4 Ignition expansion

The ignition expansion makes provision for the connection of an electric ignition fan, thereby allowing the boiler to be heated up automatically. The power supply of the ignition expansion must be established using the supplied cable between the terminal block and the “ZE-01 core module power supply” connection.



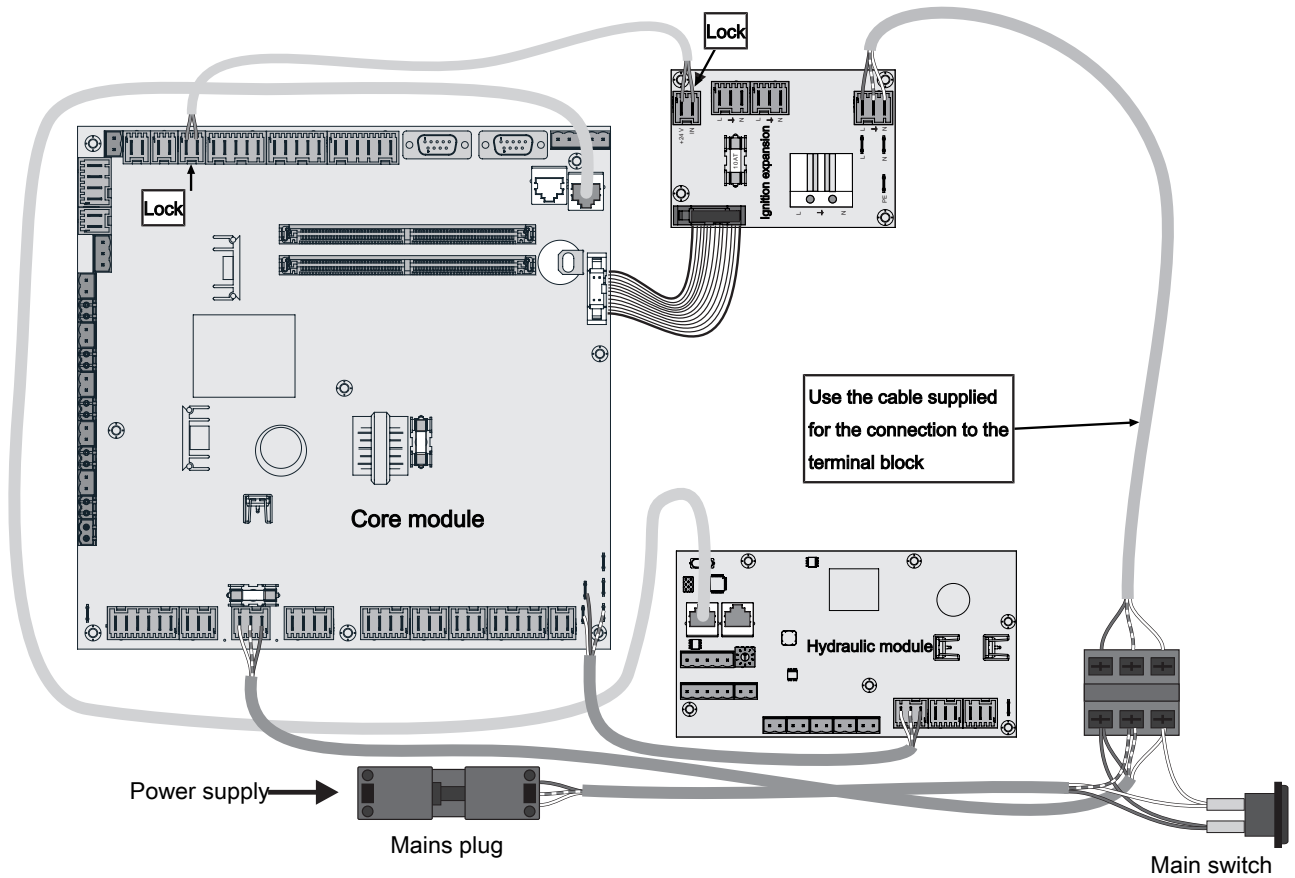
Connection / Name		Note
ZE-01	Core module power supply	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup>
ZE-02	Mains	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup>
ZE-03	Reserve	
ZE-04	Electric ignition	Connection cable <sup>1)</sup> 3 x 1.5 mm <sup>2</sup>
ZE-05	Lock	Connection cable <sup>1)</sup> 2 x 0.75 mm <sup>2</sup> , 24V looped through
ZE-06	Core module	Use the ribbon cable supplied

1. YMM to ÖVE-K41-5 or H05VV-F to DIN VDE 0881-5

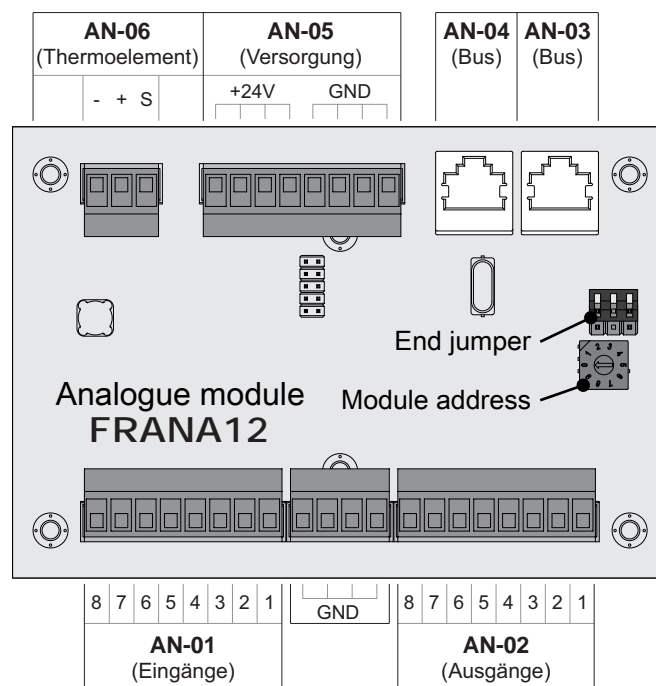
## Fuses

<b>F1</b>	10 AT	ZE-04
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## Connection diagram



## 2.2.5 Analogue module



Connection / Name		Note
AN-01	Inputs 1...8	Connection cable <sup>1)</sup> 1 x 0.75 mm <sup>2</sup>
AN-02	Outputs 1...8	Connection cable <sup>1)</sup> 1 x 0.75 mm <sup>2</sup>
AN-03	Bus	CAT 5 patch cable grey RJ45 SFTP 1:1 configuration
AN-04	Bus	
AN-05	Power supply	24 V power supply of the module, connection cable <sup>1)</sup> 2 x 1.0 mm <sup>2</sup> - Pellet boiler: ➡ "24 V power supply" [► 27] - pellet boiler and dual fuel boiler: Gravity shaft, terminal PM-12 or PM-13 at the pellet module - wood chip boiler: Supply via 24 V power supply unit
AN-06	Thermocouple	Use sensor connection

1. YMM to ÖVE-K41-5 or H05VV-F to DIN VDE 0881-5

**NOTICE!** The inputs and output are pre-configured, so it is essential the following addressing is complied with.

### Standard configuration – Analogue module with address 0

Input	Designation
3	External power specification (0-10V)

## External power demand

The type of power demand can be set using the parameter "Source for external power demand. (0 - off, 1 - 0-10 V, 2 - modbus)". The percentages are transferred directly if the power demand is made via modbus. If 0-10 V is selected as the source, the boiler release/boiler output can be controlled via an adjustable input at the analogue module using a voltage signal.

## Method of operation for a firewood boiler

The demand works on firewood boilers with an automatic ignition. If the signal at the input is above 75%, the automatic ignition is enabled (prerequisite: ignition is started via external release). The minimum output of the modulation area is limited. If the signal falls below 70% (0-69%), the boiler is activated at a boiler output of 70% until the firewood has burnt down.

By default 0V = 0% and 10V = 100%. This can be changed using the "Invert ext. power demand via analogue input" parameter.

To initiate start-up via the power demand, "Automatic" mode must be selected and the contact must be closed if a release contact is used ("Boiler release input available" parameter = YES).

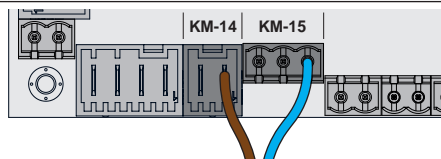
Necessary parameters for setting the power demand can be found in the "Boiler – General settings" menu.

## 24 V power supply

When used in a firewood boilers, connect the 24 V supply as follows:

### 24 V power supply

- brown: 24 V (+) to core module KM 14
- blue: 24 V (-) to core module KM 15

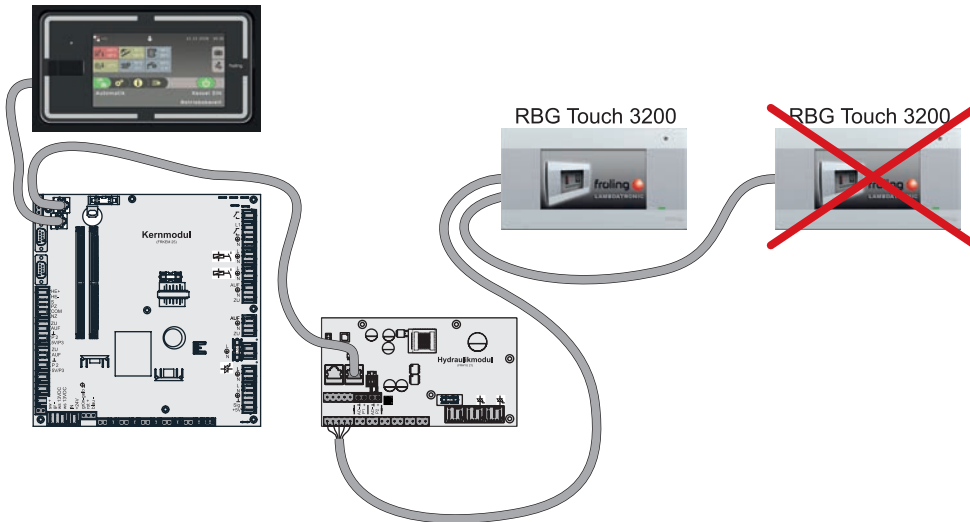


## 2.3 BUS connection

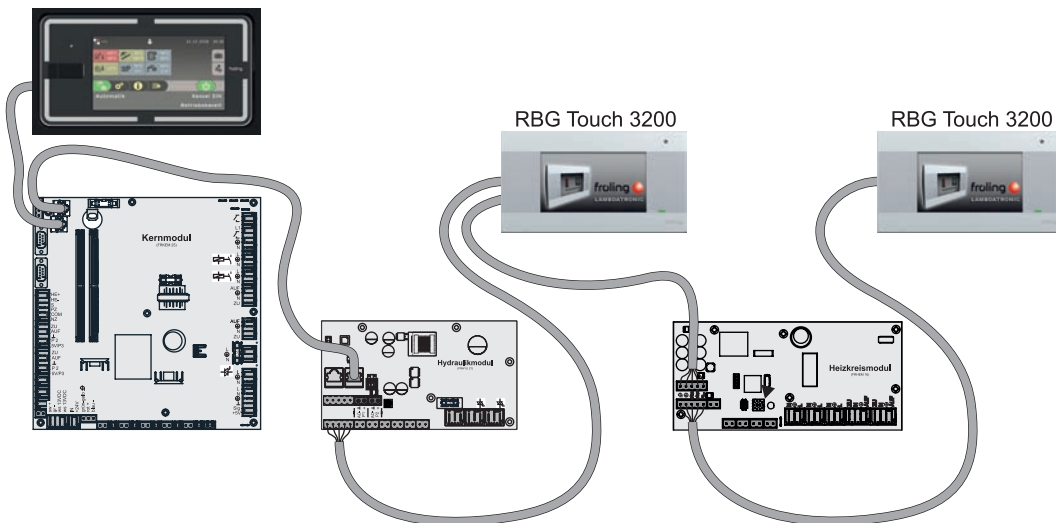
All of the bus models are connected with a bus line. The specification of the cable that is used must adhere to the LIYCY 2x2x0.5 type. A maximum cable length of 200 m must be observed. The cable length can be extended using the Fröling bus repeater.

The bus modules must be connected in series; although no specific sequence of the module types and addresses is specified. A star/stub cable is not permitted.

As the control units are supplied with voltage in addition to transferring data, problems caused by voltage drops can occur depending on the number of modules and existing cable lengths.

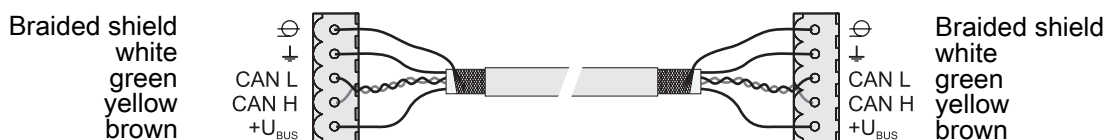


A voltage supply unit must be used for every touch room console (heating circuit module, hydraulic module).



### 2.3.1 Connecting the bus cable

For the bus connections between the individual modules, cable type **LIYCY paired 2x2x0.5** should be used. The connection to the 5-pin plugs should be carried out according to the following diagram:

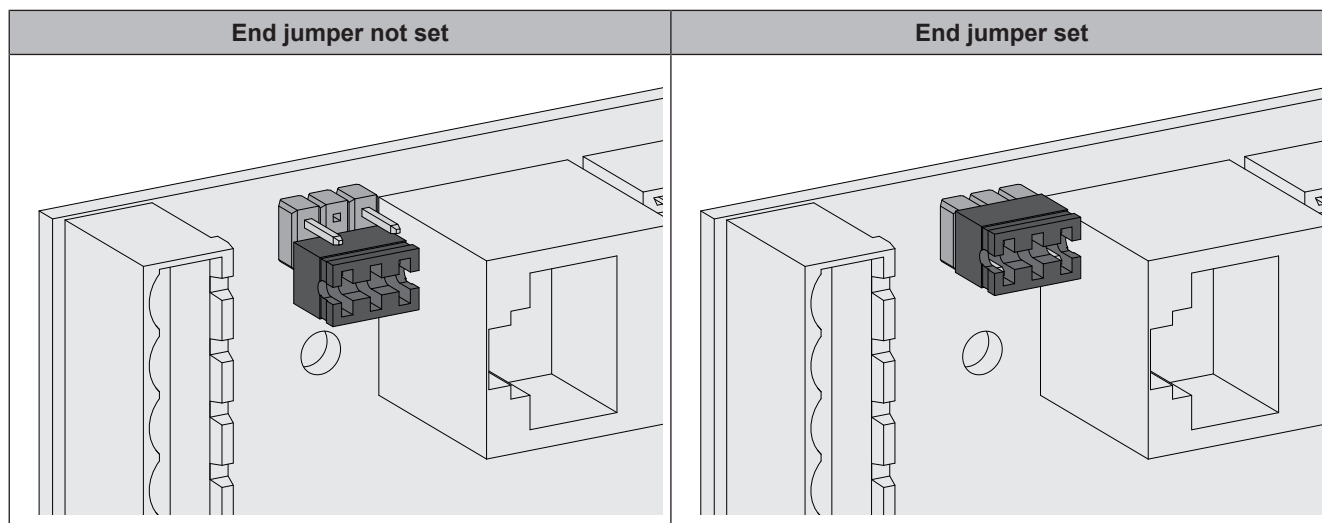




### 2.3.2 Setting end jumpers

**NOTICE!** To ensure smooth running of the bus system, the jumper must be set on the first and last module.

When using a bus repeater, the two galvanically separated sub-networks must be considered separately. The jumpers for each network must be set on the first and last module.

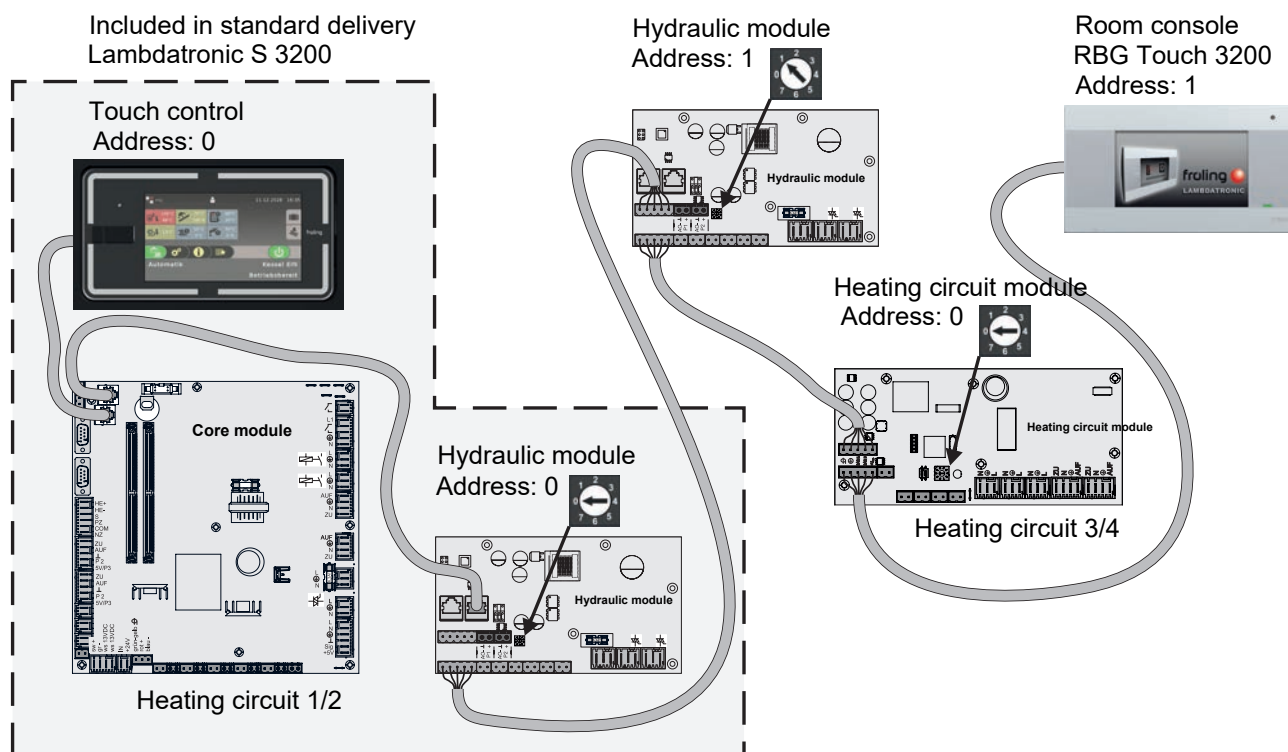


If the contacts at the base of the end jumper are not bridged (image left), it is referred to as "not set". In this case there is no bus termination. If the contacts are closed (image right), the end jumper is set and the bus connection is terminated.

### 2.3.3 Setting the module address

The necessary order for hydraulic modules and heating circuit modules is set with the module addresses. The first board of a module type should always have the address 0, so that the standard hydraulic systems set do not have to be subsequently configured. For further module types rising module addresses (address 1 - 7) are set.

**Important! Only set the module address when the device is disconnected from the power supply!**

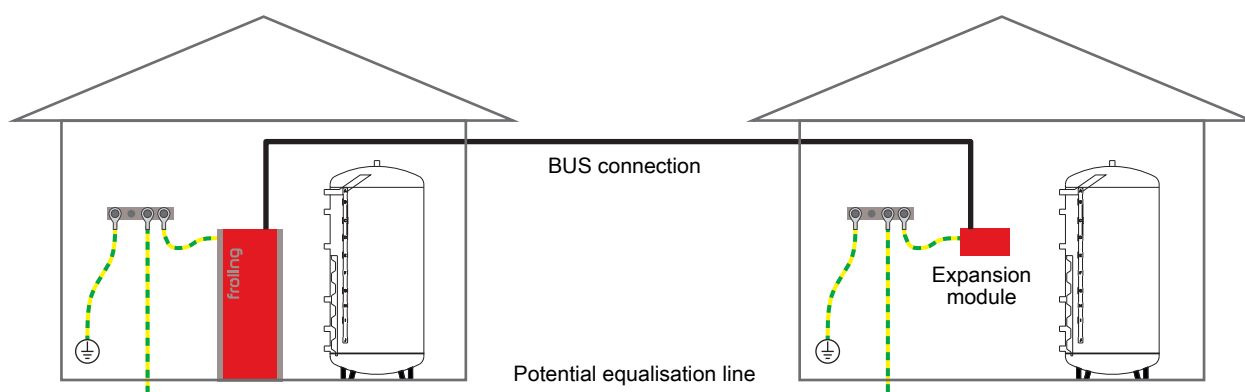


Module address set	Heating circuit module	Hydraulic module	
	Heating circuit	Sensors	Pump
0	03 – 04	0.1 – 0.6	0.1 – 0.2
1	05 – 06	1.1 – 1.6	1.1 – 1.2
2	07 – 08	2.1 – 2.6	2.1 – 2.2
3	09 – 10	3.1 – 3.6	3.1 – 3.2
4	11 – 12	4.1 – 4.6	4.1 – 4.2
5	13 – 14	5.1 – 5.6	5.1 – 5.2
6	15 – 16	6.1 – 6.6	6.1 – 6.2
7	17 – 18	7.1 – 7.6	7.1 – 7.2

### 2.3.4 Potential equalisation / potential separation

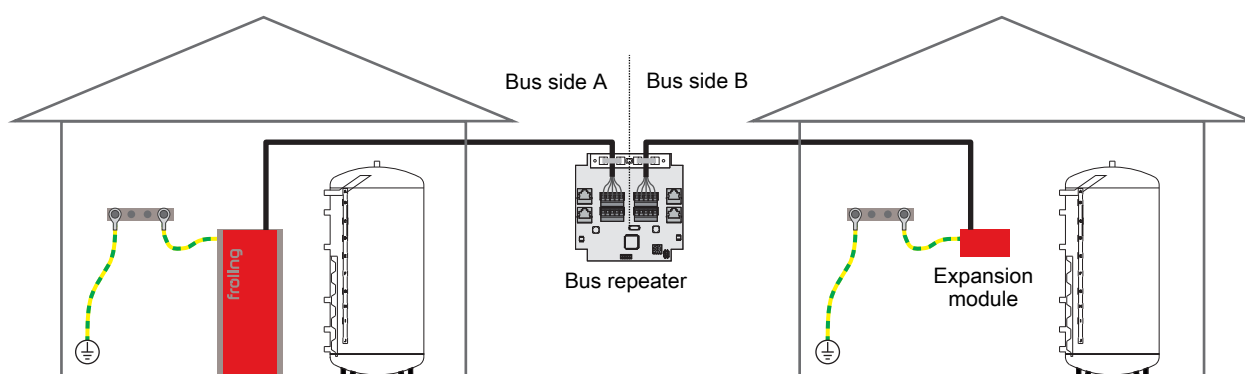
There can be potential shifts between buildings. In this case, equalising currents flow via the bus connection shield which can damage the modules.

To prevent this, buildings must be connected using a potential equalisation conductor.



**NOTICE!** The dimensions of the equalization line must be installed by a specialist in accordance with regional regulations.

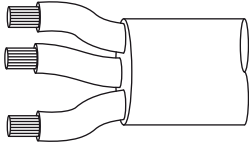
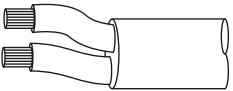
Instead of the potential equalisation, a Fröling bus repeater can be used in the bus connection line to the next building. The potential separation (galvanic isolation) allows the bus network to be split into two separate sub-networks.



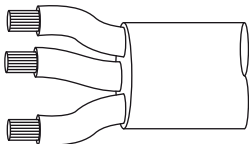
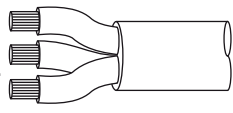
## 2.4 Connection information according to pump types

Either a 2-pin, 3-pin, or 4-pin control cable is used for the connection depending on the pump type. Please follow the connection instructions below for the wiring depending on the pump type used:

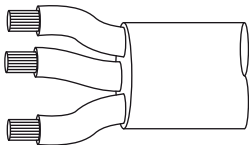
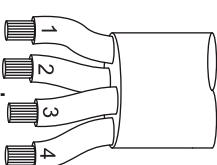
### Pump type with 2-pin control cable

Power supply	2-pin control cable
(brown) L (blue) N (yellow/green) PE 	(blue) ⊥ (brown) + 
Wire the power supply to the pump outlet on the board	Connect the control cable to the PDM output on the board, making sure that the polarity is correct: - blue wire to earth - brown wire to plus

### Pump type with 3-pin control cable

Power supply	3-pin control cable
(brown) L (blue) N (yellow/green) PE 	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <b>PWM</b> </div> <div style="margin-right: 10px;">           (blue) ⊥            (brown) +            (black)         </div>  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px; margin-left: 10px;"> <b>not used</b> </div>
Wire the power supply to the pump outlet on the board	Connect the control cable to the PDM output on the board, making sure that the polarity is correct: - blue wire to earth - brown wire to plus  Do not use the black wire and insulate if necessary

### Pump type with 4-pin control cable

Power supply	4-pin control cable
(brown) L (blue) N (yellow/green) PE 	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 10px;"> <b>PWM</b> </div> <div style="margin-right: 10px;">           (brown) ⊥            (white) +            (blue)            (black)         </div>  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 5px; margin-left: 10px;"> <b>not used</b> </div>
Wire the power supply to the pump outlet on the board	Connect the control cable to the PDM output on the board, making sure that the polarity is correct: - brown wire to earth - white wire to plus  Do not use the other two wires (blue, black) and insulate

## 3 Initial start-up with settings wizards

### 3.1 Before switching on for the first time

#### NOTICE

You should have the initial startup carried out by the authorised heating engineer from Froling customer services.

#### 3.1.1 Controller check

- ☐ Check boards for foreign bodies (pieces of wire, washers, screws ...)
- ☐ Carry out a wiring check:  
Check for loose, uninsulated wires, which could cause a short-circuit
- ☐ Check plug configuration of pumps, mixing valves and other units, which have NOT been prepared by Froling
- ☐ Check the connection of the BUS cable for short-circuits
- ☐ Check the specified addresses and terminal jumpers on the individual modules (heating circuit modules, hydraulic modules, displays...)

#### 3.1.2 Check on the connected units

- ☐ Check that all units that are used are connected correctly
- ☐ Carry out wiring check:  
Check for loose or uninsulated wires in the terminal boxes of the pumps, mixing valve and switch valve, which could cause a short-circuit

#### 3.1.3 System check



- ☐ Check that the main fuse for the boiler has a sufficient rated amperage

➡ "Mains connection" [► 8]

## 3.2 General information about the settings wizard

A wide variety of setting wizards are available to start-up the boiler system. A small selection of these can be found on the “Customer” operating level in the “Quick menu”; the rest are only on the “Service” operating level. The settings wizards can be used to set various sections of the boiler system (boiler, lambda probe, hydraulic system, etc.) with guided queries of the controller.

The following settings wizards are available for specific systems. Because they are interdependent, the sequence is automatically determined by the controller.

Icon	Designation
	<b>Switching on for the first time</b> Queries are made regarding language, facility number, date and time
	<b>Boiler</b> Setting for boiler type, boiler output, fuel, return temperature control and boiler-specific options (ignition, filter, etc.)
	<b>Lambda probe</b> Selection and calibration of the type of sensor used
	<b>Feed system</b> Selection of the existing discharge system (only for boilers with automatic loading)
	<b>Hydraulic system</b> Selection of the hydraulic system (hydraulic system 1, 2, 3, etc.)
	<b>Additional components</b> Selection and activation of the existing load and control components (heating circuits, DHW tank, solar, difference controller, etc.)
	<b>Heating up</b> Initial filling of the pellet container for pellet and dual fuel boilers; filling of the discharge screw and defining the loading times for the start process for wood chip boilers
	<b>Connect</b> Setting parameters required for the boiler to use the “froeling-connect.com” online control (IP address, display password, etc.)
	<b>Heating up program</b> Activation and selection of a heating up program.

### 3.3 Switching on for the first time

Once you have connected the device to the power supply and switched on the main switch, the display begins with a query regarding the basic settings of the system (language, production number of the boiler system, date, and time). Then the basic screen of the touch display is shown.

1: Selection of the controller language



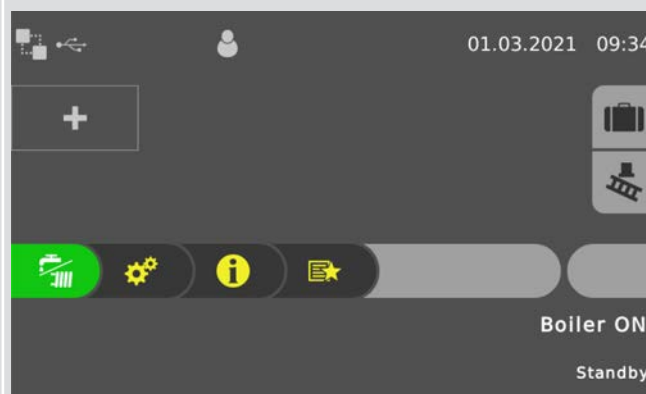
2: Setting the production number (see identification plate)



3: Setting the date and time

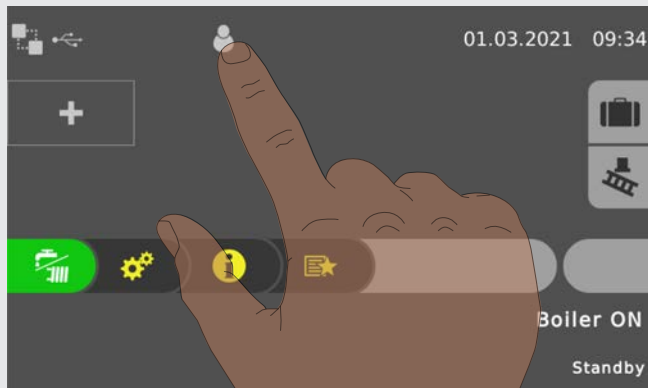


4: Display of the basic screen

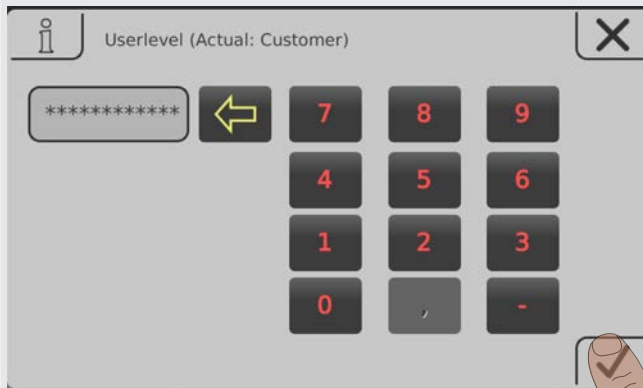


## 3.4 Starting the setting wizard

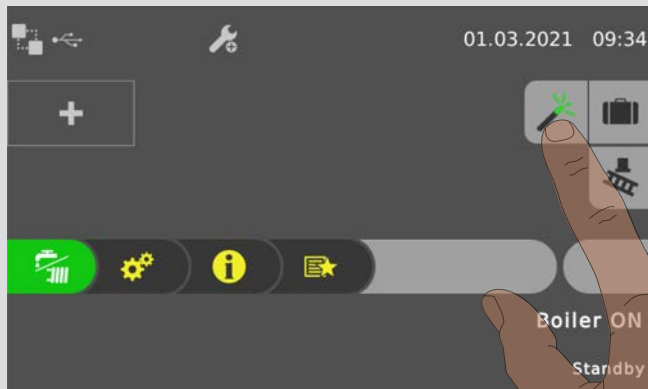
1: Tap the icon to change the user level



2: Type in the service code and confirm



3: Tap the icon of the settings wizard



4: Tap the "Boiler" setting wizard



5: The settings wizard loads

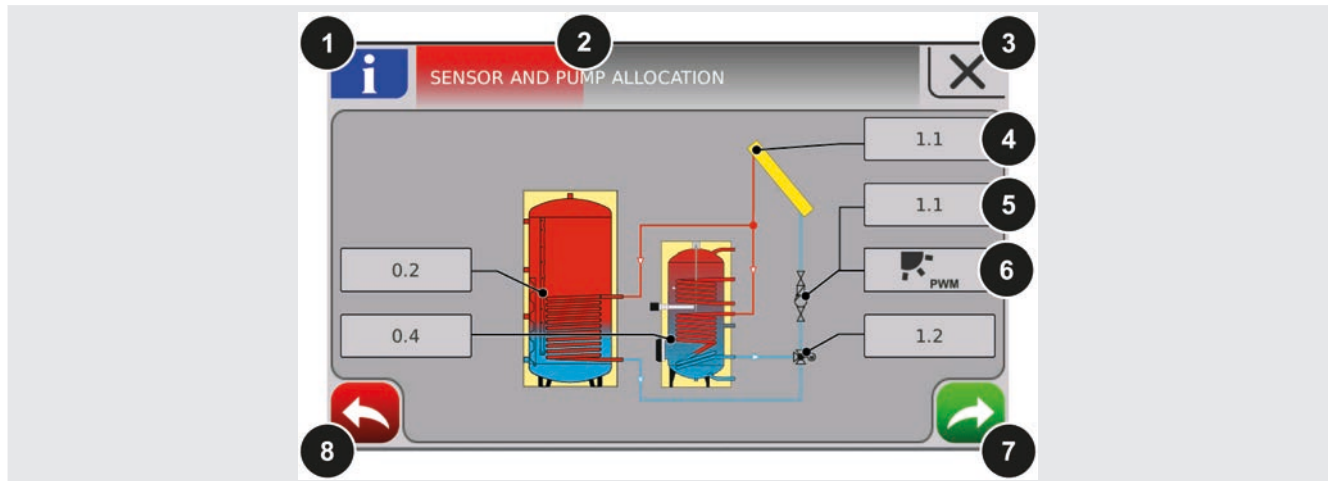













6: Read the information text and continue with "YES" to start





## Navigation as well as sensor and pump settings

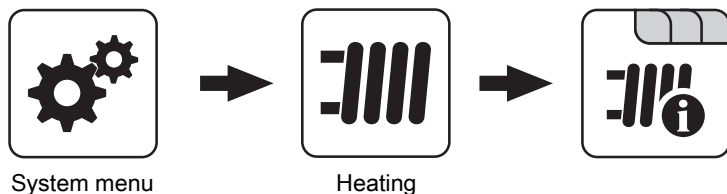


Number	Description
1	If the Info button has a blue background, more information is available for this overview page.
2	Progress bar for the respective settings wizards
3	Cancel setting wizard
4	Setting the address to which the respective sensor was connected
5	Setting the address to which the respective pump was connected
6	Defining the control signal of the respective pump. The following options are available depending on the selected menu:
	 Pump without control line
	 HE pump without control line
	 Field pump / PDM
	 Solar pump / PDM
	 Field pump PDM + valve
	 Solar pump PDM + valve
	 Field pump / 0 - 10 V
	 Solar pump / 0 - 10 V
	 Field pump 0-10 V + valve
	 Solar pump 0-10 V + valve
	 Switch valve
	<a href="#">"Activation options of pump outlets" [► 80]</a>
7	Continue to the next step
8	Go back one step

## 4 Parameters overview

### 4.1 Heating

#### 4.1.1 Heating - Status



##### Heating circuit mode

Display and setting the heating circuit mode:

	<b>Auto:</b> Automatic: heating phases according to the set heating times
	<b>Extra heating:</b> The heating circuit is regulated to the set room temperature with no time limitation. To cancel this function, activate another mode/function
	<b>Setback:</b> Setback mode; the current or next heating phase is ignored
	<b>Continuous setback mode:</b> Heating circuit remains in setback mode until another mode is activated
	<b>Party:</b> Party mode; the current or next setback phase is ignored

##### Heating circuit mode



**OFF:**

Switched off; heating circuit deactivated, only frost protection!

##### Actual flow temperature

Display of the current flow temperature.

##### Room temperature

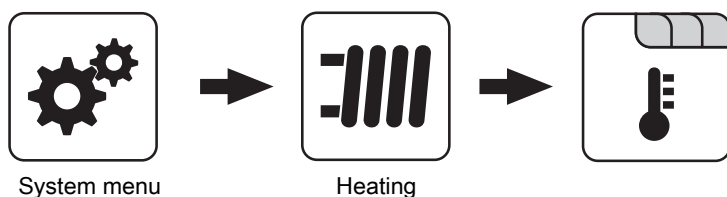
**Prerequisite:** Heating circuit used in conjunction with remote control

Display of the current room temperature.

##### Outside air temperature

Display of the current outside air temperature.

#### 4.1.2 Heating – Temperatures



##### Desired room temperature during heating mode

**Prerequisite:** Heating circuit used in conjunction with remote control

Room temperature which is regulated during the set heating times.

##### Desired room temperature during setback mode

**Prerequisite:** Heating circuit used in conjunction with remote control

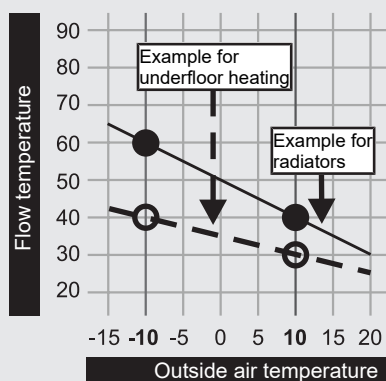
Room temperature which is regulated outside of the set heating times.

##### Flow temperature SP at outside air temperature of +10°C

First setting point for definition of heating curve.

### Flow temperature SP at outside air temperature of -10°C

Second setting point for definition of heating curve.



### Controller gain at room temperature Kp-Rm

**Prerequisite:** Heating circuit used in conjunction with remote control

Influencing factor of room temperature on the flow temperature of the heating circuit. If there is a deviation in the room temperature of  $\pm 1^\circ\text{C}$ , the set value of the flow temperature is corrected by this value. (Only in conjunction with remote control)  
Recommended values:

- Underfloor heating: 2-3
- Radiators (new build): 4-5
- Radiators (old build): 6-7

**NOTICE!** Observe external influences on the remote control!

### Reduction of flow temperature in setback mode

The flow temperature is reduced by this value during setback mode.

### External temperature, at which heating circuit pump switches off in heating mode

If the outside air temperature exceeds this value during heating, the heating circuit pumps and mixing valve are deactivated.

### External temperature, at which heating circuit pump switches off in setback mode

If the outside air temperature falls below this value in setback mode, the heating circuit pumps and mixing valve are activated.

### Maximum heating circuit flow temp

Maximum temperature for limiting outfeed temperature at which the heating circuit is supplied.

### Maximum DHW tank flow temp

If DHW tank 1 is supplied directly from heating circuit 1, you can limit the maximum flow temperature for the duration of DHW tank loading.

### Frost protection temperature

If the room temperature or the flow temperature is lower than the set value, the heating circuit pump will be switched on and the heating circuit mixer keeps to the maximum heating circuit flow temperature that is set.

### From which temperature at top buffer tank should the overheating protection be activated

If the temperature at top buffer tank exceeds the set value, the heating circuit is activated regardless of mode (boiler, remote control) and set heating times. The flow temperature is controlled to the value set in the parameter "Flow temperature SP at outside air temperature of  $-10^\circ\text{C}$ ". The function will remain active until the value falls below  $2^\circ\text{C}$ .

**Recommendation:** The overheating protection should be assigned to a high temperature heating circuit (e.g. radiators).

### Deviation of room temperature sensor

If a deviation of the room temperature is determined from the evaluated value to the displayed value, the evaluation of the room temperature sensor can be adjusted with this parameter. The temperature measured by the sensor is increased (positive value) or reduced (negative value) by the pre-set value.

## 4.1.3 Heating - Times



System menu

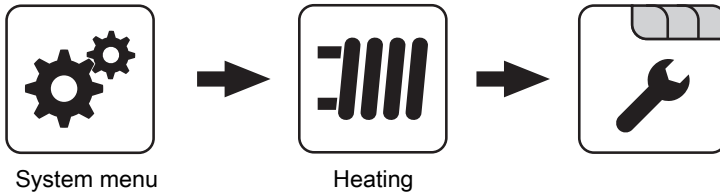


Heating



➞ "Setting times" | 85]

#### 4.1.4 Heating - Service



##### Heating circuit pump

Used for testing the pump output:

- **A 0:** Automatic, Off; **A 1:** Automatic, On
- **1:** Manual, On
- **0:** Manual, Off

##### Heating circuit mixer OPEN

Used for testing the mixing valve output:

- **A 0:** Automatic, Off; **A 1:** Automatic, On
- **1:** Manual, On
- **0:** Manual, Off

##### Heating circuit mixer CLOSED

Used for testing the mixing valve output:

- **A 0:** Automatic, Off; **A 1:** Automatic, On
- **1:** Manual, On
- **0:** Manual, Off

##### Mixer runtime

Here you can set the mixer runtime of the mixer in use.

##### Switch off heating circuit pump when outfeed setpoint is lower than

**Prerequisite:** Heating circuit is operated without remote control

If a flow temperature setpoint is calculated below the value set, the heating circuit pump switches off and the mixing valve closes.

##### Should this heating circuit heat when there is DHW tank priority?

- **NO:** During DHW tank loading this heating circuit is deactivated.
- **YES:** Despite active DHW tank priority, this heating circuit is supplied with heat during DHW tank loading.

##### From which buffer tank or distributor is the heating circuit supplied (0 = boiler)

**Prerequisite:** Parameter can only be used in conjunction with multiple house systems (variants)

This parameter defines the allocation of the heat source for this heating circuit.

- **0** = Boiler
- **1** = Buffer tank 01, ...

##### High temperature requirement because of DHW tank loading

**IMPORTANT! Parameter is available only for heating circuits 1 and 2!**

**Set Pellet as the unit model for “DHW tank 1” in the case of pellet boiler PE1!**

- **No DHW tank:** the heating circuit is operated according to the selected heating curve
- **DHW tank 1:** only DHW tank 1 is supplied via the heating circuit
- **DHW tanks 2-8:** all DHW tanks apart from DHW tank 1 are supplied via the heating circuit
- **All DHW tanks:** all DHW tanks are supplied via the heating circuit

The DHW tank can be loaded via the heating circuit. If there is a requirement from the DHW tank and the criteria for DHW tank loading have been met, the switch valve immediately clears the way for DHW tank loading. The heating circuit pump starts running as soon as the criterion “Load if temperature difference between boiler and DHW tank is” is satisfied. Once DHW tank loading is complete, the heating circuit pump will stop, the switch valve will remain active for a specified period of time and the heating circuit mixer will close. If time has run out, the heating circuit will go back to being supplied on a weather-compensated basis.

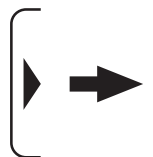
### 4.1.5 Heating - Heating up program



System menu

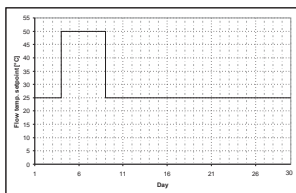


Heating

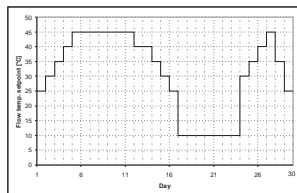
Heating up program  
Service

### Heating up programs

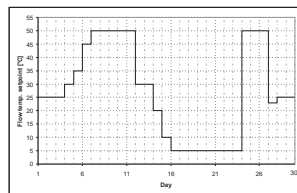
Heating up program 1:



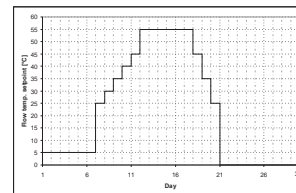
Heating up program 2:



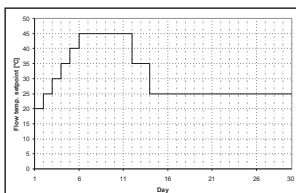
Heating up program 5:



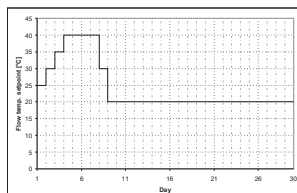
Heating up program 6:



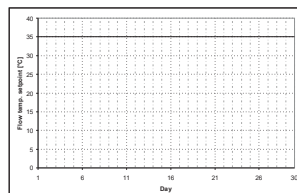
Heating up program 3:



Heating up program 4:



Heating up program 7:



The heating up programs listed are non-binding recommendations. If the heating up program is to be used for floor screed drying, you must consult the manufacturer of the floor finish and/or the installer!

### Configure program 8

Heating up program  
Service

Configure program 8

#### Outfeed temperature setpoint on day 1 ... 30



If "heating up program 8" is selected, the flow temperature setpoint can be preset for each day using this setting.

## Heating circuits used



Heating circuits used

Heating up program  
Service

### Using heating circuit 01 ... 18



The number of heating circuits used depends on the system configuration. If only 2 heating circuits are installed, then only 2 heating circuits will be available for selection.

The heating up program selected will be used for all heating circuits!

## Heating up program - Service

### Heating up program active



- **NO:** The heating up program is deactivated. When the heating up program is deactivated, all heating circuits are operated according to the selected heating times.
- **YES:** The 30-day heating up program that has been set starts. After the 30 days, the heating circuit that has been selected operates based on the set heating times again.

The heating times of the selected heating circuit, as well as the boiler/buffer tank loading times are automatically set to 0:00-24:00 and the outside air temperature heating limit is ignored.

When using a firewood boiler, a sufficient heat supply must be ensured.

If the actual flow temperature setpoint required cannot be reached or maintained (e.g. boiler output, ...), then no warning is displayed!

In the event of a power failure, the program continues from the point at which it was interrupted!

The parameter "Maximum heating circuit flow temperature" is not automatically adjusted when the heating up program is activated, and must be raised to the desired temperature for the set duration. The building temperature limits must also be adjusted for the duration of the heating up program.

If the current room temperature falls below the set frost protection temperature setpoint, this influences the set flow temperature setpoint of the heating up program.

**NOTE:** Only in conjunction with remote control!

### Current day of the heating up program



Shows the current day of the heating up program that is running. By adjusting this parameter, you can skip forward or return to a specific day of the program.

### Which heating up program is used



There are set options for the progression of the flow temperature in heating up programs 1 – 6. With heating up program 7 the flow temperature can be selected freely over the entire 30 days.

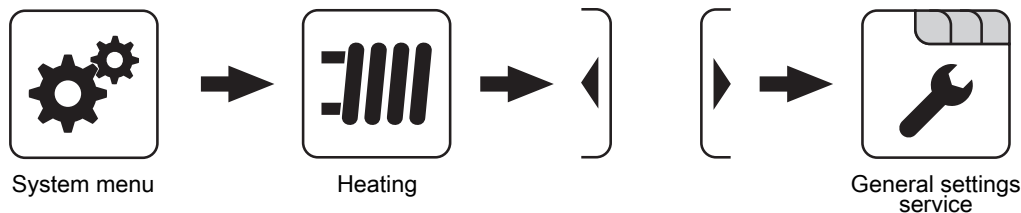
Heating up program 8 allows you to pre-define the progression of the flow temperature for each individual day.

### Outfeed setpoint for all days in program 7



If heating up program 7 is active, the selected heating circuit is adjusted to the specified flow temperature.

### 4.1.6 Heating - General settings



#### Correction value for external sensor

If it is found that the evaluated value for the outside temperature value deviates from the displayed value, the evaluation of the outside temperature sensor can be adjusted using this parameter. The temperature measured by the sensor is increased (positive value) or reduced (negative value) by the pre-set value.

#### Heating circuit module to which the external sensor is connected (0 = core module)

If the outside temperature sensor is not connected to the core module, the address of the relevant heating circuit module +1 must be set here (sensor 1 on relevant module).

#### Using room sensor inputs for room thermostat

**NOTICE! This parameter influences all sensor connections to which an analogue room temperature sensor can be connected!**

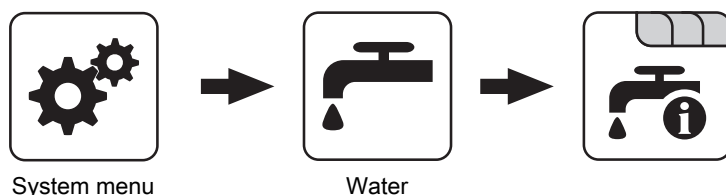
- **NO:** At the sensor connector of the room sensor, a room sensor must be connected to control the room temperature.
- **YES:** At the sensor connector of the room sensor, room thermostats can be connected to control the room temperature.

Contact of room thermostat open: Heating circuit pump deactivated, mixing valve is closed

Contact of room thermostat closed: Heating circuit pump and mixer control active

## 4.2 Water

### 4.2.1 Water - Status



#### DHW tank top temperature

Current temperature of the DHW tank. If the time window for DHW tank loading is reached and the temperature falls below the value set under parameter "Reload if DHW tank temperature is below", the DHW tank will be loaded. The DHW tank is loaded either until the time window has elapsed or the temperature set under "Desired DHW tank temperature" has been reached.

#### DHW tank bottom temperature

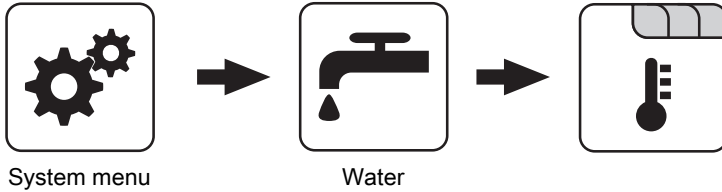
**Prerequisite:** Solar panel system is regulated by Froling!

Current temperature in the area of the reference sensor of the solar panel system.

#### DHW tank pump control

Specifies the speed of the DHW tank pump as a percentage of maximum speed.

### 4.2.2 Water - Temperatures



#### Set DHW temperature

When this DHW temperature is reached, DHW tank loading is stopped.

#### Reload if DHW tank temperature is below

If the DHW tank temperature falls below the value set here, the time window is active and the loading source (boiler or buffer tank) indicates the set loading increase, and the DHW tank loading is started.

#### Load if temperature difference between boiler and DHW tank is

If the boiler temperature is above the current DHW tank temperature by this value and the time window is active, DHW tank loading starts (only for systems without a buffer tank).

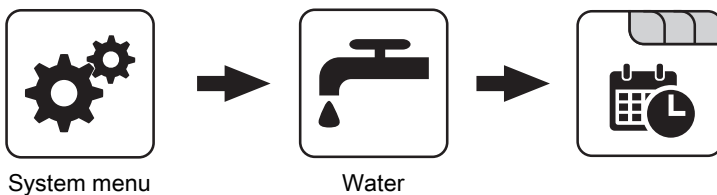
#### Setpoint for temperature difference between boiler and DHW tank

Adjust the boiler temperature setpoint to reach the desired DHW tank temperature.

Boiler temperature setpoint = Set DHW temperature + difference

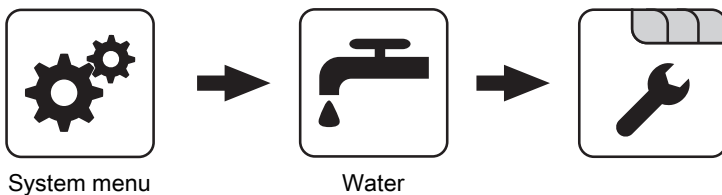
If the current boiler temperature setpoint calculated is higher than the result from the above calculation, the boiler temperature setpoint is maintained (only for systems without a buffer tank).

### 4.2.3 Water - Times



➔ "Setting times" ► 85

### 4.2.4 Water - Service



#### Residual heat use

**Prerequisite:** Hydraulic system 0 and return temperature control with mixing valve

**YES:** Diverts the residual heat to the DHW tank. The "Minimum boiler temperature to release all pumps" parameter is then ignored. The pump is set to minimum speed until the boiler temperature is lower than the DHW tank temperature + 3°C.

#### Only load DHW tank once a day

- **NO:** DHW loading is always triggered by the DHW tank temperature falling below the value that is set under „Reload if DHW tank temperature is below“ and the time window is active and the heat source (boiler or buffer tank) indicates sufficient temperature.
- **YES:** If in the current day the DHW tank has already been loaded once, any further DHW tank loading is prevented.



**Legionella heating activated**

- **NO:** A legionella heating of the DHW tank is not carried out.
- **YES:** Once a week the DHW tank is heated to the temperature set under the parameter "DHW tank temp. setpoint for legionella heating (same for all DHW tanks)".

**When should the legionella heating be carried out**

Determines the day of the week on which the legionella heating of the domestic hot water is carried out.

**DHW tank temp. setpoint for legionella heating (same for all DHW tanks)**

If the parameter "Legionella heating activated" is set to "YES", the DHW tank is heated to the set temperature on the specified day of the week.

**Which buffer tank or heat distributor supplies the heat to this DHW tank (0 = boiler)**

**Prerequisite:** Parameter can only be used in conjunction with multiple house systems (variants)

This parameter defines the allocation of the heat source for this DHW tank.

- **0** = Boiler
- **1** = Buffer tank 01, ...

**DHW tanks run-on ⇒ (this setting applies for all DHW tanks)**

When DHW tank loading has finished, the DHW tank loading pumps continue to run for the time set here.

**Sensor input of DHW tank 01 ... 08 top sensor**

Sensor input to which the DHW tank sensor is connected.

**Sensor input of DHW tank 01 ... 08 solar reference sensor**

Sensor input to which the sensor for the DHW tank solar reference is connected.

**Pump output of DHW tank 01 ... 08 pump**

Pump outlet to which the boiler loading pump is connected.

**Control of DHW tank pump**

Definition of control signal for pump type used.

➡ "Activation options of pump outlets" ► 80

**Minimum DHW tank speed**

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

**Maximum DHW tank pump speed**

If for reasons of system operation you need to limit the maximum speed of the DHW tank loading pump you can do so by adjusting this parameter.

## 4.3 Solar

### 4.3.1 Solar - Status



System menu

Solar

**Collector temperature**

Display of the current temperature at the solar collector.

**Top storage tank solar sensor**

Display of the current temperature at the solar reference sensor in the top part of the buffer tank.

**Solar temperature buffer tank bottom**

Display of the current temperature at the solar reference sensor in the lower part of the buffer tank.

**Collector return temperature**

**Prerequisite:** Hydraulic system 12 or 13

Display of the current temperature at the collector return.

**Actual power from solar heat meter [kW]**

Display of the current output which is generated by the solar collector. The calculation of the output is only performed either when a per litre output of the collector pump has been set or an external volume pulse transmitter is used. In order to perform the calculation more precisely, the use of a collector return sensor is recommended.

**Flow through [l/h]**

**Prerequisite:** External volume pulse transmitter installed

Display of the water quantity currently being pumped through the solar collector.

**Todays yield [kWh]**

Display of the heat quantity that has been supplied by the solar panel system today.

**Daily yield 1 ... 6 days ago**

Shows the historical progression of the solar panel system. The yields of the last 6 days are available.

**Total yield [kWh]**

Display of the heat quantity which has been supplied by the solar panel system since activation of the heat meter.

**Total yield [MWh]**

Display of the heat quantity which has been supplied by the solar panel system since activation of the heat meter.

**DHW tank bottom temperature**

Current temperature in the area of the reference sensor of the solar panel system.

**Heat exchanger sec. return temperature (line to buffer tank)**

**Prerequisite:** Hydraulic system 12 or 13

Current temperature at heat exchanger flow on the secondary side.

**Collector pump runtime**

Display of the total runtime of the collector pump.

**Number of switch cycles of the isolating valve**

Indicates the number of switch cycles of the solar isolating valve that switches between two heat sinks (e.g. upper and lower solar element).

**Collector pump control**

Display of the current speed of the collector pump as a percentage of maximum speed.

**Pump between heat exchanger and DHW tank**

**Prerequisite:** Hydraulic system 12

Display of the current speed of the pump between heat exchanger and DHW tank.

**Diverter valve for top/bottom coils**

**Prerequisite:** Hydraulic system 12 or 13

Current control of the isolating valve on the solar side.

- **0%** ... bottom buffer tank
- **100%** ... top buffer tank

**Current control status of the collector – DHW tank pump**

**Prerequisite:** Solar System 3 on the DHW tank and buffer tank

Indicates the current control status of the collector pump between the collector and DHW tank.

**Current control status of the collector – buffer tank pump**

**Prerequisite:** Solar System 3 on the DHW tank and buffer tank

Indicates the current control status of the collector pump between the collector and buffer tank.

**Collector - buffer tank pump runtime**

**Prerequisite:** Solar System 3 on the DHW tank and buffer tank

Specifies the operation hours of the pump between the collector and buffer tank.

**Collector - DHW tank pump runtime**

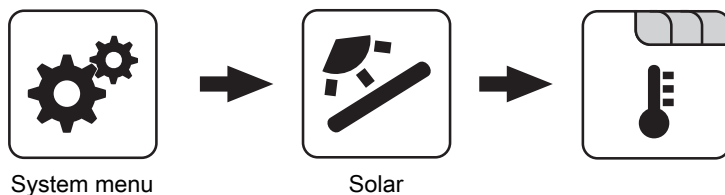
**Prerequisite:** Solar System 3 on the DHW tank and buffer tank

Specifies the operation hours of the pump between the collector and DHW tank.

**Goal of solar loading**

Indicates which heat sink (buffer tank, DHW tank) is currently being loaded.

### 4.3.2 Solar - Temperatures



#### Boiler target temperature during solar charging

Up to this temperature the DHW tank is heated by the solar system. If the solar panel system is equipped with an isolating valve for switching between DHW tank and buffer solar coil, then this parameter is responsible for switching between both of these solar coils.

#### Temp differential to start collector pump

The collector pump activates when the collector temperature exceeds the reference temperature in the DHW tank or buffer tank by this value.

#### Temp difference to stop collector pump

The collector pump switches off when the difference between the collector temperature and reference temperature in the DHW tank or buffer tank is lower than this value.

#### Maximum buffer tank bottom temperature during solar charging

**Prerequisite:** Hydraulic system 12 or 13

If the sensor for the solar reference temperature in the buffer tank exceeds the specified value, the collector pump is switched off.

#### Minimum collector temperature

Minimum temperature at collector which must be reached in order for the solar control to start.

#### Collector/pump protection from a collector temp.

If the measured value of the solar collector sensor exceeds the set value, the solar collector must cool down by 20°C within 15 minutes, otherwise the solar collector pump stops in order to protect the pump.

#### Heat exchanger - buffer tank pump start delay

**Prerequisite:** Hydraulic system 12 or 13

Delay for switching on the pump between heat exchanger and buffer tank.

#### Heat exchanger – buffer tank pump stop delay

**Prerequisite:** Hydraulic system 12 or 13

Delay for switching off the pump between heat exchanger and buffer tank.

#### Buffer tank top solar setpoint (fast loading until this temperature)

**Prerequisite:** Hydraulic system 12 or 13

When the upper sensor in the buffer tank reaches the specified value, the solar isolating valve switches to the lower area of the buffer tank.

#### Collector - buffer tank top differential

**Prerequisite:** Hydraulic system 12 or 13

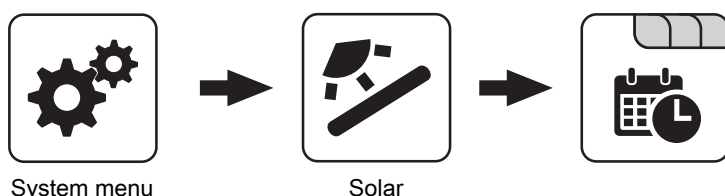
This is the overcharge for the collector pump controller for the top or bottom temperature in the buffer tank.

#### Top buffer tank – secondary HE flow difference

**Prerequisite:** Hydraulic system 12 or 13

This parameter indicates how much lower the temperature at the heat exchanger secondary outfeed is than the collector temperature should be. If the difference is less than the set value, the speed of the pump between heat exchanger, DHW tank and buffer tank is reduced.

### 4.3.3 Solar - Times



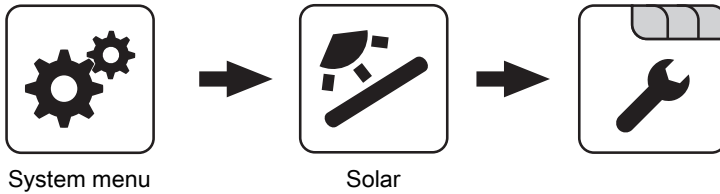
#### The solar panel system pump is allowed to start from

If the criteria for starting the collector pump have been reached after the set time, the collector pump starts.

#### The solar panel system pump is allowed to run until

Also when the criteria for starting the collector pump have been reached, the collector pump is only active up to the set time.

### 4.3.4 Solar - Service



#### Solar system

- **1:** The solar panel system supplies only the DHW tank
- **2:** The solar panel system supplies only the buffer tank
- **3:** The solar panel system is expanded with a switch valve and is used to supply two different heat sinks. For example: Switch from domestic hot water tank to buffer tank, or between top and bottom solar coils with the hygienic solar layered tank or modular solar layered tank with 2 solar coils)

**NOTICE!** This parameter is not displayed when hydraulic system 12 or 13 is set.

#### Pump output of collector pump

Pump outlet to which the collector pump is connected.

#### Control of the collector pump

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" ► 80

#### Minimum collector pump speed

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

#### Maximum collector pump speed

If for systemic reasons you need to limit the maximum speed of the collector pump you can do so by adjusting this parameter.

#### Collector monitoring

- **YES:** The collector pump is switched on at regular intervals for 10 seconds. The time can be defined using the following parameter. If the collector sensor detects an increase in temperature, the pump remains activated continuously. This function is active from 8:00 am - 7:00 pm and the threshold value of the collector temperature, from which this function is active, is dynamically adjusted.
- **NO:** The collector pump starts only when the criterion which is defined under parameter "Temp differential to start collector pump" is reached.

#### Collector monitoring every

If the collector pump is not active within the time window between 8:00 am – 7:00 pm, the pump is activated for 10 seconds at the end of the specified time set. If the collector sensor detects an increase in temperature, the pump remains activated continuously. If no temperature increase on the collector sensor is detected, the collector pump switches off and the time restarts from zero.

#### DHW tank priority for solar loading

- **YES:** The DHW tank is loaded until the temperature set under „Set DHW temperature for solar charging“ is reached.. Only then does it switch to the buffer tank by means of the switch valve.
- **NO:** The DHW tank is loaded until the temperature difference between the sensor on the solar collector and the solar reference sensor in DHW tank is no longer sufficient. The switch valve then switches to the buffer tank and supplies it for 20 minutes. Afterwards the collector pump is stopped for 20 minutes and a check is carried out to see if the temperature difference is now sufficient for DHW tank charging.

#### Solar charging to which buffer tank

This parameter defines the buffer tank to which the solar charging takes place.

#### Solar charging to which DHW tank

This parameter defines the DHW tank to which the solar charging takes place.

#### Sensor input of solar collector sensor

Sensor input to which the collector sensor is connected.

#### Sensor input of solar reference buffer tank top sensor

**Prerequisite:** Hydraulic system 12 or 13

Sensor input to which the solar reference sensor in the top part of the buffer tank is connected.

#### Sensor input of solar reference buffer tank bottom sensor

Sensor input to which the solar reference sensor in the lower part of the buffer tank is connected.

#### Sensor input of secondary HE sensor flow

**Prerequisite:** Hydraulic system 12 or 13

Sensor input to which the sensor at heat exchanger flow on the secondary side is connected.

#### Sensor input of the collector return sensor

Sensor input to which the sensor for the collector return is connected.

#### Pump output of the solar isolating valve

Pump outlet to which the solar isolating valve is connected.

**Pump output of buffer tank – heat exchanger pump****Prerequisite:** Hydraulic system 12 or 13

Pump outlet to which the pump between the solar heat exchanger and buffer tank is connected.

**Control of buffer tank – heat exchanger pump****Prerequisite:** Hydraulic system 12 or 13

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" [► 80]

**Pump outlet of DHW tank – heat exchanger pump****Prerequisite:** Hydraulic system 12

Pump outlet to which the pump between the solar heat exchanger and DHW tank is connected.

**Control of DHW tank – heat exchanger pump****Prerequisite:** Hydraulic system 12

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" [► 80]

**Invert switch valve output****Prerequisite:** Solar system 3, hydraulic system 12 or 13

- **NO:** The pump outlet to which the solar switch valve is connected is supplied with 230V if the solar panel system is supplying energy to the DHW tank solar element or the top part of the buffer tank. If there is not 230V at this output, the valve clears the way to the buffer tank solar element or the lower area of the buffer tank.
- **YES:** If the solar switch valve switches incorrectly, the way it is controlled can be adjusted using this parameter.

**Is a PT1000 sensor used as a solar sensor?**

- **NO:** A KTY81 sensor is used as a collector sensor
- **YES:** A PT1000 sensor is used as a collector sensor

**Collector pump control Kp value**

Control parameter for the speed control of the collector pump.

**Collector pump control Tn value**

Control parameter for the speed control of the collector pump.

**Secondary HE pumps control Kp value****Prerequisite:** Hydraulic system 12 or 13

Control parameter for the speed control of the pump between the solar heat exchanger and buffer tank, as well as for the pump between the solar heat exchanger and DHW tank (if installed).

**Secondary HE pumps control Tn value****Prerequisite:** Hydraulic system 12 or 13

Control parameter for the speed control of the pump between the solar heat exchanger and buffer tank, as well as for the pump between the solar heat exchanger and DHW tank (if installed).

**Minimum pump speed secondary HE****Prerequisite:** Hydraulic system 12 or 13

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

This parameter applies to the pump between the solar heat exchanger and the buffer tank, as well as to the pump between the solar heat exchanger and DHW tank (if installed).

**Control of collector - DHW tank pump**

Adjustable parameters for the control type of the pump between the collector and DHW tank.

**Control of the collector - buffer tank pump**

Adjustable parameters for the control type of the pump between the collector and buffer tank.

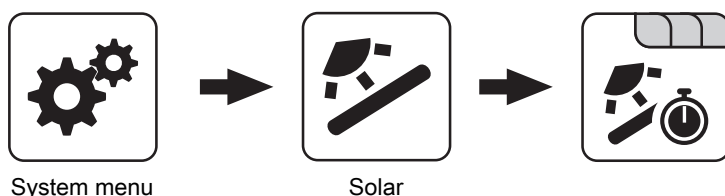
**Pump output of the collector - DHW tank pump**

Adjustable parameters for the initial configuration of the pump between the collector and DHW tank.

**Pump output of the collector - buffer tank pump**

Adjustable parameters for the initial configuration of the pump between the collector and buffer tank.

### 4.3.5 Solar - Heat meter

**Collector temperature**

Display of the current temperature at the solar collector.

**Collector return temperature****Prerequisite:** Hydraulic system 12 or 13

Display of the current temperature at the collector return.

**Actual power from solar heat meter [kW]**

Display of the current output which is generated by the solar collector. The calculation of the output is only performed either when a per litre output of the collector pump has been set or an external volume pulse transmitter is used. In order to perform the calculation more precisely, the use of a collector return sensor is recommended.

**Flow through [l/h]**

**Prerequisite:** External volume pulse transmitter installed

Display of the water quantity currently being pumped through the solar collector.

**Today's yield [kWh]**

Display of the heat quantity that has been supplied by the solar panel system today.

**Daily yield 1 ... 6 days ago**

Shows the historical progression of the solar panel system. The yields of the last 6 days are available.

**Total yield [kWh]**

Display of the heat quantity which has been supplied by the solar panel system since activation of the heat meter.

**Nominal flow of collector pump for heat meter [L/h]**

If no external volume pulse transmitter is used, the pump of the heat meter can be activated by entering the per litre output. The flow rate at 100% collector pump speed must be entered here.

**NOTICE!** This parameter can be ignored if using an external volume pulse transmitter!

**Litres per pulse of flow through meter**

If an external volume pulse transmitter is used, adjust this value according to the volume pulse transmitter used [0.5 – 5 pulses/L].

**Sensor input of the collector return sensor**

Sensor input to which the sensor for the collector return is connected.

**Sensor input of heat meter flow temperature sensor**

Sensor input to which the sensor for the heat meter flow temperature is connected.

**Is an external flow meter used?**

- **YES:** An external volume pulse transmitter is in use.

**Total yield [MWh]**

Display of the heat quantity which has been supplied by the solar panel system since activation of the heat meter.

**Collector flow temperature**

Indicates the temperature of the sensor in the flow to the collector. This can optionally be configured and is necessary for measuring heat quantity. If no flow temperature sensor is configured, the collector temperature is used.

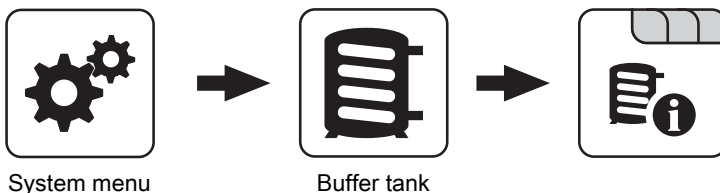
**Heat exchanger sec. return temperature (line to buffer tank)**

**Prerequisite:** System 12 or System 13

For solar systems with an external heat exchanger, the outlet temperature from the heat exchanger is recorded as a secondary measurement.

## 4.4 Buffer tank

### 4.4.1 Buffer tank - Status

**Buffer tank top temperature**

Display of the current temperature in the top part of the buffer tank.

**Storage tank temperature sensor 2 ... 7**

**Prerequisite:** Multi-sensor management with 3 – 8 sensors

Displays the current temperature at the respective sensor position at the storage tank. All of the configured sensors are used to calculate the storage tank charge status.

**Buffer tank middle temperature**

**Prerequisite:** Middle buffer tank temperature sensor installed

Display of the current temperature in the mid area of the buffer tank.

**Buffer tank bottom temperature**

Display of the current temperature in the lower part of the buffer tank.

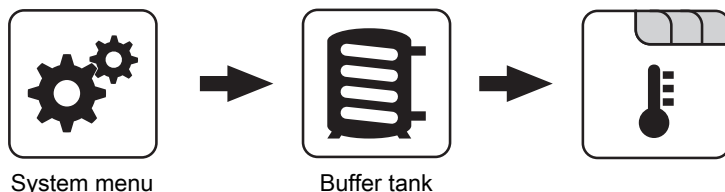


**Buffer tank pump control**

Display of the current speed of the buffer loading pump.

**Storage tank charge**

Display of the current storage tank charge.

**4.4.2 Buffer tank - Temperatures****Heating circuit release from following buffer tank temperature**

Temperature value which must be reached to release the heating circuit pumps in the top part of the buffer tank.

**NOTICE! This parameter applies for all available heating circuits!**

**Temperature difference between boiler and border layer**

**Prerequisite:** Middle buffer tank temperature sensor installed and mid buffer controller active

The boiler controller attempts to maintain the boiler setpoint temperature minus the value set here, using the speed control of buffer loading pump.

**Boiler start if there is a difference between the boiler temperature setpoint and the top buffer tank temperature**

If the difference between the upper buffer tank temperature and the boiler temperature setpoint is greater than the specified value, the boiler starts.

**Start of buffer tank charging from charge**

**Prerequisite:** Master boiler in the cascade or hydraulic system 4

If the buffer tank charge is below the specified value, the boiler starts.

**100% boiler control output when buffer charge is lower than**

**Prerequisite:** Master boiler in the cascade or hydraulic system 4

If the buffer tank charge is below the specified value, the boiler system runs at nominal load.

**0% boiler output if buffer charge is over**

**Prerequisite:** Master boiler in the cascade or hydraulic system 4

If the buffer tank charge is greater than the specified value, the boiler system follows the shutdown procedure.

**Storage tank charge is 100% at boiler setpoint parameter**

**Prerequisite:** Master boiler in the cascade or hydraulic system 4

The buffer tank charge is 100% if the average temperature of the buffer tank is below the specified boiler temperature setpoint by the specified value. This parameter defines the end point of the charging curve of the buffer tank.

**Buffer tank fully loaded if temperature difference between boiler and bottom buffer tank**

From this difference between the boiler temperature setpoint that has been set and the current temperature in the lower part of the buffer tank, buffer tank loading is stopped.

**Storage tank – buffer tank difference**

**Prerequisite:** Variant 3

Difference, which must be given for loading a buffer tank e.g. in an adjacent building. If this difference is not reached, the buffer tank loading stops.

**Top buffer temp. when the start-up relief valve switches to bottom buffer**

If the temperature set is exceeded at top sensor in buffer tank, the start relief valve switches to bottom buffer tank.

**Buffer tank charge is 100% at boiler setpoint parameter**

The buffer tank charge is 100% if the average temperature of the buffer tank is below the specified boiler temperature setpoint by the specified value. This parameter defines the end point of the charging curve of the buffer tank to calculate the amount of fuel required to load the buffer tank.

**Buffer tank charge is 0% at the following temperature (absolute value)**

The buffer tank charge is 0% if the average temperature of the buffer tank reaches the specified value. This parameter defines the base point of the charging curve of the buffer tank.

### 4.4.3 Buffer tank - Service



System menu



Buffer tank



#### Enable heating circuit pump 0 according to top buffer temp

- **NO:** Enable heating circuit pump 0 according to the boiler temperature parameter „Minimum boiler temperature to release all pumps“
- **YES:** Enable heating circuit pump 0 according to the temperature in the upper part of the buffer tank parameter "Heating circuit release from following buffer tank temperature" "Heating circuit release from following buffer tank temperature"

#### Residual heat use

**Prerequisite:** Return temperature control with mixing valve

**YES:** Diverts the residual energy to the buffer tank, the "Minimum boiler temperature to release all pumps" parameter is ignored. Minimum boiler temperature to release all pumps" parameter is then ignored. The pump is activated at minimum speed until the boiler temperature is lower than the bottom buffer tank temperature +3°C.

#### Mid buffer controller active? If No the sensor is only a display

**Prerequisite:** Middle buffer tank temperature sensor installed

- **NO:** The sensor in the mid area of the buffer tank is shown on the display.

**YES:** The sensor in the middle area of the buffer tank is used for the border layer loading function.

#### Sensor input of buffer tank top sensor

Sensor input to which the sensor in the top part of the buffer tank is connected.

#### Sensor input of buffer tank sensor 2-7

The number of sensors displayed depends on the configuration. All of the configured sensors are used to calculate the buffer tank charge status.

#### Sensor input of buffer tank middle sensor

Sensor input to which the sensor in the mid area of the buffer tank is connected.

#### Sensor input of buffer tank bottom sensor

Sensor input to which the sensor in the bottom part of the buffer tank is connected.

#### Pump output of buffer tank pump

Pump outlet to which the buffer loading pump is connected.

#### Control of buffer tank pump

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" ► 80]

#### Minimum buffer tank pump speed

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

#### Maximum buffer tank pump speed

If for system operation reasons you need to limit the maximum speed of the buffer tank loading pump you can do so by adjusting this parameter.

#### Refill calculation active (sensors have to be assigned correctly)

- **YES:** When opening the insulated door a recommendation message regarding the amount of fuel required to load up the layered tank appears on the display.

#### Minimum value for the reload quantity

If the calculated reload quantity is less than the minimum value setting, an instruction is displayed to the user that he need not heat up/reload.

#### Is a hygienic layered tank used

- **YES:** If a hygienic layered tank (combi tank) is used, 1/3 of the storage volume is subtracted when calculating the amount of fuel.

#### Volume of the used buffer tank

The buffer tank volume set here is used for calculating the required amount of fuel to fully load the buffer tank.

#### If the boiler is active then charge all buffer tanks

**Prerequisite:** Variant 3 or variant 4

**YES:** Starting the boiler due to a heating requirement by the buffer tank in the boiler system loads not only this buffer tank, but all of the buffer tanks in sub-stations. This increases the runtime related to a boiler system start.



**Pump outlet for buffer tank relief valve**

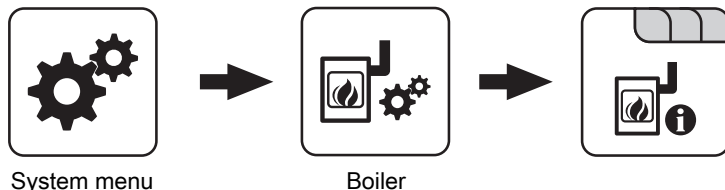
The switch valve switches off part of the layered tank until an adjustable temperature has been reached in the top layer of the tank so that the boiler reaches the temperature more quickly. Once this temperature has been reached, the switch valve switches back and the entire volume of the layered tank is available to the boiler.

**Invert pump outlet for buffer relief valve**

- **YES:** If the valve switches incorrectly, the way it is controlled can be changed using this parameter.

## 4.5 Boiler

### 4.5.1 Boiler - Status

**Boiler temperature**

Display of the current boiler temperature.

**Flue gas temperature**

Display of the current flue gas temperature. If a flue gas temperature sensor is not connected, the board temperature of the core modules is displayed.

**Flue gas temperature after condenser heat exchanger**

Shows the current flue gas temperature after calorific value heat exchanger.

**Flue gas setpoint**

Display of the calculated flue gas setpoint.

**Boiler control variable**

Display of the signal for the combustion controller.

**ID fan control**

Display of the current ID fan control.

**ID fan speed**

Display of the current ID fan speed.

**Primary air**

Display of the current value of the primary air flap according to controller.

**Position of primary air flap**

Display of the current position of the primary air flap (adjusted for the air settings).

**Residual oxygen content**

Display of the current residual oxygen content.

**Oxygen control**

Display of control of primary and secondary air flap.

**Secondary air**

Display of the current value of the secondary air flap according to controller.

**Position of secondary air flap**

Display of the current position of the secondary air flap (adjusted for the air settings).

**Sensor 1**

Display of the current temperature at sensor 1.

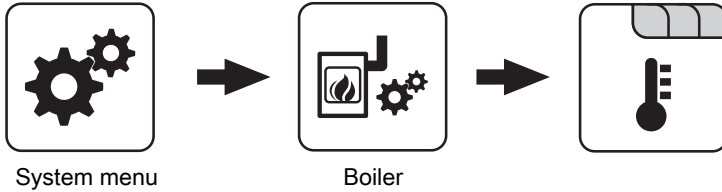
**Return sensor**

**Prerequisite:** Return temperature control with mixing valve or bypass pump  
Display of the current temperature at the boiler return.

**Return pump controller**

Reports the current speed of the return lift pump (bypass pump) in percent.

### 4.5.2 Boiler - Temperatures



#### Boiler temperature setpoint

The boiler temperature is regulated to this temperature. Setting range 70 – 90°C

#### Shutdown if current boiler temperature is higher than boiler setpoint +

If the boiler temperature setpoint is exceeded by this value, the boiler switches to “slumber” status. The boiler starts up again below the boiler temperature setpoint.

#### Always shutdown when boiler maximum setpoint is exceeded by +

If the maximum boiler temperature setpoint is exceeded by this value, the available heating circuit pumps and DHW tank loading pumps are also activated for cooling the boiler. If the current boiler temperature falls below the boiler temperature setpoint, the boiler starts up again.

#### Minimum boiler temperature to enable all pumps

When the current boiler temperature reaches this value, the buffer tank loading pump starts (hysteresis: 2°C).

**Recommendation for PE1 Pellet and P4 Pellet:** For systems with a storage tank, this value should be about 20°C below the specified boiler temperature setpoint (prevention of cold through flow!).

#### Minimum return temperature

**Prerequisite:** Return temperature control with mixing valve

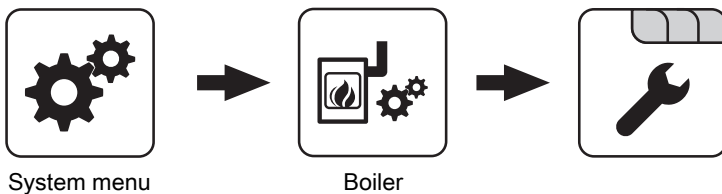
Minimum temperature of return to the boiler.

#### Enable return mixer only with active storage tank pump

**Prerequisite:** “Variant 2 and 5” or “Variant 3”

Return mixer is controlled only when the store loading pump is active. If the pump stops, the mixer closes the total return / opens the bypass.

### 4.5.3 Boiler - Service



#### Mixer runtime

**Prerequisite:** Return temperature control with mixing valve

Setting the runtime of the mixer used for the return temperature control.

**Recommendation:** To reduce vibration of the mixer, do not set value to less than 150s!

#### Output fire off message using HCP0

- **NO:** The HKP0 output toggles as determined by the parameter „Minimum boiler temperature to release all pumps“.
- **YES:** The HKP0 output toggles when the boiler switches to “Fire Off” status.

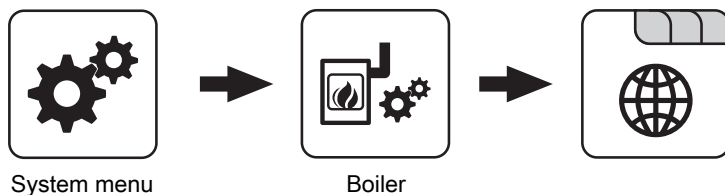
#### Control of bypass pump

Indicates the control type of the RL lift pump.

#### Minimum speed of shunt pump

Indicates the minimum speed of the RL lift pump.

## 4.5.4 Boiler - General settings



### Fuel selection

- **Dry firewood:** If firewood is to be burnt with a water content of less than 15%, this setting should be selected. A prompt then appears to confirm whether the specified values for the chosen fuel selection should be adopted.
- **Wet firewood:** If firewood is to be burnt with a water content of more than 15%, this setting should be selected. A prompt then appears to confirm whether the specified values for the chosen fuel selection should be adopted.

### Abort heating up --> ID fan off, close air flaps

- **NO:** The heating up process is not aborted.
- **YES:** If the criteria for "Off" is reached, the heating up process of the boiler can be cancelled. The air flaps close, the induced draught fan stops.

**NOTICE!** In order to cancel the heating up process, the criteria for "Off" must be fulfilled!

The current flue gas temperature is set lower than under "Flue gas temperature, below which boiler switches to OFF status".

The current residual oxygen content is higher than that set under "Residual oxygen content, above which it switches to OFF".

### Modem installed

- **NO:** The boiler does not have a modem for data transfer installed.
- **YES:** The boiler has a modem for data transfer installed.

### Memory cycle of data logger

If the boiler is equipped with a data logger the most important boiler data is stored on a SD card. This parameter specifies at what intervals the recording should be started.

### Which temperature scale should be used

- **Celsius (°C):** Displayed temperature values and settings are shown in °C.
- **Fahrenheit (°F):** Displayed temperature values and settings are shown in °F.

### Always log data in °C

- **YES:** In conjunction with a data logger, all temperature values are saved in °C.
- **NO:** In conjunction with a data logger, all temperature values are saved in °F.

### Send a line break when ASCII data output on COM2

- **NO:** When a new data set is issued it will be added to the previous one.
- **YES:** A line break for better visualisation is sent between the individual data sets.

### Reset counter since last maintenance to 0

- **NO:** The service hours counter since last maintenance continues to run.
- **YES:** The service hours counter since last maintenance is set to "0".

### Source for ext. power demand (0 - off, 1 - 0-10V, 2 - Modbus)

Defines whether the boiler is controlled via an external power demand. If "1 - 0-10V" or "2 - Modbus" is selected as the source, the boiler release and output can be controlled via an adjustable input at the analogue module (0-10V) or via the Modbus.

➔ "External power demand" [► 27]

### Invert ext. power demand via analogue input

The purpose is to invert the input signal (0V = 0% ⇒ 0V = 100%).

### Input external power demand

Current input value for the external power demand.

### Current external power demand

Current effective specified value for the boiler taking the minimum times into consideration.

### Adopt specified material values

**YES:** The preset boiler parameters for the chosen fuel selection are adopted. When the process is completed the parameter changes back to "NO".

### Adopt specified boiler values

**YES:** The preset boiler parameters for the selected boiler type are adopted. When the process is completed the parameter changes back to "NO".

### EEPROM reset

- **YES:** All boiler settings and system configurations are deleted! The boiler is only functional again once it has been recommissioned by Froling customer services or authorized installer!

**Analogue module input for external power demand**

Defines the input for the external power demand with a specified power of "0-10V" (address of analogue module and input terminal, e.g. 0.3).

**The system is filled with frost protection**

**YES:** No error is triggered when the boiler falls to less than 2°C. The parameter has no effect on the other sensors.

**Show info page QM wood processing plants**

If this parameter is set to "YES", an extra page with information for "QM wood processing plants" is displayed in the info menu.

**Boiler - General settings - MODBUS settings**

System menu



Boiler



MODBUS settings

**COM 2 is used as a MODBUS interface**

- **NO:** The COM 2 interface sends the most important boiler values every second.
- **YES:** The COM 2 interface can be used to connect a MODBUS (RTU/ASCII).

**MODBUS address**

Defines the address of the boiler in the Modbus network.

**MODBUS protocol (1 – RTU / 2 – ASCII)**

Indicates which Modbus protocol is to be used for the transfer. Which protocol must be used can be found in the documentation of the Modbus system used on site.

**Use MODBUS protocol 2014?**

Indicates whether the Modbus protocol 2014 is to be used for communication. In this version, parameters can be written at the customer level. In addition to the previous version, the element addresses are newly grouped thematically.

If the parameter is set to "NO", the functionality and the element addresses remain the same as in the previous version to ensure compatibility with existing systems in the event of software updates.

**Boiler - General settings - Operator data**

System menu



Boiler



Operator data

**Production number**

For unique identification of the boiler on the froeling-connect server, the facility number listed on the identification plate must be set here.

**Customer number**

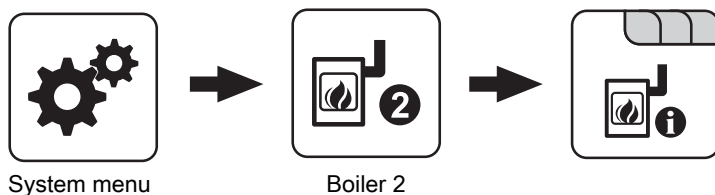
By setting the customer number, this is automatically transferred into the commissioning report when it is saved.

**Boiler number**

By setting the boiler number, this is automatically transferred into the commissioning report when it is saved.

## 4.6 Boiler 2

### 4.6.1 Boiler 2 - Status



#### Temperature of backup boiler

Displays the current boiler temperature of the backup boiler.

#### Burner relay status

Shows the current status of the burner relay:

- **0:** Backup boiler not active
- **1:** Backup boiler active

#### Backup boiler pump

**Prerequisite:** Set the parameter "Switch valve installed" to "NO"

Display of the current pump control for the standby boiler.

#### Standby boiler switch valve

**Prerequisite:** Set the parameter "Switch valve installed" to "YES"

Display of the current switch valve control of the standby boiler.

#### Manual start of backup boiler (only when the ID fan is switched off)

- **OFF:** Backup boiler is controlled according to the program that is set
- **ON:** Backup boiler is activated immediately

**NOTICE! Response to burner blockage!**

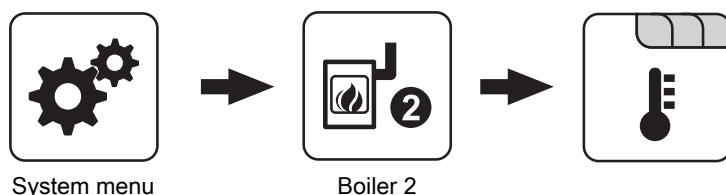
#### Heat pump mode

If a heat pump is used as a backup boiler, the operating mode will be displayed here. The operating mode selected is dependent on the outdoor temperature and flow temperature.

#### Heat pump status

Indicates the current status of the control process of the heat pump.

### 4.6.2 Boiler 2 - Temperatures



#### Secondary boiler start delay

If there is a requirement from the heating circuit or DHW tank and the buffer tank or boiler has insufficient temperature, the secondary boiler starts after the specified delay time set here.

#### Disable startup delay in case of fault?

Indicates whether the startup delay is ignored in the event of a boiler fault and whether the standby boiler is activated immediately on request.

#### Deactivate startup delay when boiler is switched off?

Indicates whether the startup delay is ignored when the boiler is switched off and whether the standby boiler is activated immediately on request.

#### Backup boiler start, if buffer tank top temperature is below

If the temperature in the top part of the buffer tank falls below the specified value, the backup boiler is started once the set duration has elapsed.

#### Start standby boiler only according to storage tank top

Standby boiler enabled after temperature decreases below minimum temperature on top buffer tank. No consumers are taken into consideration.

#### Secondary boiler minimum runtime

If the secondary boiler is started, it will run for at least the length of time set here.

**No heat pump operation when outside air temperature less than****Prerequisite:** Heat pump as standby boiler

The heat pump stops working below the set temperature. This avoids operation with high energy consumption when the temperature outside is cold.

**Maximum outfeed temperature for heat pump operation****Prerequisite:** Heat pump as standby boiler

If a flow temperature higher than the set value is required, the main boiler takes over.

**Main boiler minimum runtime****Prerequisite:** Heat pump as standby boiler

If the main boiler is in operation, it only shuts down after the minimum runtime of the main boiler if the criteria for heat pump operation are fulfilled. This should prevent excessively short runtimes of the main boiler.

**Minimum temperature of secondary boiler**

When the secondary boiler reaches the specified temperature, the loading pump is started and switches the isolating valve.

**Temperature difference between secondary boiler and buffer tank**

Temperature difference between secondary boiler and upper temperature in layered tank to activate the loading pump of the secondary boiler.

**Oil valve shut delay**

If the current boiler temperature of the backup boiler falls to less than the value that is set under „Minimum temperature of backup boiler“ the isolating valve does not trip until the set duration has elapsed.

**Backup boiler delivery temperature****Prerequisite:** Hydraulic system 3 in conjunction with a manually loaded backup boiler

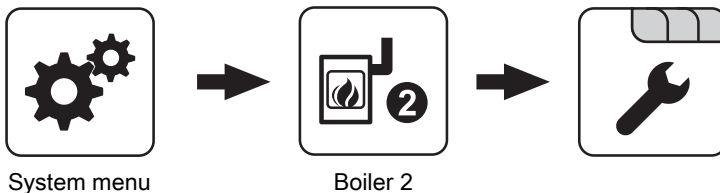
If the backup boiler exceeds the specified temperature, the isolating valve switches and skims the boiler.

**Main boiler startup delay****Prerequisite:** Backup boiler is manually fed

Specifies the delay time after which the main boiler is permitted to start again.

**Close delay for isolating valve**

Specifies the delay time after the shutdown of the backup boiler. After the set time the valves switches back to the main boiler. This allows the backup boiler it has a certain period during which it can be warmed up after it was shut down.

**4.6.3 Boiler 2 - Service****Control backup boiler variably to the target value**

- **NO:** The backup boiler is operated at the boiler temperature set by the backup boiler thermostat.
- **YES:** The boiler temperature of the backup boiler is regulated to the target temperature specified by the heating circuit or DHW tank.

**Sensor input of backup boiler sensor**

Sensor input to which the sensor for the backup boiler is connected.

**Which pump output is used for unloading the backup boiler**

Pump outlet to which the loading pump of the backup boiler or the backup boiler switch valve is connected.

**Control of boiler 2 pump**

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" [► 80]

**Maximum backup boiler 2 pump speed**

If for system operation reasons you need to limit the maximum speed of the loading pump of the backup boiler you can do so by adjusting this parameter.

**Invert the backup boiler isolating valve**

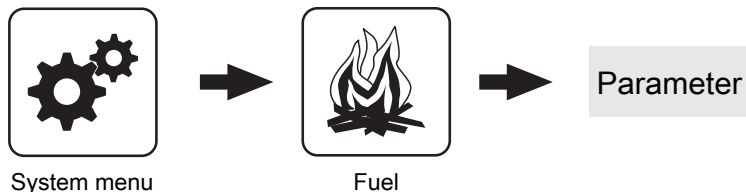
**YES:** If the valve switches incorrectly, the way it is controlled can be adjusted using this parameter.

**Burner relay**

- **A:** Standby boiler is controlled according to the program that is set.
- **1:** Standby boiler was started manually.
- **0:** Backup boiler was stopped manually.

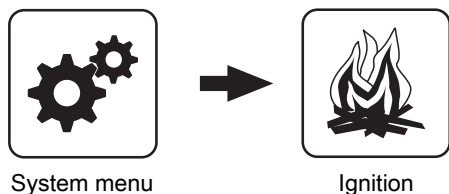
## 4.7 Fuel

### 4.7.1 Fuel - Parameter

**Fuel selection**

- **Dry firewood:** If firewood is to be burnt with a water content of less than 15%, this setting should be selected. A prompt then appears to confirm whether the specified values for the chosen fuel selection should be adopted.
- **Wet firewood:** If firewood is to be burnt with a water content of more than 15%, this setting should be selected. A prompt then appears to confirm whether the specified values for the chosen fuel selection should be adopted.

## 4.8 Ignition

**Automatic ignition**

- **NO:** Automatic ignition deactivated
- **YES:** Automatic ignition activated.

**Ignition time (date - time)**

Day (date or daily) and time setting for the start of ignition. The parameter is active only if the parameter "Start ignition" is set to "by time" „Start ignition" is set to "Date and time", "Buffer tank min" or "Buffer < maximum flow temperature".

**NOTICE! The boiler status must generally be "Ignition wait" for ignition to start! Follow the instructions for heating up with the automatic ignition!**

- **"Date and time" method:** Ignition starts at the specified time exactly. If the parameter is set to "daily" instead of the date, ignition starts every day at the specified time.
- **"Buffer tank min" method:** The ignition process starts if heat is requested from the buffer tank from the specified time (parameter „Boiler start if difference between boiler setpoint and top buffer tank is larger"). The period applies from the specified time until 24:00 h on the specified date. If the specified time is not subsequently changed and ignition is not disabled, the buffer tank loading criterion applies daily from the specified time.
- **"Buffer < maximum flow temperature" method:** The maximum flow temperature required by the system environment (e.g. heating circuit) is compared with the current buffer tank temperature from the specified time. The ignition process starts if the top buffer tank temperature falls below the maximum flow temperature setpoint. The period applies from the specified time until 24:00 h on the specified date. If the specified time is not subsequently changed and ignition is not disabled, the start criterion applies daily from the specified time.

**Maximum ignition duration**

Specifies how long the ignition procedure should last. The "Heating" status must be reached within this time.

**Increased induced draught fan activation during ignition**

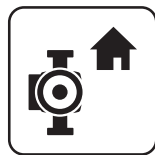
Cycle time after which the induced draught fan controller is raised by 1% during "Ignition" status.

## 4.9 Network pump

### 4.9.1 Network pump - Status



System menu



Network pump

**Network return temperature**

Display of the current return temperature of the remote line.

**Network pump speed**

Specifies the current speed of the network pump.

**Return temperature distributor 1**

**Prerequisite:** Variant 1 and feeder pump for distributor 1 installed

Display of the current return temperature from distributor 1.

**Speed, distributor 1 pump**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

Display of the current speed of distributor 1 pump.



**Return temperature distributor 2 ... 4**

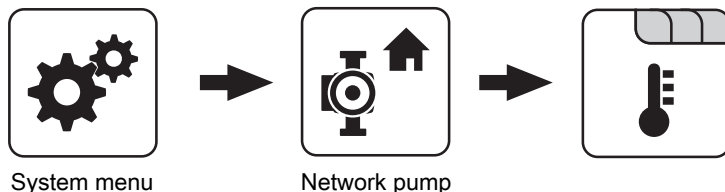
**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Display of the current return temperature from distributor 2 ... 4.

**Speed, distributor 2 ... 4 pump**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Display of the current speed of the distributor 2 ... 4 pump.

**4.9.2 Network pump - Temperatures****Network return setpoint**

**Prerequisite:** Network pump installed

The network return setpoint is regulated to the value set here. When the network return temperature reaches the specified value, the network pumps starts up at minimum speed.

**Return temperature setpoint distributor 2 ... 4**

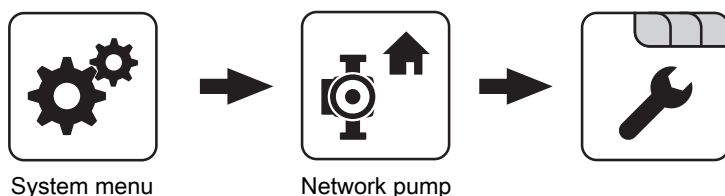
**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

The return temperature from distributor 2 ... 4 is regulated to the value set here. When the return temperature from distributor 2 reaches the specified value, the pump for distributor 2 ... 4 starts up at minimum speed.

**Return temperature setpoint distributor 1**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

The return temperature from distributor 1 is regulated to the value set here. When the return temperature from distributor 1 reaches the specified value, the pump for distributor 1 starts up at minimum speed.

**4.9.3 Network pump - Service****Switch on the network pump only when required by the buffer tank (variant 3 / 4)**

**Prerequisite:** Variant 3 or variant 4

- **NO:** The network pump is activated as soon as a consumer in the hydraulic system requires heat.
- **YES:** The network pump is only activated when one or more layered tanks require heat.

**NOTICE!** Parameter only relevant if a layered tank is installed in all buildings to be supplied!

**Sensor input of network return temperature sensor**

Sensor input to which the sensor for the network return temperature is connected.

**Pump output of network pump**

Pump outlet to which the network pump is connected.

**Control of network pump**

Definition of control signal for pump type used.

➡ ["Activation options of pump outlets" \[p. 80\]](#)

**Minimum speed of the network pump**

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

**Maximum speed of the network pump**

If for system operation reasons you need to limit the maximum speed for the network pump you can do so by adjusting this parameter.

**Sensor input of distributor 1 return sensor**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

Sensor input to which the sensor for the return distributor 1 is connected.

**Pump output of distributor 1 pump**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

Pump outlet to which the pump for distributor 1 is connected.

**Control of distributor 1 pump**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" ► 80]

**Minimum speed for distributor 1 pump**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

**Maximum speed for distributor 1 pump**

**Prerequisite:** Variant 1 and pump for distributor 1 installed

If for system operation reasons you need to limit the maximum speed of the distributor 1 pump you can do so by adjusting this parameter.

**Sensor input of distributor 2 ... 4 return sensor**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Sensor input to which the sensor for the distributor 2 ... 4 return is connected.

**Pump outlet of distributor 2 ... 4 pump**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Pump outlet to which the pump for distributor 2 ... 4 is connected.

**Activation of distributor 2 ... 4 pump**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" ► 80]

**Minimum speed for distributor 2 ... 4 pump**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

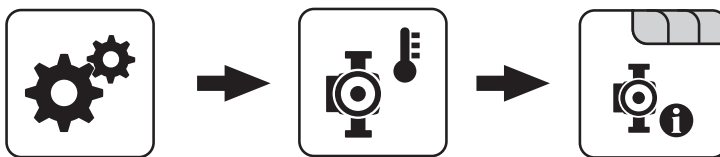
**Maximum speed for distributor 2 ... 4 pump**

**Prerequisite:** Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

If for system operation reasons you need to limit the maximum speed of distributors 2 ... 4 pump you can do so by adjusting this parameter.

## 4.10 Difference regulator

### 4.10.1 Difference regulator - Status



System menu

Difference regulator

**Heat source temperature**

Display of the current heat source temperature of the differential controller (e.g. tiled stove with water pocket, ...).

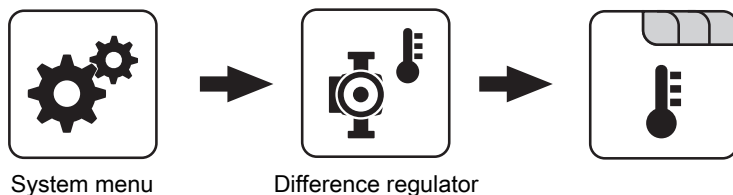
**Heat sink sensor**

Display of the current temperature of the heat sink for the differential controller (e.g. layered tank, etc.).

**Pump speed**

Specifies the current speed of the differential controller pump.

### 4.10.2 Difference regulator - Temperatures



#### Startup differential

Temperature difference between heat source and heat sink which must be reached to activate the pump of the differential controller.

#### Shutdown differential

If the temperature difference between the heat source and the heat sink falls below this value, the pump of the differential controller is deactivated.

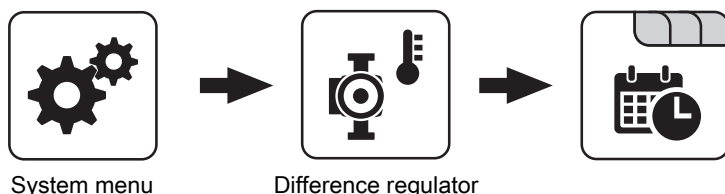
#### Minimum temperature for heat source

If the temperature in the heat source falls below this value the differential controller will be deactivated.

#### Maximum temperature for heat sink

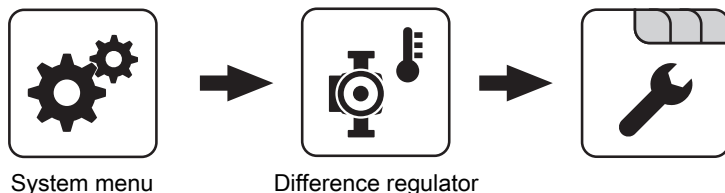
When the heat sink reaches this value, the pump of the differential controller is deactivated.

### 4.10.3 Difference regulator - Times



➔ "Setting times" [▶ 85]

### 4.10.4 Difference regulator - Service



#### Pump output of diff. control pump

Pump outlet to which the pump of the differential controller is connected.

#### Control of diff. control pump

Definition of control signal for pump type used.

➔ "Activation options of pump outlets" [▶ 80]

#### Minimum pump speed

Adjustment of the minimum speed to the pump type (set mode of pump in accordance with pump manufacturer).

#### Maximum pump speed

If for system operation reasons you need to limit the maximum speed of the pump of the differential controller you can do so by adjusting this parameter.

#### Sensor input of heat source sensor

Sensor input to which the heat source sensor is connected.

#### Sensor input of heat sink sensor

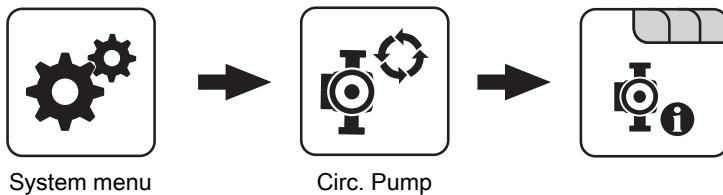
Sensor input to which the heat sink sensor is connected.

#### Sensor monitoring

- **YES:** If temperatures around freezing point occur, an error message appears on the display.
- **NO:** The error messages of the differential controller sensor are suppressed.

## 4.11 Circulation pump

### 4.11.1 Circulation pump - Status



#### Return temperature in circulation line

Display of the current temperature at the return feed sensor of the circulation line.

**NOTICE!** If the parameter “Return sensor present” is set to “NO”, 0°C is permanently displayed.

#### Flow switch on the domestic hot water line

- **0:** Flow switch detects no flow
- **1:** Flow switch detects flow

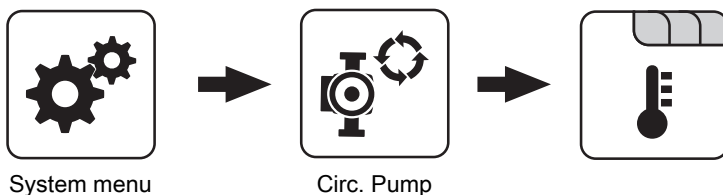
If the flow sensor is implemented as a push-button:

- **0:** The button is not pressed
- **1:** The button is pressed

#### Speed of the circulation pump

Specifies the current speed of the circulation pump.

### 4.11.2 Circulation pump - Temperatures



#### If the return sensor is present

- **NO:** The circulation pump is controlled according to time program. In conjunction with the use of a flow valve, the circulation pump is also activated at a signal from the flow valve.
- **YES:** The circulation pump is controlled according to time program and temperature at the return circulation line. In conjunction with the use of a flow switch, the circulation pump is also activated at a signal from the flow switch.

**NOTICE!** Connect the flow sensor as the return sensor!

#### The return temperature in the circulation pipe at which the pump is switched off

When the set temperature at the return circulation line is reached, the circulation pump is deactivated (3° hysteresis).

**NOTICE!** Parameter only relevant when using a return feed sensor in the circulation line!

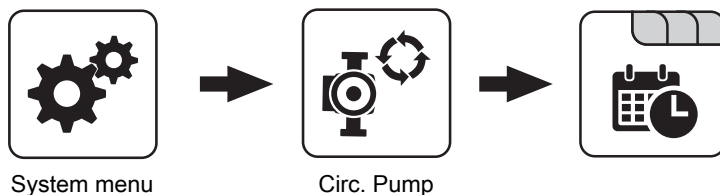
#### Circulation pump run-on

If the flow stops at the flow switch, the circulation pump still remains active for the time set.

If the flow switch is implemented as a push button, after the button is pressed the circulation pump still continues to run for the specified time.

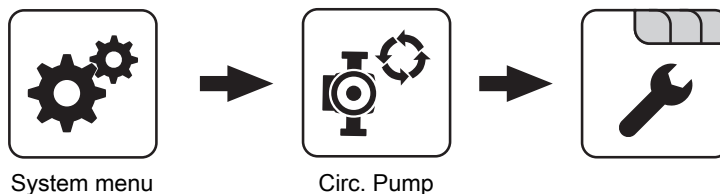
**NOTICE!** Parameter only relevant when using a flow switch!

### 4.11.3 Circulation pump - Times



↪ "Setting times" [▶ 85]

### 4.11.4 Circulation pump - Service



#### Sensor input of circulation return sensor

Sensor input to which the sensor at the return line of the circulation is connected.

#### Which sensor is used for the flow switch

Sensor input to which the flow switch is connected.

If the flow switch is implemented as a push button, connect the external button directly to the sensor input.

#### Pump output of circulation pump

Pump outlet to which the circulation pump is connected.

#### Control of circulation pump

Definition of control signal for pump type used.

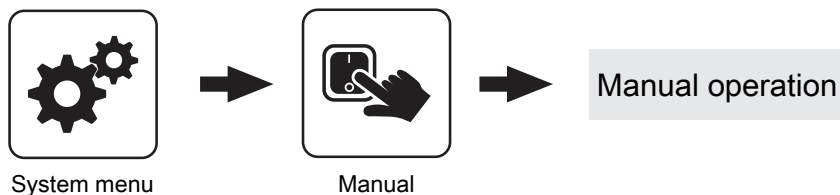
↪ "Activation options of pump outlets" [▶ 80]

#### Maximum speed of the circulation pump

If for system operation reasons you need to limit the maximum speed of the circulation pump you can do so by adjusting this parameter.

## 4.12 Manual

### 4.12.1 Manual - Manual operation



When exiting the “Manual operation” menu, all active parameters are automatically set to “OFF”! The parameters displayed depend on the boiler configuration!

#### WOS drive

- **ON:** The heat exchanger cleaning system is activated.

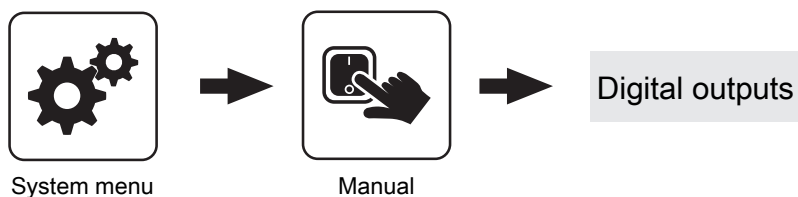
**NOTICE!** With PE1c Pellet, the WOS is activated via a combined drive with the ash screw!

#### Rinse the condenser manually – only possible if boiler off / on standby

- **ON:** The solenoid opens and the calorific value heat exchanger is cleaned.

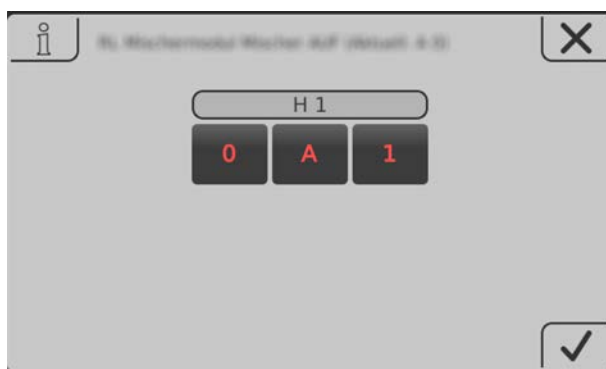
**NOTICE!** This parameter can only be activated when the boiler is in “Standby” or “Boiler off” status.

### 4.12.2 Manual - Digital outputs

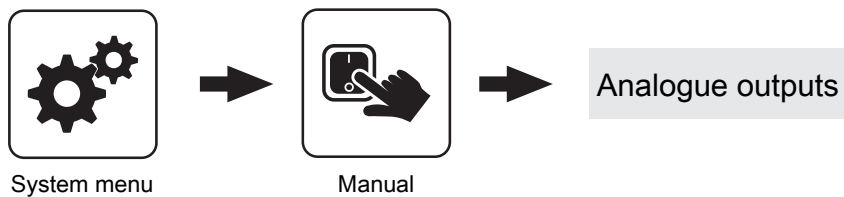


The parameters displayed depend on the boiler configuration!

- **A 0:** Automatic, Off; **A 1:** Automatic, On
- **1:** Manual, On
- **0:** Manual, Off

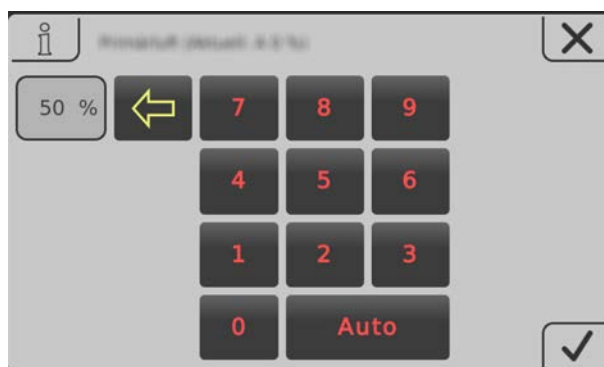


### 4.12.3 Manual - Analogue outputs

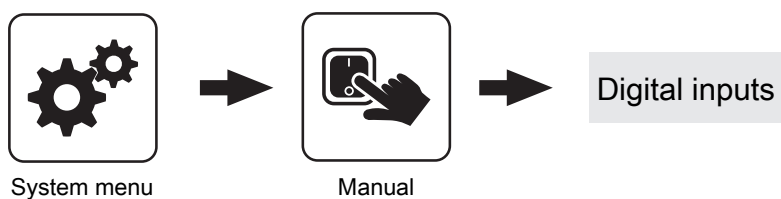


The parameters displayed depend on the boiler configuration!

- **A 0**: Automatic, Off; **A 1-100%**: Automatic, with % value ON
- **1-100%**: Manual, with % value ON
- **0%**: Manual, Off

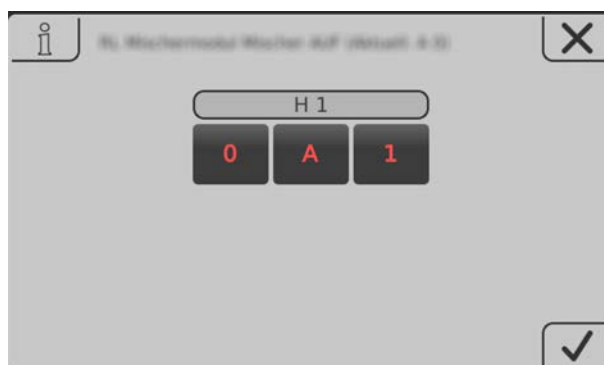


### 4.12.4 Manual - Digital inputs



The parameters displayed depend on the boiler configuration!

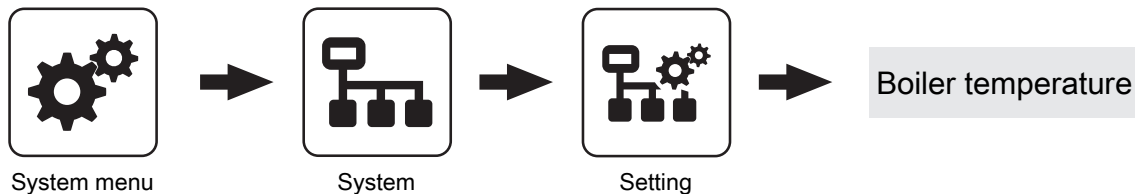
- **A 0**: Automatic, Off; **A 1**: Automatic, On
- **1**: Manual, On
- **0**: Manual, Off



## 4.13 System

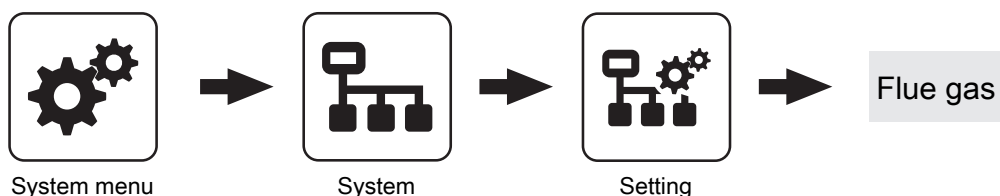
### 4.13.1 System - Setting

#### Setting - Boiler temperature



➔ "Boiler - Temperatures" [▶ 54]

#### Setting - Flue gas



##### Maximum heating up time, during which HEATING status must be reached

If the criteria for the "Heating" status is not reached after a specified time, it switches to "Heating" status regardless. If the flue gas temperatures rises and the residual oxygen content falls, the "Heating" status remains active. If the criteria for "Heating" status is not reached within 5 mins, the boiler switches to "Off" status.

##### Minimum flue gas temperature

Lowest operation point of flue gas temperature for continuous operation.

##### Max. flue gas temperature

Highest operation point of flue gas temperature for continuous operation.

##### Start increase of flue gas temperature

The flue gas temperature setpoint rises by the specified value set here during "Heating up" status.

##### 100% boiler output from a flue gas temperature of

Upper point of the start ramp of boiler controller. If the flue gas temperature reaches the value set here, the fuel output should reach 100%.

##### Minimum difference between flue gas temperature and boiler temperature in HEATING

As a condition for the "Heating" operating status, the difference between the current flue gas temperature and the current boiler temperature must at least exceed the value set here.

##### Flue gas temperature, below which boiler switches to OFF status

If flue gas temperature remains below this value throughout the period specified by „for themaximum heating up time during which HEATING status must be reached“, the boiler switches to "Off" operating status.

##### Activating the prompt to close the door

- **YES:** If the criteria for "Heating" status are reached when heating up, the "Close the door!" prompt appears on the display.
- **NO:** The "Close the door!" prompt is not displayed after reaching the criteria for the "Heating" status.

##### Increase of flue gas temperature for prompt to close the door

When the flue gas temperature rises by this value in "Heating up" status, the "Close the door!" prompt appears on the display.

##### Residual O2 content below which the instruction to close the door appears

When the residual oxygen content falls below this value in "Heating up" status, the "Close the door!" prompt appears on the display.

##### Desired work point of flue gas temperature

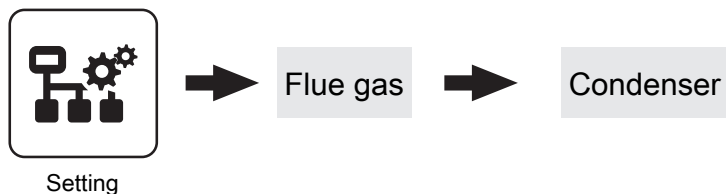
Flue gas temperature to be maintained in firewood operation under the influence of the boiler control variable.

##### Maximum ignition duration

Specifies how long the ignition procedure should last. The "Heating" status must be reached within this time.



## Condenser



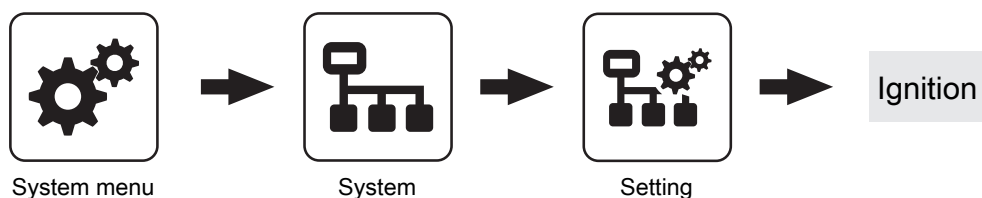
### Difference between return setpoint and boiler temp. in heat-up phase

The heat-up phase begins in the "Heating up" status and ends when the boiler temperature has reached the value set under "Boiler temperature from which all pumps are allowed to run". The return temperature setpoint is regulated in the heat-up phase according to the boiler temperature setpoint. The set value indicates the difference between the return temperature setpoint and the boiler temperature setpoint in the heat-up phase.

### Reduce pump release temp. in heat-up phase by

In firewood boilers with a calorific value heat exchanger, the store loading pump is enabled in the heat-up phase at a lower temperature. This ensures an earlier flow through the heat exchanger.

## Setting - Ignition



### Automatic ignition

- **NO:** Automatic ignition deactivated
- **YES:** Automatic ignition activated.

**Ignition time (date - time)**

Day (date or daily) and time setting for the start of ignition. The parameter is active only when the "Start ignition" parameter is set to "after elapsed time", "after storage tank" or "Storage tank outfeed max".

**NOTICE! The boiler status must generally be "Ignition wait" for ignition to start! Follow the instructions for heating up with the automatic ignition!**

- **"Date and time" method:** Ignition starts at the specified time exactly. If the parameter is set to "daily" instead of the date, ignition starts every day at the specified time.
- **"Storage tank min" method:** The ignition process starts if heat is requested from the storage tank from the specified time (parameter "Boiler start if difference between boiler setpoint and top storage tank is greater"). The period applies from the specified time until 24:00 h on the specified date. If the specified time is not subsequently changed and ignition is not disabled, the buffer tank loading criterion applies daily from the specified time.

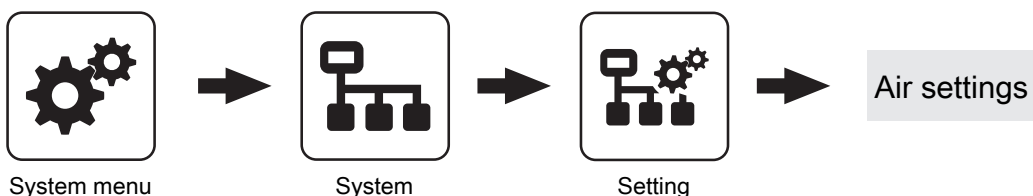
**"Buffer < maximum flow temperature" method:** The maximum flow temperature required by the system environment (e.g. heating circuit) is compared with the current buffer tank temperature from the specified time. The ignition process starts if the top buffer tank temperature falls below the maximum flow temperature setpoint. The period applies from the specified time until 24:00 h on the specified date. If the specified time is not subsequently changed and ignition is not disabled, the start criterion applies daily from the specified time.

**Maximum ignition duration**

Specifies how long the ignition procedure should last. The "Heating" status must be reached within this time.

**Increased induced draught fan activation during ignition**

Cycle time after which the induced draught fan controller is raised by 1% during "Ignition" status.

**Setting - Air settings****Minimum ID fan speed**

Lower operation point of the ID fan characteristic line.

**ID fan min**

Base point for setting the ID fan characteristic line.

**ID fan max**

End point for setting the ID fan characteristic curve.

**Minimum secondary air in heating**

In "Heating" status, the opening of the secondary air flap is not lower than the specified value.

**Secondary air at door open during status Heating**

If the insulated door of the boiler is opened in "Heating" status, the secondary air flap is opened to the specified value.

**Safety time for checking for air leaks**

In "Heating" status, if the control of the secondary air flap is "0%" and the current flue gas temperature is over "100°C" the safety time starts. If the control of the secondary air flap does not change within this set period of time, a warning appears on the display.

**Secondary air opening at 0% signal**

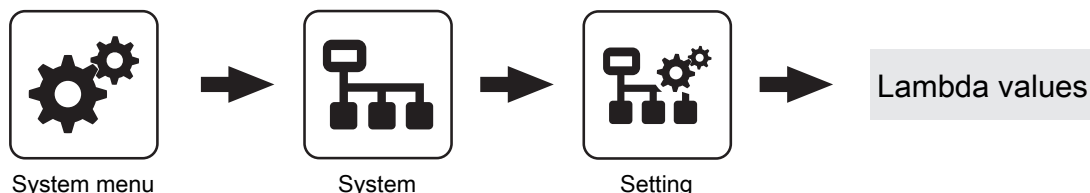
At 0% control of the secondary air flap, this will open by the specified value.

**Secondary air opening at 100% control**

At 100% control of the secondary air flap, this will open by the maximum specified value.

**Minimum induced draught fan control at 0Pa combustion chamber underpressure**

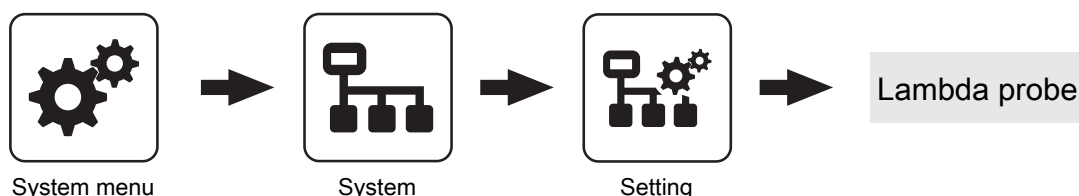
If due its the load change characteristics the PI regulator does not change quickly enough, a minimum activation of the ID fan is calculated.

**Setting - Lambda values****Residual oxygen content setpoint**

Residual oxygen content which is regulated during "Heating" operating status.

**Residual oxygen content, above which it switches to OFF**

If the current residual oxygen content in "Heating" status exceeds the specified value for the duration of the „Maximum heating up time, during which HEATING status must be reached“, the boiler switches to "Off" status.

**Setting - Lambda probe****Residual oxygen content**

Display of the current residual oxygen content.

**Lambda probe status**

The following status displays are possible:

- Off
- Pre-heating
- Normal operation
- Cooling
- Reheating
- Error

**Lambda probe type**

Setting the Lambda probe type used:

- Bosch broadband probe (item number: 69001A, "broadband probe" socket)
- NTK broadband probe (item number: 69003, "broadband probe" socket)
- Bosch switching-type sensor (type LSM11, "Lambda probe" socket)
- NTK switching-type sensor (type OZA685, item number: 69400, "Lambda probe" socket)

**Lambda probe heating**

- **A 0:** Automatic, Off; **A 1:** Automatic, On
- **1:** Manual, On
- **0:** Manual, Off

**Lambda probe calibration (probe must be at 21% O<sub>2</sub>)**

- **YES:** After activation of the Lambda probe heating, the Lambda probe can be calibrated.

**NOTICE! The Lambda probe must be at 21% oxygen (air)!**

**Automatic lambda probe calibration active**

- **YES:** If the boiler is in one of these statuses ("Boiler off", "Off", or "Standby") for a minimum period, which can be set ("Minimum time at standstill"), the broadband probe will be calibrated to 21%. For boilers with automatic loading, calibration is carried out at the next start (status "Preparation"). For boilers with manual loading, the boiler changes to the "sensor check" status after this time has elapsed (additional indication on the display). The ID fan is activated and the secondary air is completely opened. If the insulated door is opened in this status, the process is aborted. The prerequisite for calibration is that the probe provides a stable measurement for one minute. If the measurement exceeds 21% for more than one minute, the probe is also calibrated, regardless of the standstill times.

**Minimum time at standstill**

Defines the duration that the boiler must be in "Boiler Off", "Off" or "Standby" mode to start automatic Lambda sensor calibration.

**Residual oxygen, above which the lambda probe is allowed to switch off**

If the boiler switches to "Boiler off" or "Off" mode, the lambda probe heating remains active for at least 1 hour, up to a maximum of 24 hours. If the residual oxygen content exceeds the value set here, the lambda probe heating is switched off.

**Switching-type sensor**

Setting



Lambda values



Switching-type sensor

**Residual oxygen content**

Display of the current residual oxygen content.

**Lambda probe voltage measured**

Display of the current measured Lambda probe voltage.

**Lambda probe correction value**

Correction value for lambda measurement. If too much is displayed, this value must be set to positive, if too little is displayed, the value must be set to negative.

**Lambda probe voltage corrected**

Display of the measured Lambda probe voltage, at which the „Lambda probe correction value“ governs the response.

**Broadband probe**

Setting



Lambda values



Broadband probe

**Residual oxygen content**

Display of the current residual oxygen content.

**Broadband probe heating current**

The measured heating current of the broadband probe is displayed.

**Broadband probe heating voltage**

The measured heating voltage of the broadband probe is displayed.

**Broadband probe Nernst voltage**

The measured Nernst voltage of the broadband probe is displayed.

**Broadband probe pump current**

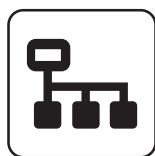
The measured pump current of the broadband probe is displayed.

**Broadband probe internal resistance**

Display of the measured internal resistance of the broadband probe.

**Pump current at the last calibration****Setting - Quantity of heat calculation**

System menu



System



Setting

**Determination of heat calculation****Flow temperature sensor correction value**

If, at the same ambient temperature, the flow temperature sensor and return feed sensor display different temperature values, this correction value is used to calibrate the difference between the flow sensor and the return sensor to "0". The corrected value is used only to calculate the quantity of heat does not affect the operation of the boiler. If the boiler temperature is used to calculate the quantity of heat, the correction value is applicable to the boiler sensor.

**Flow temperature sensor input**

Sensors 1/2 on the core module or a sensor on the hydraulic module can be used as flow temperature sensors. If an invalid sensor assignment is made, the value of the boiler sensor is used to calculate the quantity of heat.

**Specific heat capacity**

This parameter indicates the specific heat capacity of the heat carrier. The value for pure water (4180 Ws/kgK) is used as the default value.

**Litres per pulse of flow through meter**

If an external volume pulse transmitter is used, adjust this value accordingly.

**Flow rate at 50% pump rotation speed**

The parameter specifies the volumetric flow rate at 50% pump actuation.

➔ "Calculating the feed output of the circulating pump" [► 82]

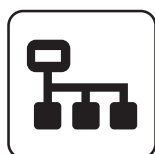
**Flow rate at 100% pump rotation speed**

The parameter specifies the volumetric flow rate at 100% pump actuation.

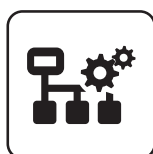
➔ "Calculating the feed output of the circulating pump" [► 82]

**Setting - General settings**

System menu



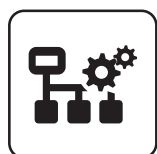
System



Setting

**General settings**

➔ "Boiler - General settings" [► 55]

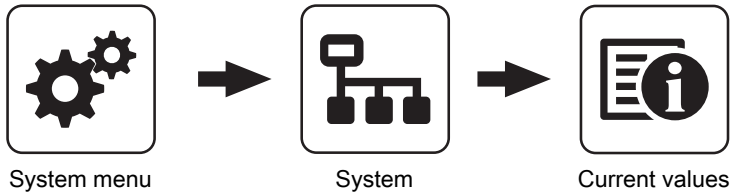
**MODBUS settings**

Setting

**General settings****MODBUS settings**

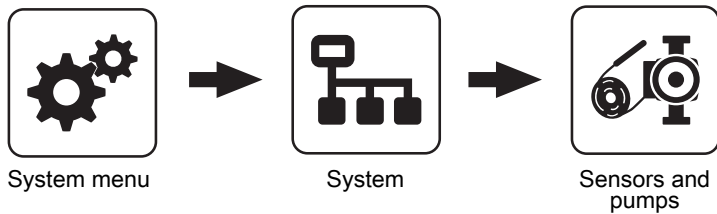
➔ "Boiler - General settings - MODBUS settings" [► 56]

### 4.13.2 System - Current values



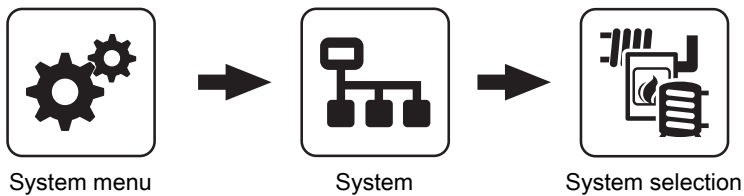
Display of the current value for the relevant parameter. The parameters displayed depend on the boiler configuration!

### 4.13.3 System - Sensors and pumps



In the “Sensors and pumps” menu, all sensor inputs and pump outlets available in the hydraulic system can be allocated. The number of parameters depends on the configuration.

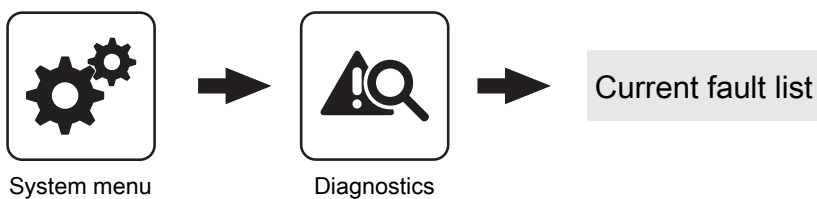
### 4.13.4 System - System selection



Menu for setting the configuration for systems that have not been configured with the setting wizard.

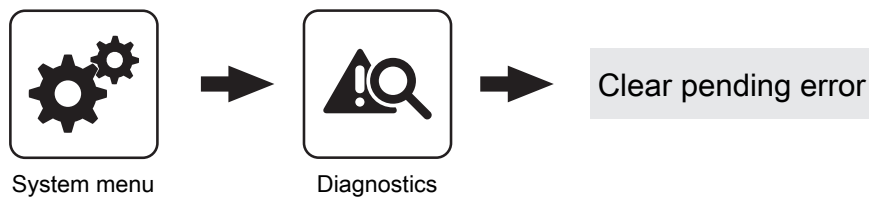
## 4.14 Diagnostics

### 4.14.1 Diagnosis – Current fault list



Display of the current fault messages. In addition, you can also invoke time information here, such as when the fault occurred, when the fault was acknowledged and when the fault was cleared.

#### 4.14.2 Diagnosis – Clear pending error



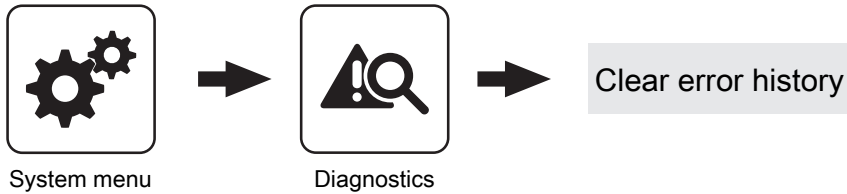
Used to delete current faults in the fault list. Depending on the system configuration, the status LED can flash red even though no fault messages are pending. This function can also be used to delete pending fault messages that are not visible.

#### 4.14.3 Diagnostics - Error history



Up to 50 fault indication entries are stored in the error history. A fault can consist of up to 3 fault indication entries. You can determine what type of fault message it is, when the fault occurred (appeared), when the fault was acknowledged and when the fault was eliminated (cleared). If all 50 fault indication entries are in use and there is another fault indication entry, the oldest entry will be deleted to make room for the current one.

#### 4.14.4 Diagnostics - Clear error history

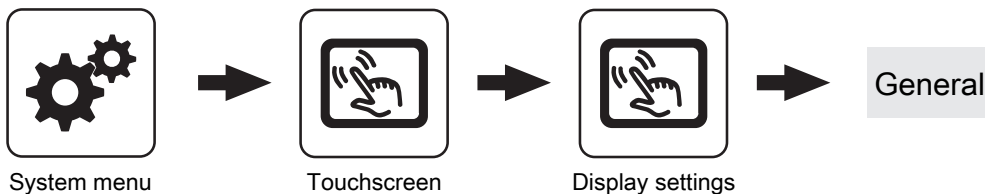


The entire error history can be deleted using this function. From this time on, the error history will be filled again with new fault messages.

### 4.15 Touchscreen

#### 4.15.1 Touchscreen - Display settings

##### *Display settings - General*



##### **Brightness**

Display of the light sensor's evaluation of the current brightness in the room for adjusting the backlight.

##### **Maximum backlight**

The brighter it is in the room, the more the background of the touch display is illuminated. This is where you can limit the maximum backlight.

##### **Minimum backlight**

The darker it is in the room, the less the background of the touch display is illuminated. This is where you can set the minimum backlight.

##### **Delay time for screen saver (0 deactivates the screensaver)**

If the touchscreen is not touched within the set time, the screensaver will activate and the screen will go dark. To disable the screensaver, set the delay time to "0".

##### **Module address**

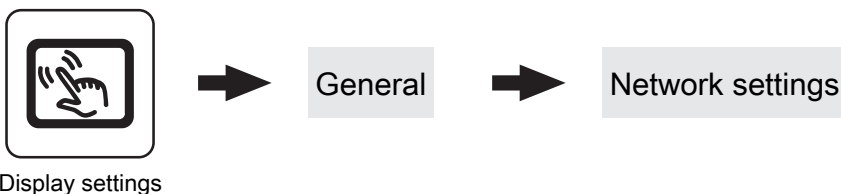
This is where you can change the module address if it is incorrectly set.

Module address 0: Boiler console

Module address 1-7: respective room console 3200 with touchscreen

**NOTICE! Once you have changed the module address, you will need to restart the boiler controller (switch main switch on boiler off and on)!**

##### *Network settings*

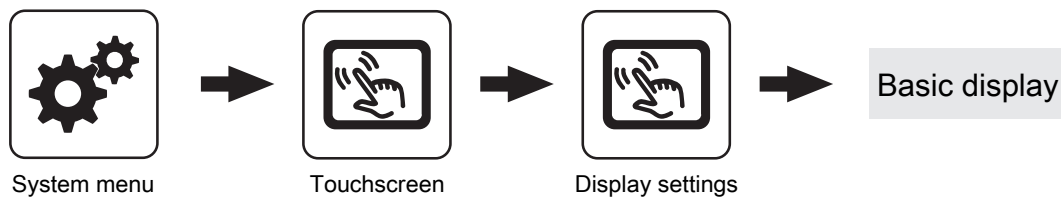


##### **Obtain IP address automatically**

- **On:** The address in the local network (IP address), the subnet mask, default gateway and DNS server are automatically assigned by the router/server.
- **Off:** IP address, subnet mask, default gateway and DNS server can be manually set.



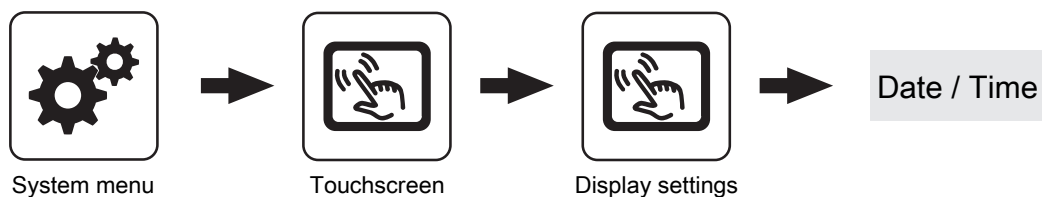
### Display settings - Basic display



#### Figures 1 ... 6

On the basic display, up to six different information displays can be freely selected. The selection depends on the system configuration.

### Display settings - Date / Time



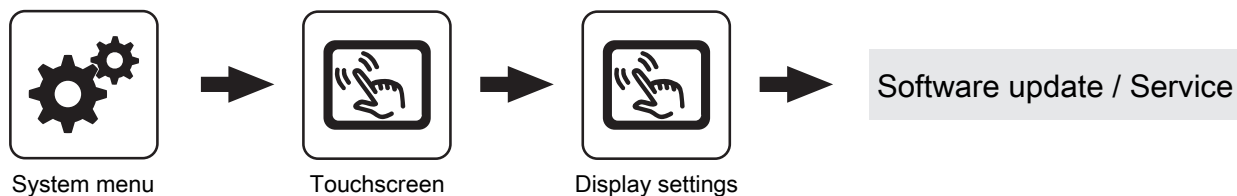
#### Automatic switching between standard/daylight saving time

Used to deactivate switch to daylight saving time (factory setting: YES).

#### Date / Time

Display and setting of the date and time.

### Display settings - Software update / Service



#### Calibrate screen

➔ "Calibrating the touchscreen" [▶ 87]

#### Restart control Carry out update

➔ "Software update Lambdatronic 3200" [▶ 89]

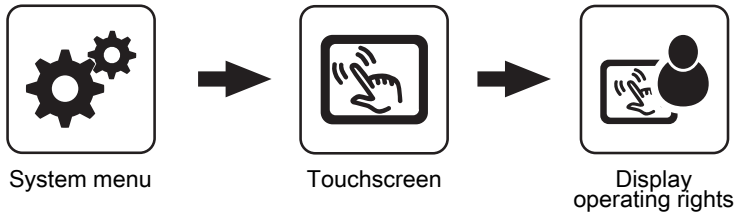
#### Restart display

Touch control unit is restarted and the data is reloaded from the core module.

#### Restore control device to factory settings (restart is carried out)

The touch display is reset to the factory setting. Data stored on the touch display (e.g. setting wizard) is completely deleted. Only perform if the system must be completely reconfigured (e.g. when replacing the core module).

### 4.15.2 Touchscreen - Display operating rights



In this menu the operating rights for the individual room consoles are allocated. If access from a room console to a heating system component is permitted, the corresponding parameter must be set to “YES”. The number of menus as well as the parameter entries depend on the system configuration!

**NOTICE! The operating rights of the room consoles should be allocated from the boiler console, as unrestricted access is only possible here!**

**“Touch display with address 1 – 7” and “Button display with address 1 – 7”**

**Heating circuit system:**

<b>Allow access to heating circuit 01 ... 18?</b>	
Specifies whether heating circuit 01 ... 18 can be accessed from touchscreen 1 ... 7.	

**DHW tank system:**

<b>Allow access to DHW tank 01 ... 08?</b>	
Specifies whether DHW tank 01 ... 08 can be accessed from touchscreen 1 ... 7.	

**Buffer tank system:**

<b>Allow access to buffer tank 01 ... 04?</b>	
Specifies whether the buffer tanks 01 ... 04 can be accessed from the touch screen displays 1 ... 7.	

**Solar panel system:**

<b>Allow access to solar system 01?</b>	
Specifies whether solar system 01 can be accessed from touchscreen 1 ... 7.	

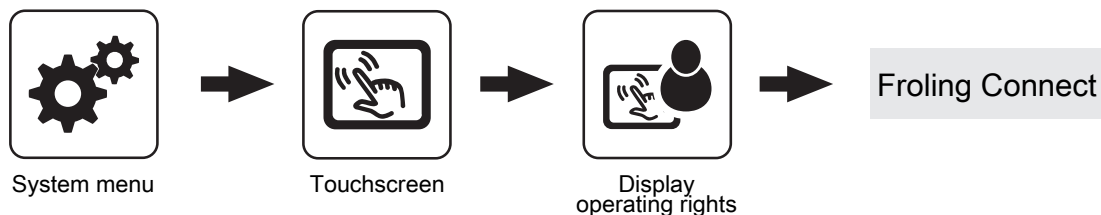
**Heating system:**

The parameters displayed depend on the configuration.

**Boiler:**

<b>Boiler values visible</b>	
If this function is activated, all boiler status values and the “Boiler” menu are available on the room console.	

## Froling Connect



For connection via the [froeling-connect.com](https://froeling-connect.com) online platform using a touchscreen, the issue of a password is required.

**NOTICE! The same password can be assigned for each touch display!**

### Password for boiler display

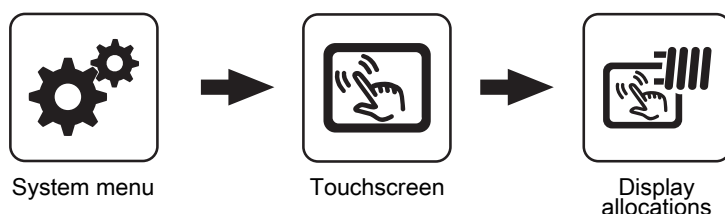
Password for boiler display can be issued.

Password for Touch display with address 1 ... 7

### Password for boiler display

Password for the touchscreed with address 1 ... 7 can be issued.

## 4.15.3 Touchscreen - Display allocation



### Heating circuit system:

#### Touch display with address 1 ... 7 is assigned to the following heating circuit:

To assign a room console to a heating circuit, the respective heating circuit number with its address must be set on the room console. The parameters are set to "none" at the factory!

#### Button display with address 1 ... 7 is assigned to the following heating circuit:

To assign a room console to a heating circuit, the respective heating circuit number with its address must be set on the room console. The parameters are set to "none" at the factory!

### DHW tank system:

#### Touchscreen with address 1 ... 7 is assigned to the following DHW tank:

To assign a DHW tank to a specific room console, the respective DHW tank number with its address must be set on the room console. The parameters are set to "none" at the factory!

#### Button display with address 1 ... 7 is assigned to the following DHW tank:

To assign a DHW tank to a specific room console, the respective DHW tank number with its address must be set on the room console. The parameters are set to "none" at the factory!

## 5 FAQ

### 5.1 Activation options of pump outlets

#### Pump 0.1 – 7.2, pump 1

The following settings are possible at the hydraulic modules as well as at pump 1 on the core module with pump outlets 0.1 – 7.2.

- **Pump without control line)**  
Set when a standard pump is run at the respective output. This is controlled at the 230V output using pulse packets.
- **HE pump without control line**  
Set when a high efficiency pump without control line (e.g. Grundfos Alpha, WILO Yonos Pico, etc.) is run at the respective output.
- **Field pump / PDM**  
There is a permanent power supply of 230V at the output for the high efficiency pump. The pump is controlled using pulse duration modulation at the respective PDM output.
- **Solar pump / PDM**  
Here again, the pump is controlled by means of pulse duration modulation at the respective PDM output. In this case, however, the characteristic line is inverted and can only be used for specially marked high efficiency solar pumps.
- **Field pump PDM +valve**  
The signal for the field pump is emitted at the PDM output. If the signal exceeds 2%, the 230V output is switched on. If the signal is below 2% for more than 4 minutes, the output is switched off again.
- **PDM sol.pump +valve**  
The signal for specially marked high efficiency solar pumps is emitted at the PDM output. If the signal exceeds 2%, the 230V output is switched on. If the signal is below 2% for more than 4 minutes, the output is switched off again.
- **Field pump / 0–10V**
- **Solar pump / 0–10V**
- **Field pump 0–10 +valve**
- **Sol. pump 0–10V +valve**  
The same functions that apply with PDM apply to the parameter values with 0-10V. The only difference is that instead of pulse duration modulation, a 0-10V signal is used to control the pump.
- **Switch valve**  
When set to “Isolating valve” the output is activated either with 0% or 100%. This setting value is only available in the “Water” or “Boiler 2” menu.

#### HKP0

The following applies to pump outlet HKP0 at the core module:

- Relay output
- Speed control is not possible

## 5.2 Pump stall protection

After extended standstill times, there is a risk the pump drive may block due to corrosion and deposits. The pump stall protection feature is intended to prevent this.

The control ensures that the circulation pumps are switched on briefly on a regular basis, even outside the season of use.

At that time, the pumps are activated for 15 seconds at 100%.

The following components are affected:

- DHW loading pump
- Buffer pump
- Collector pump (not applicable to system 12 and system 13)
- Difference control pump
- Heating circuits (15 seconds pump run, subsequently the mixer starts up and shuts down again)

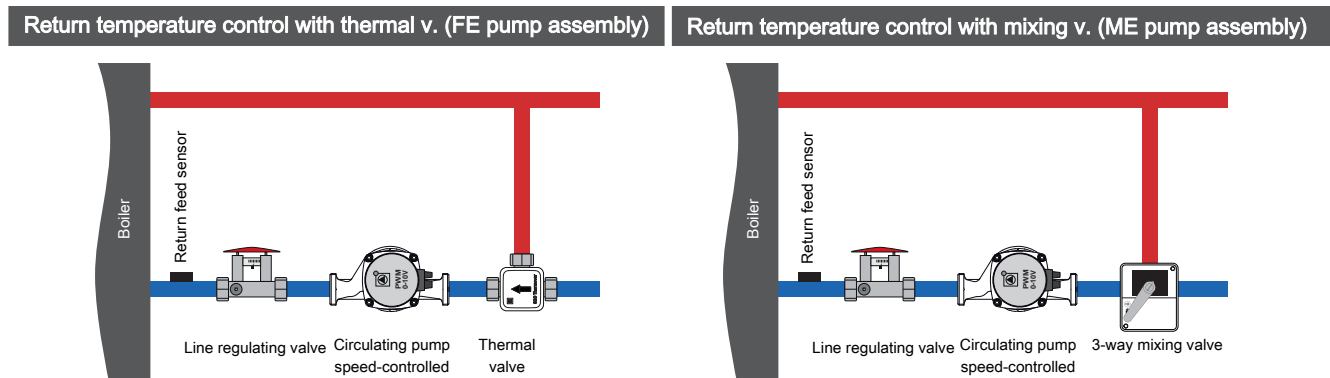
## 5.3 Boiler operating statuses

<b>Heating up</b>	Boiler status during the heating up process up to a certain minimum flue gas temperature. Fan and primary air at 100%.
<b>Preventilation (with auto ignition)</b>	Safety function with operation with automatic ignition.  Within a specified time, the boiler attempts to reach the status Heating without activating the ignition. Within this time period, heating up can be carried out manually, to bypass the automatic ignition.
<b>Awaiting ignition (with auto ignition)</b>	When the safety time has elapsed ("Preventilation" operating status), the boiler remains in the "Awaiting ignition" status until the time specified in the "Ignition" menu for the automatic ignition has been reached.
<b>Ignition (with auto ignition)</b>	The fuel is ignited with fan assistance. The boiler attempts to reach the criteria for heating status within a specified time.
<b>Heating</b>	The boiler controller controls combustion according to the boiler setpoints.
<b>Slumber</b>	Very low power consumption.  When the boiler temperature setpoint is exceeded by a specified value, the boiler goes to "Slumber" status. The fan stops and the air flaps are closed to the minimum opening.  If the temperature falls below the boiler temperature setpoint, the boiler goes back to "heating" status.
<b>Door open</b>	The insulating door is open and the fan runs at maximum speed.
<b>Off</b>	The fuel burns down to residual embers.
<b>Fault</b>	CAUTION - There is a fault!

## 5.4 Determination of the quantity of heat

### 5.4.1 Assembly Information

The contact sensor and the line regulating valve must be positioned in the direction of flow downstream of the circulating pump and immediately upstream of the return connection of the boiler. Additional contact sensors and line regulating valves are required for boilers without return temperature control or return temperature control with thermal valve. A return feed sensor is already fitted on the return temperature control with 3-way mixing valve, which means that only the line regulating valve is required additionally.



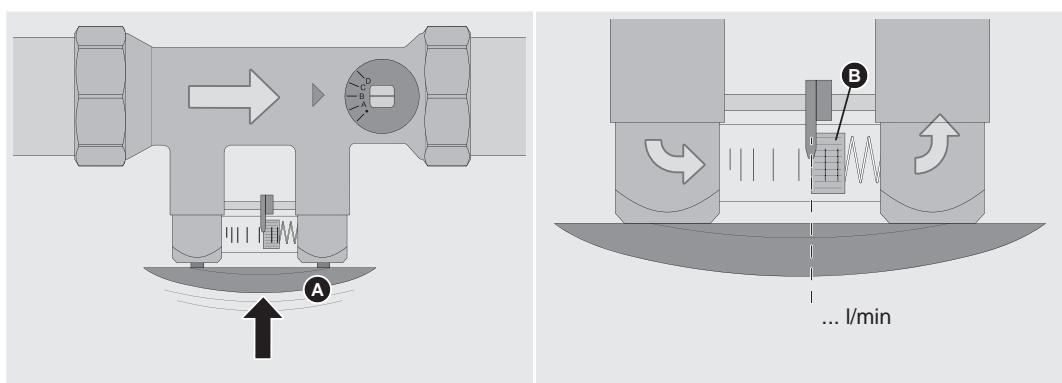
### 5.4.2 Functioning and configuration

Software version V50.04 – B05.19 at minimum is required for the heat quantity calculation to work. The difference between the boiler temperature and the boiler return temperature as well as the flow of the circulating pump are used to calculate the heat quantity.

### Calculating the feed output of the circulating pump

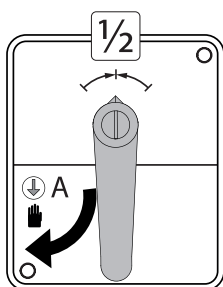
#### Boiler with thermal valve

- ☐ Bring the boiler to the boiler temperature setpoint

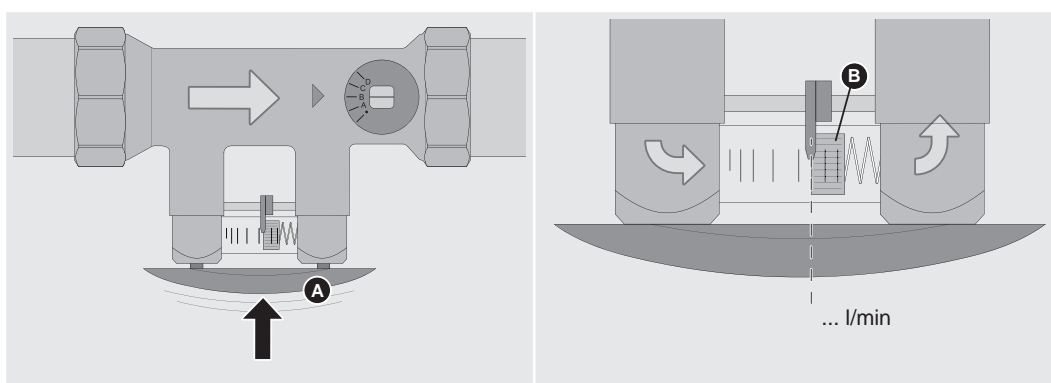


- ☐ Activate the circulating pump in manual operation with 100% speed
- ☐ Press the handle (A) on the line regulating valve
- ☐ Read and record the flow rate in l/min at the underside of the floater (B)
- ☐ Activate the circulating pump in manual operation at 50% speed
- ☐ Press the push bar on the line regulating valve; make a note of the flow on the scale

### Boiler with 3-way mixing valve



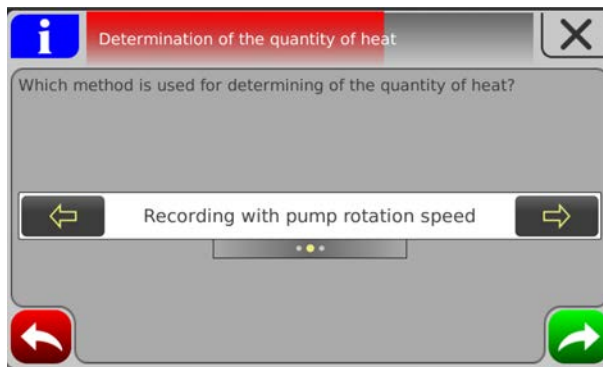
- ☐ Set mixing valve to manual operation and turn the lever to the central position
- ☐ Activate the circulating pump in manual operation with 100% speed



- ☐ Press the handle (A) on the line regulating valve
- ☐ Read and record the flow rate in l/min at the underside of the floater (B)
- ☐ Activate the circulating pump in manual operation at 50% speed
- ☐ Press the push bar on the line regulating valve; make a note of the flow on the scale

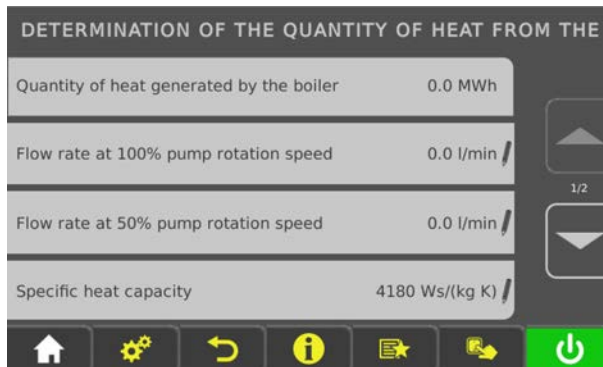
### Setting the type of heat quantity calculation

- ☐ In the boiler's setting wizard, select "Record with pump speed"



### Configuring the heat quantity calculation

- ☐ Go to the menu "System → Settings → Boiler heat quantity calculation"
- ☐ Enter the recorded values for the flow of the circulating pump at the respective parameter

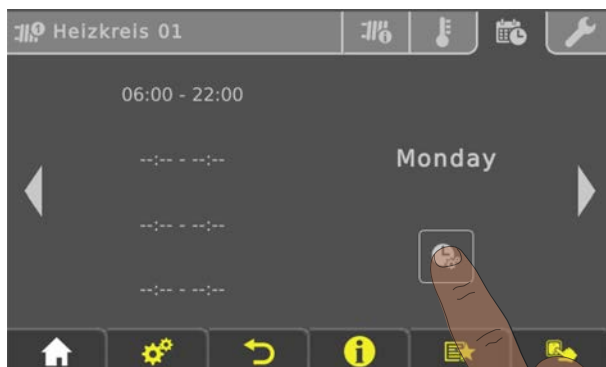




## 5.5 Setting times

The desired time window for the component can be set in the "Times" tab in the individual menus of the heating components (heating circuits, DHW tanks etc.). The structure of the time menu and the procedure for changing the times are always the same.

- ☐ Use the left or right arrow to navigate to the desired day of the week
- ☐ Tap the symbol under the day of the week
  - ✎ The edit window will appear

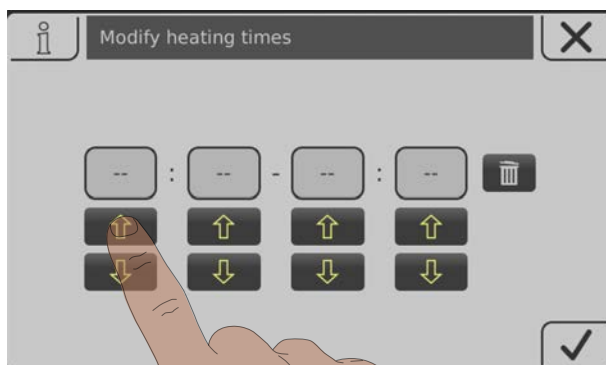


You can specify up to four time windows per component and day.

- ☐ Tap the desired time window



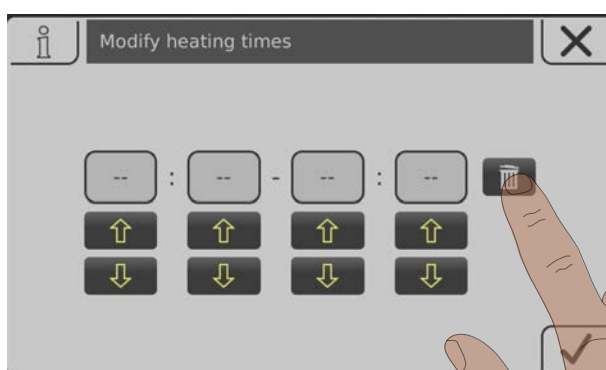
- ❑ The time window will open for editing
- ❑ Set the start and end time for the time window using the up and down arrows
- ❑ Save the time window setting by tapping on the confirm icon



If you want to apply the time window setting to another day in addition, you can do this by activating the relevant day.



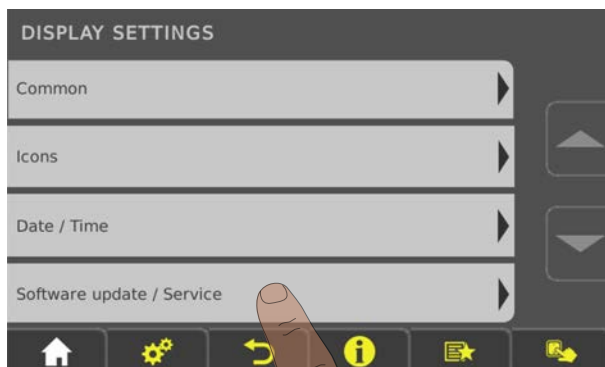
A set time window can be deleted by tapping on the “Recycle bin” symbol.



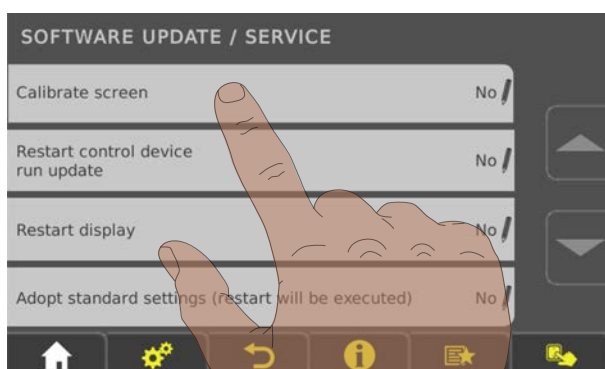
## 5.6 Calibrating the touchscreen

If the touchscreen stops working properly, it will need to be calibrated.

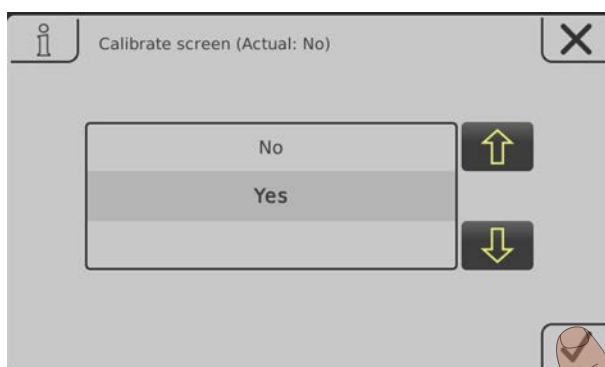
- ❑ Go to the “Display settings” menu
- ❑ Scroll down until the “Software update / Service” submenu appears and open the submenu



- ❑ In the “Software update / Service” menu open the “Recalibrate touch control” parameter



- ❑ Set the parameter to “YES” and confirm at the bottom right
- ↳ The touchscreen will restart and begin calibrating



To calibrate the touchscreen, you must press five points indicated by a crosshair in the order shown. The control will restart after calibration.

## NOTICE

Inaccurate calibration

***If you do not tap the indicated points accurately, the control may stop working properly and a software update may be required.***

---

## 5.7 Software update Lambdatronic 3200

The following description shows the software update process for systems with Lambdatronic 3200 and a touch control in the system environment (also applies to systems with button boiler console and touch room console). The Froling Flash Update Wizard (core module) as well as a USB storage device is necessary to perform the software update. The procedure for establishing a connection and any necessary bootloader update is described in the documentation of the Flash Update Wizard.

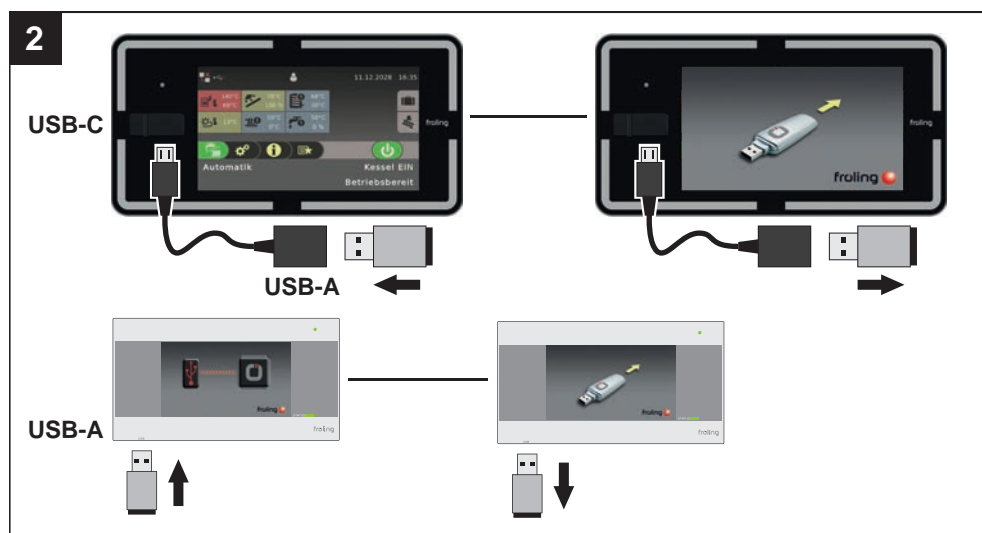
### Overview of main steps during a software update

- ☐ Perform flash update - but do not close the Wizard



- ➡ "Carrying out a software update on the boiler controller" [▶ 90]

- ☐ Perform software update of all touch controls



- ➡ "Carrying out a software update on the touch control" [▶ 92]

- ☐ Close Flash Update Wizard - restart controller

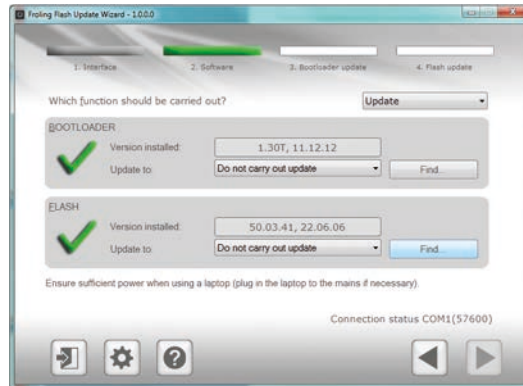


- ➡ "Finishing a software update" [▶ 93]

## 5.7.1 Carrying out a software update on the boiler controller

### Selecting a Flash file

Once the connection has been established, the main window displays the update files which can be installed:



- The "Version installed" field displays the Flash version which is currently installed on the boiler controller
- There is a drop-down list next to the "Update to:" field which shows the Flash files available in the standard folder

#### If the Flash file is located in the standard folder:

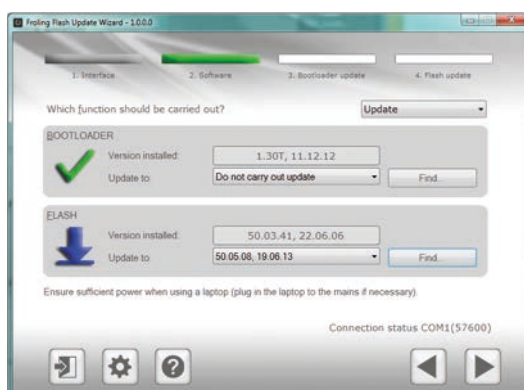
- ☐ Select the required Flash file from the drop-down list

#### If the Flash file is not located in the standard folder:

- ☐ Click on the "Find" button in the "FLASH" section
  - ↳ A window is displayed where you can search for the Flash file
- ☐ Navigate to the folder where the file is saved
- ☐ Select the Flash (\*.s19) file and click on the "Open" button

## Starting the Flash update

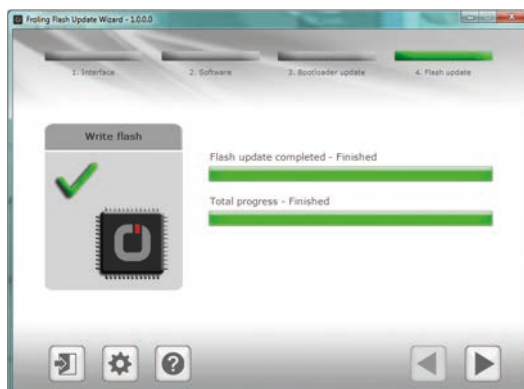
After selected the desired Flash file, it will be displayed next to the "Update to:" field:



Click on the "Next" button

The update process will now start and a progress bar displays the current status

When the flash update is successfully transferred to the boiler controller, the following window appears:

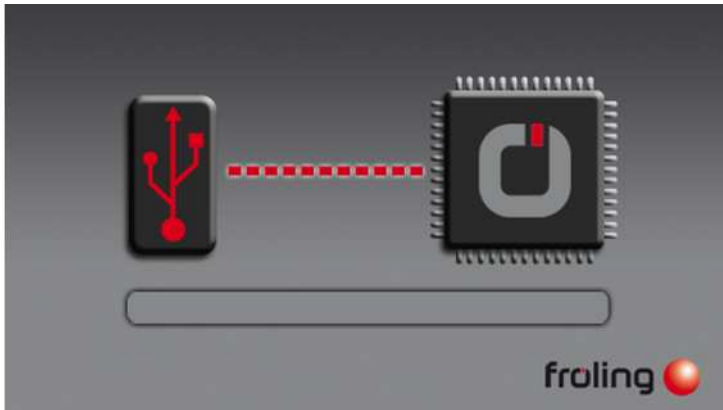


**NOTICE! Do not close the update at this time and do not disconnect the boiler controller!**

### 5.7.2 Carrying out a software update on the touch control

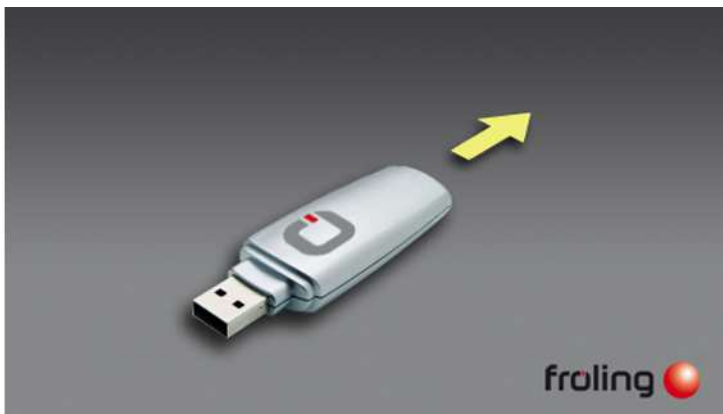
**NOTICE! If several touch controls are installed, we recommend the use of several USB sticks to perform the updates in parallel!**

- ☐ Insert the USB stick with the necessary data (autostart.txt, froresetdemo.inc, frorestart.inc, rootfs.ubi, update, V 60.01 B01.38.15 K37) into the USB port.
  - ↳ Note: the data files must not be located in sub-directories!
  - ↳ System message for restart is displayed
- ☐ Tap "OK" to carry out a restart of the touch control
  - ↳ After the restart, the update process will begin automatically



Once the update is complete, a message will appear that you can remove the stick

- ☐ Remove the USB stick
  - ↳ The touch control restarts automatically



The touch control software is up-to-date following the restart.

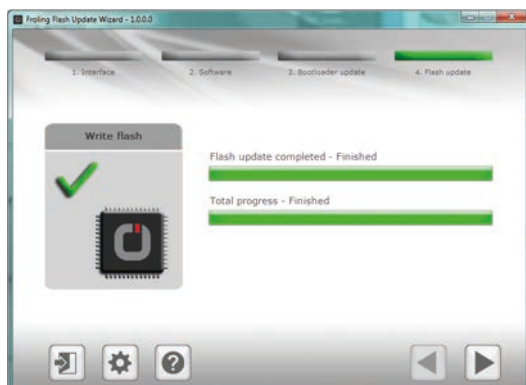
- ☐ Perform updates to any other touch controls



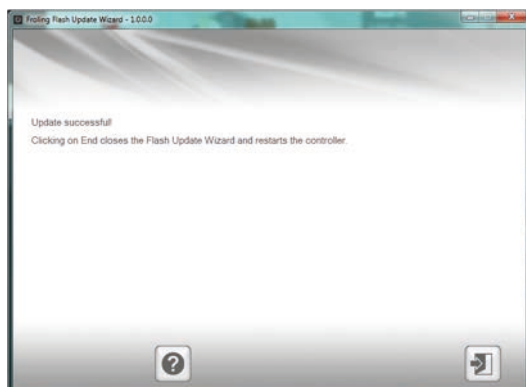
### 5.7.3 Finishing a software update

When the software update has been performed on all touch controls, the Flash Update Wizard must be ended correctly.

#### End flash update



- Click on the "Next" button
- ↳ The completion window appears

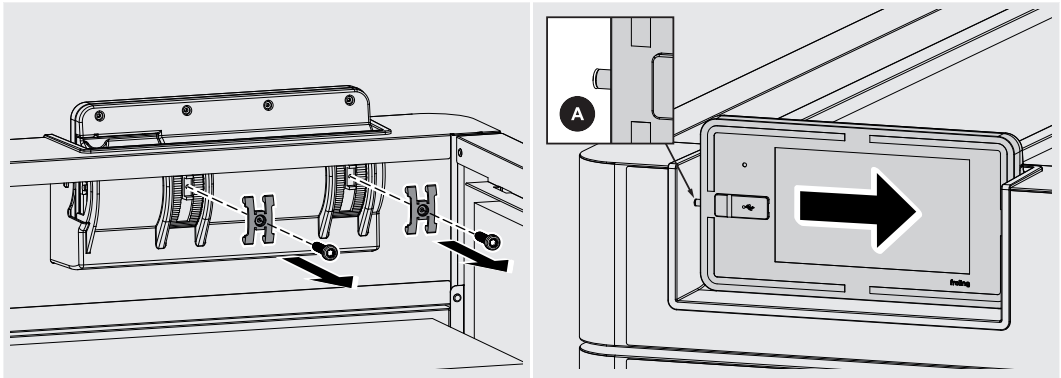


- Clicking on "Close" closes the Flash Update Wizard and restarts the boiler controller
- ↳ After restarting the boiler controller, check whether all touch controls have started up correctly

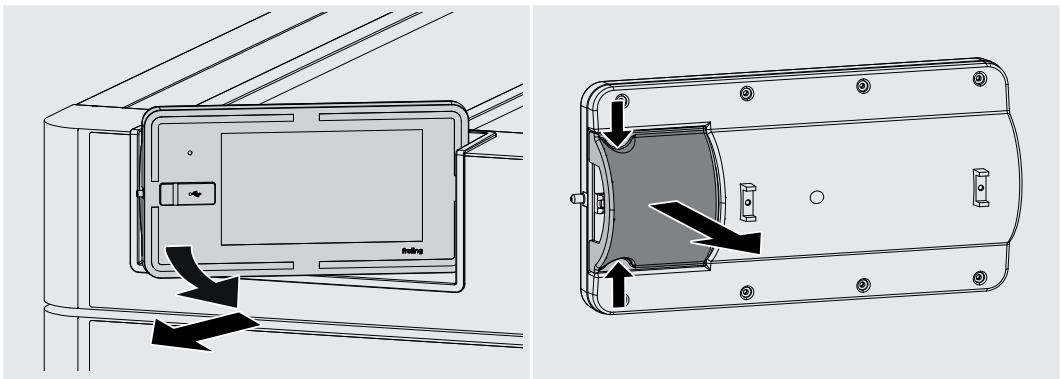
**NOTICE! If not all touch controls connect to the boiler control, a restart of the entire system (main switch OFF/ON) is necessary!**

## 5.8 USB data recording

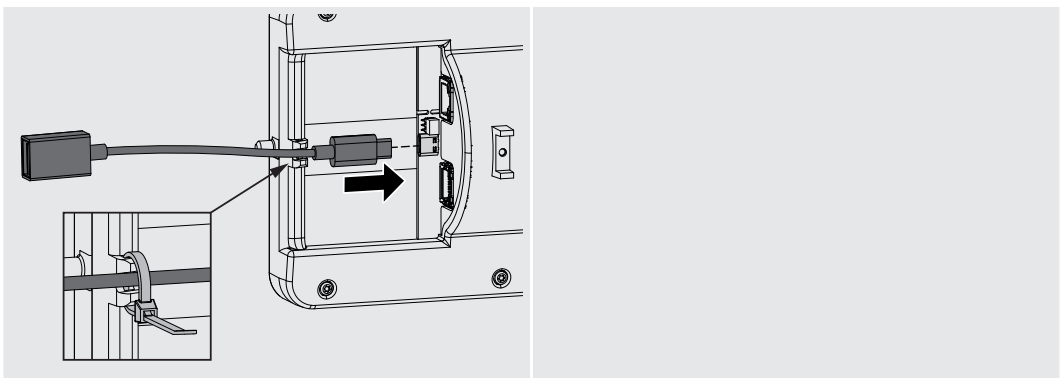
- ☐ Switch off the boiler using the main switch



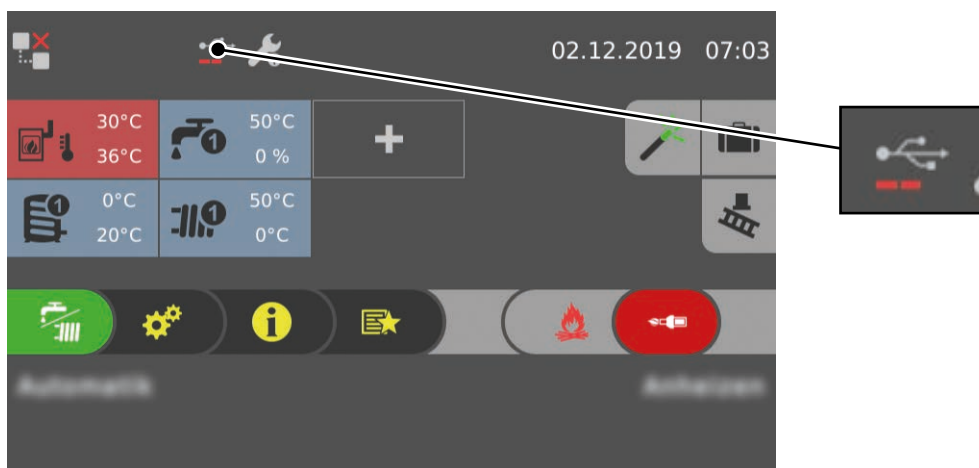
- ☐ Remove the insulating cover and disassemble the retaining brackets on the rear of the display bracket
- ☐ Push the display to the right until pin (A) is positioned on the left outside the holding fixture



- ☐ Swivel the display forwards on the left side and remove diagonally to the left
- ☐ Push the cover together at both indentations and remove



- ☐ Connect USB C - USB A adapter cable to the display bushing and secure cable on display housing using cable ties
- ☐ Re-assemble the display in reverse order
- ☐ Turn on the main switch and connect USB to the extension
  - ↳ The USB must not contain a software update
  - ↳ Recording starts automatically once the touch display has started



Data recording is indicated in the status line by means of the USB symbol with an activity bar.

## Manufacturer's address

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