Service handbook

Lambdatronic H 3200 - PT4e

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 ... 5
1.1 About these instructions ... 5
1.2 Safety information ... 5
2 Power connection and wiring ... 6
2.1 Core module and connection options ... 6
2.1.1 Board view - core module ... 6
2.1.2 Mains connection ... 8
2.1.3 Connecting the outside temperature sensor ... 8
2.1.4 FRA room temperature sensor ... 9
2.1.5 Boiler enable contact ... 9
2.1.6 Connecting a circulating pump to the core module ... 10
2.1.7 Connecting a circulating pump with valve to the core module ... 12
2.1.8 Heating circuit pump 0 / burner relay ... 14
2.1.9 Operating signal ... 14
2.2 Expansion modules ... 15
2.2.1 Heating circuit module ... 15
2.2.2 Hydraulic module ... 16
2.2.3 Wood chip module ... 22
2.2.4 Plug power pack FRSNT17 ... 23
2.2.5 Plug power pack Meanwell LRS-100-24 ... 23
2.2.6 Analogue module ... 24
2.2.7 Digital module ... 26
2.2.8 Feed system module ... 27
2.3 BUS connection ... 29
2.3.1 Connecting the bus cable ... 29
2.3.2 Setting end jumpers ... 30
2.3.3 Setting the module address ... 31
2.3.4 Potential equalisation / potential separation ... 32
2.4 Connection information according to pump types ... 33
2.5 Frequency converter ... 34
2.5.1 Operating elements ... 34
2.5.2 Changing parameters ... 35
3 Initial start-up with settings wizards ... 37
3.1 Before switching on for the first time ... 37
3.1.1 Controller check ... 37
3.1.2 Check on the connected units ... 37
3.1.3 System check ... 37
3.2 General information about the settings wizard ... 38
3.3 Switching on for the first time ... 39
3.4 Starting the setting wizard ... 40
4 Parameters overview ... 42
4.1 Heating ... 42
4.1.1 Heating - Status ... 42
4.1.2 Heating – Temperatures ... 42
4.1.3 Heating - Times ... 43
4.1.4 Heating - Service ... 44
4.1.5 Heating - Heating up program ... 45
4.1.6 Heating - General settings ... 47
4.2 Water ... 47
4.2.1 Water - Status ... 47
4.2.2 Water - Temperatures ... 48
4.2.3 Water - Times ... 48
4.2.4 Water - Service ... 48
4.3 Solar ... 49

4.3.1 Solar - Status ... 49
4.3.2 Solar - Temperatures ... 51
4.3.3 Solar - Times ... 51
4.3.4 Solar - Service ... 52
4.3.5 Solar - Heat meter ... 53

4.4 Buffer tank ... 54
4.4.1 Buffer tank - Status ... 54
4.4.2 Buffer tank - Temperatures ... 55
4.4.3 Buffer tank - Service ... 56

4.5 Boiler ... 56
4.5.1 Boiler - Status ... 56
4.5.2 Boiler - Temperatures ... 57
4.5.3 Boiler - Times ... 58
4.5.4 Boiler - Service ... 58
4.5.5 Boiler - General settings ... 59

4.6 Boiler 2 ... 60
4.6.1 Boiler 2 - Status ... 60
4.6.2 Boiler 2 - Temperatures ... 61
4.6.3 Boiler 2 - Service ... 62

4.7 Feed system ... 63
4.7.1 Feed system - Cyclone 1 ... 63

4.8 Network pump ... 66
4.8.1 Network pump - Status ... 66
4.8.2 Network pump - Temperatures ... 66
4.8.3 Network pump - Service ... 67

4.9 Cascade ... 68
4.9.1 Cascade - Status ... 68
4.9.2 Cascade - Temperatures ... 69
4.9.3 Cascade - Service ... 70

4.10 Difference regulator ... 72
4.10.1 Difference regulator - Status ... 72
4.10.2 Difference regulator - Temperatures ... 72
4.10.3 Difference regulator - Times ... 72
4.10.4 Difference regulator - Service ... 73

4.11 Circulation pump ... 73
4.11.1 Circulation pump - Status ... 73
4.11.2 Circulation pump - Temperatures ... 74
4.11.3 Circulation pump - Times ... 74
4.11.4 Circulation pump - Service ... 74

4.12 Manual ... 75
4.12.1 Manual - Manual operation ... 75
4.12.2 Manual - Digital outputs ... 76
4.12.3 Manual - Analogue outputs ... 76
4.12.4 Manual - Digital inputs ... 77

4.13 System ... 77
4.13.1 System - Setting ... 77
4.13.2 System - Current values ... 90
4.13.3 System - Sensors and pumps ... 90
4.13.4 System - System selection ... 91

4.14 Diagnostics ... 91
4.14.1 Diagnosis – Current fault list ... 91
4.14.2 Diagnosis – Clear pending error ... 91
4.14.3 Diagnostics - Error history ... 91
4.14.4 Diagnostics - Clear error history ... 92

4.15 Touchscreen ... 92
4.15.1 Touchscreen - Display settings ... 92
4.15.2 Touchscreen - Display operating rights ... 94

4.15.3 Touchscreen - Display allocation 95

5 FAQ 96

5.1 Activation options of pump outlets 96

5.2 Pump stall protection 97

5.3 Boiler operating statuses 98

5.4 Determination of the quantity of heat 99
5.4.1 Assembly Information 99
5.4.2 Functioning and configuration 99

5.5 Boiler modes 101
5.5.1 "Automatic” mode without storage tank 101
5.5.2 “Automatic” mode with storage tank 102
5.5.3 “Continuous load” mode without storage tank 103
5.5.4 “Continuous load” mode with storage tank 103
5.5.5 “Domestic hot water” mode without storage tank 104
5.5.6 “Domestic hot water” mode with storage tank 105

5.6 Setting times 106

5.7 Calibrating the touchscreen 108

5.8 Software update Lambdatronic 3200 110
5.8.1 Carrying out a software update on the boiler controller 111
5.8.2 Carrying out a software update on the touch control 113
5.8.3 Finishing a software update 114

5.9 USB data recording 115

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:

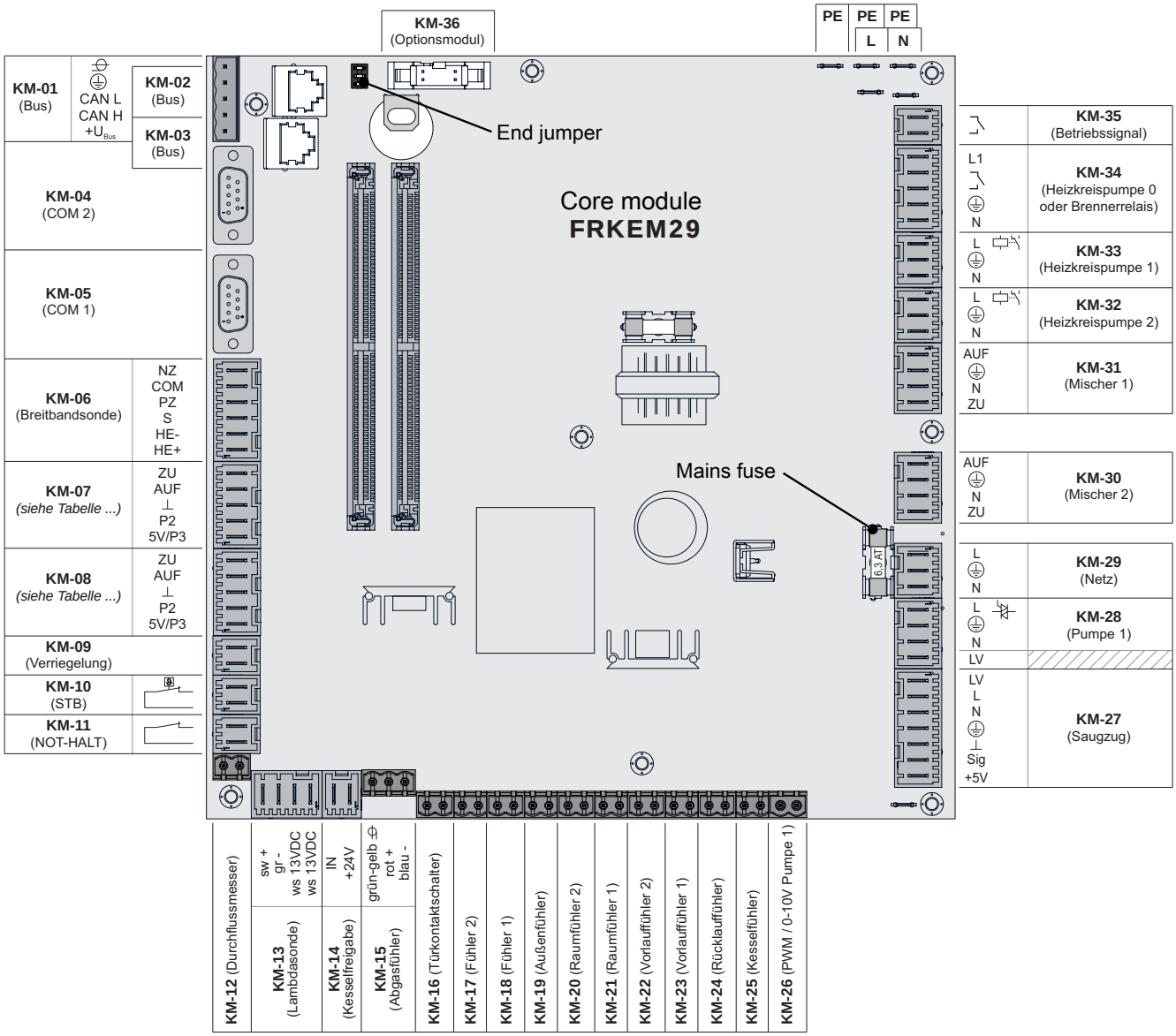
- ❒ Shut down the boiler according to procedure (“Off” operating status) and allow it to cool down
- ❒ Protective gloves must usually be worn for work on the boiler, and it should only be operated using the handles provided
- ❒ Insulate the flue gas pipes and do not touch them during operation

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" [▶ 29] Caution! CAN L and CAN H must not be connected to $+U_{BUS}$!
KM-02 KM-03	BUS	Patch cable CAT 5 RJ45 SFTP 1:1 Assignment: pellet module connection
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

Connection / Name		Note
KM-06	Broadband probe	Connection cable[1)] 5 x 0.75 mm^2 Connection of a Bosch (item number 69001A) or NTK (item number 69003) broadband Lambda probe
KM-07	FGR flap	Connection cable[1)] 5 x 0.75 mm^2
KM-08	Air flap	Connection cable[1)] 5 x 0.75mm^2; Combined air damper for primary and secondary air
KM-09	Lock	Connection cable[1)] 2 x 0.75 mm^2
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[1)] 2 x 0.75 mm^2
KM-13	Lambda probe	Connection cable[1)] 4 x 0.75 mm^2 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[1)] 2 x 0.75 mm^2 Caution! The connection must be a floating connection! ➲ "Boiler enable contact" [▶ 9]
KM-15	Flue gas temperature sensor	Only use connection cable of the component
KM-16	Door switch for ash box	Connection cable[1)] 2 x 0.75 mm^2
KM-17	Stoker sensor	
KM-18	Sensor 1	
KM-19	Outside temperature sensor	Connection cable[1)] 2 x 0.75 mm^2, 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[1)] 2 x 0.75 mm^2
KM-25	Boiler sensor	
KM-26	PWM / 0-10V pump 1	
KM-27	Induced draught fan	Connection cable[1)] 3 x 1.5 mm^2 for power supply, Connection cable[1)] 3 x 0.75 mm^2 for analysis of current speed
KM-28	Pump 1	Connection cable[1)] 3 x 1.5 mm^2, max. 1.5A / 280W / 230V
KM-29	Mains connection	Connection cable[1)] 3 x 1.5 mm^2, fuse provided by customer: C16A
KM-30	Mixing valve heating circuit 2	Connection cable[1)] 4 x 0.75 mm^2, max. 0.15A / 230V
KM-31	Mixing valve heating circuit 1	
KM-32	Heating circuit pump 2	Connection cable[1)] 3 x 1.5 mm^2, max. 2.5A
KM-33	Heating circuit pump 1	
KM-34	Heating circuit pump 0 or burner relay	Connection cable[1)] 3 x 1.5 mm^2, max. 2A
KM-35	Operating signal	Connection cable[1)] 2 x 0.75 mm^2 ➲ "Operating signal" [▶ 14]
KM-36	Optional module	

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

Fuses

F2	6.3 AT	KM-27, KM-28

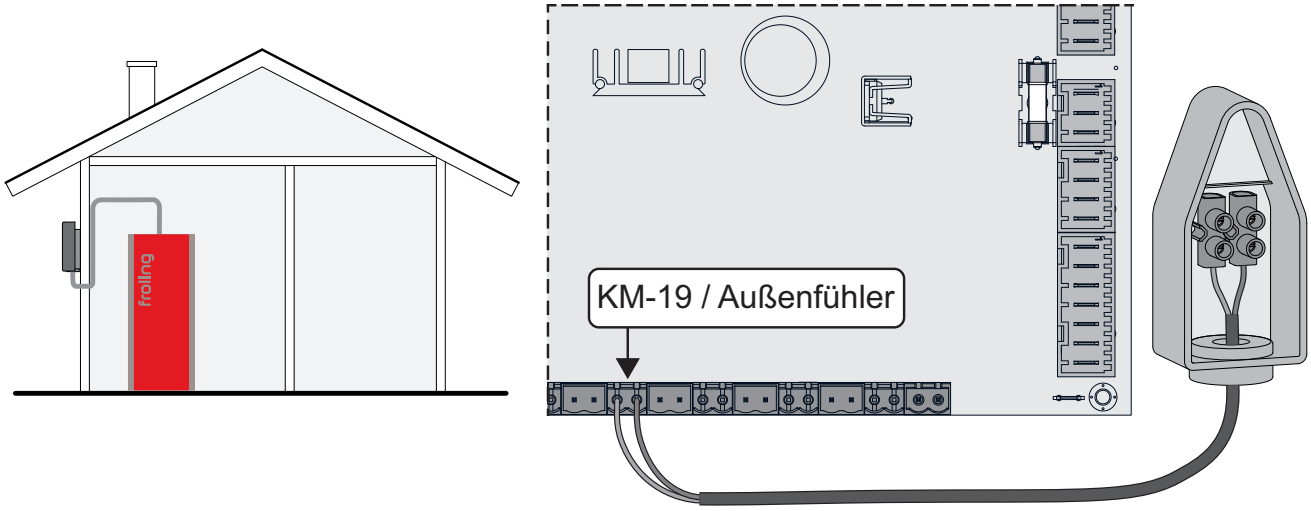
2.1.2 Mains connection

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

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.



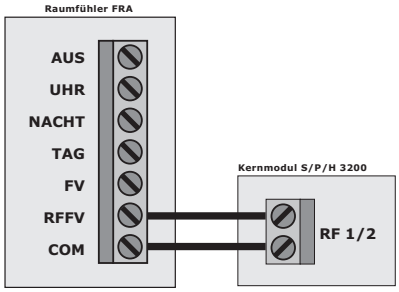
In the delivered state, the outside temperature sensor is read in by the core module ("KM-19 / outside temperature sensor" connection). Alternatively, the outside temperature sensor can be connected to an additional heating circuit module.

➲ "Heating circuit module" [▶ 15]

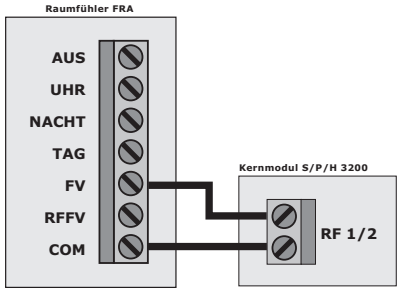
2.1.4 FRA room temperature sensor

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.

affecting room:



not affecting room:



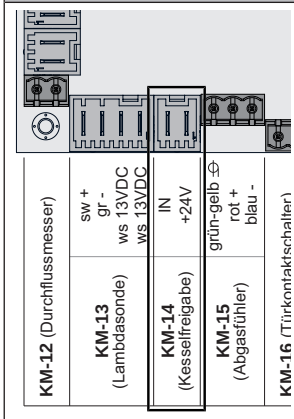
Possible positions of the mode switch:

⏻	**Boiler off**	Heating circuit deactivated, only frost protection!
🕒	**Automatic mode**	Heating and setback phases according to the set times
☾	**Setback mode**	Ignores the heating phases and continuously controls the room temperature to the temperature set in setback mode
☀	**Party switch**	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 Boiler enable contact

When commissioning the boiler using the settings wizard, the boiler release contact function ("`How is the boiler release contact on the core module being used?`") is called up to enable the optional analysis of an external floating release or start contact. The following functions are possible depending on the setting and electrical connection:

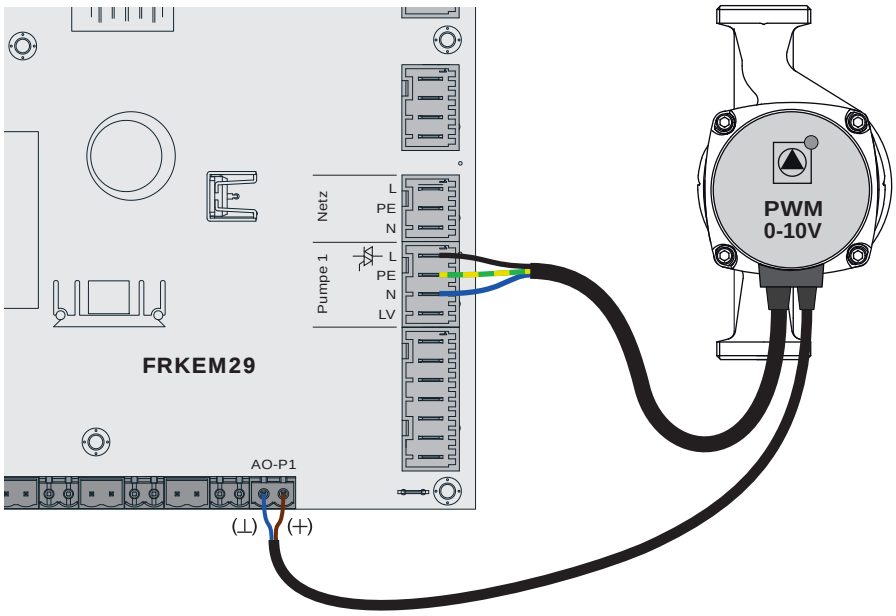
Connection position	Setting	Description
	not in use	No effect on boiler operation (contact must not be clamped/ bridged).
	Release/disable boiler	As long as the boiler release contact is closed, the boiler controller operates according to the specified parameters (mode, time window, etc.). If the boiler release contact is opened, the boiler is no longer released and follows the shutdown procedure. As long as the boiler release contact is open, heating requirements are ignored. (e.g. flue gas thermostat of a supply boiler, house distribution box).
	Extra heating	As long as the boiler release contact is open, the boiler controller operates according to the specified parameters. If the boiler release contact is closed, the boiler starts in continuous load operation (e.g. heat requirements of a heating fan).

2.1.6 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)

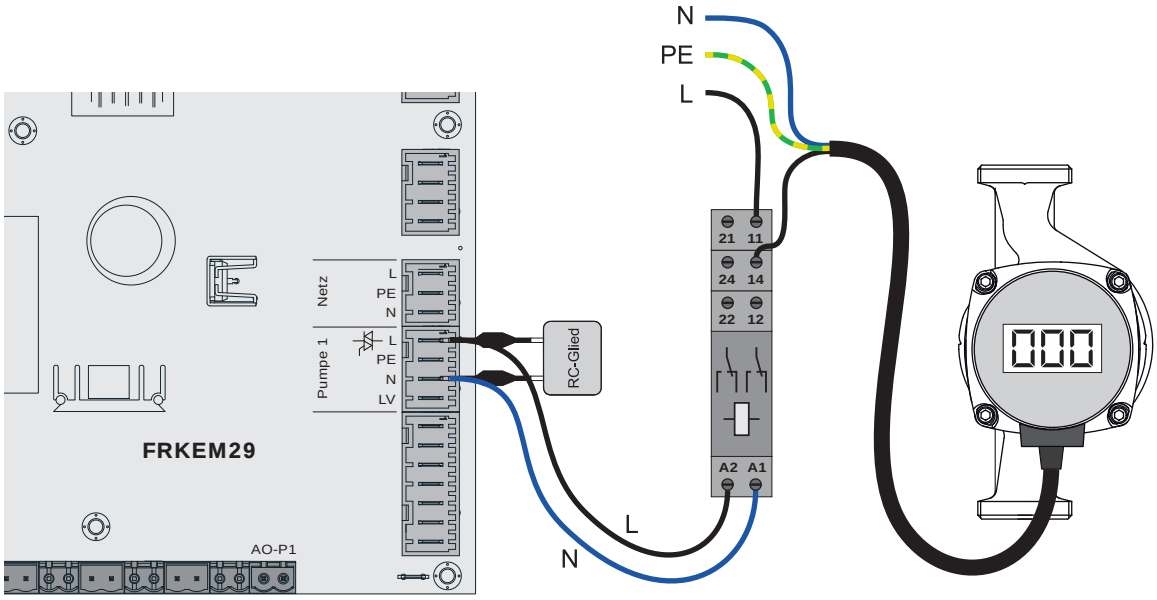
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PWM or 0-10V signal.



- ❒ 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

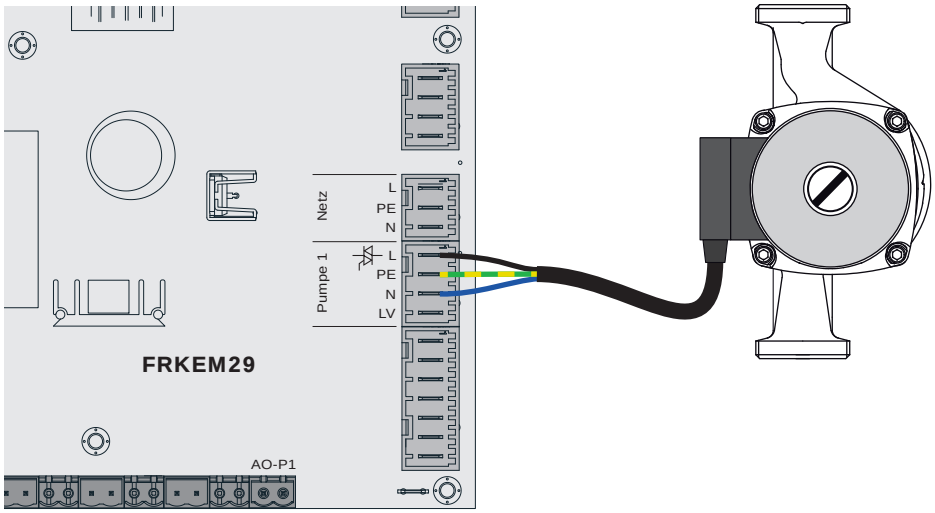
It is not possible to control the speed when using this type of pump. The use of a line regulating valve (e.g.: Setter balancing valve) is recommended.



- ❒ 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

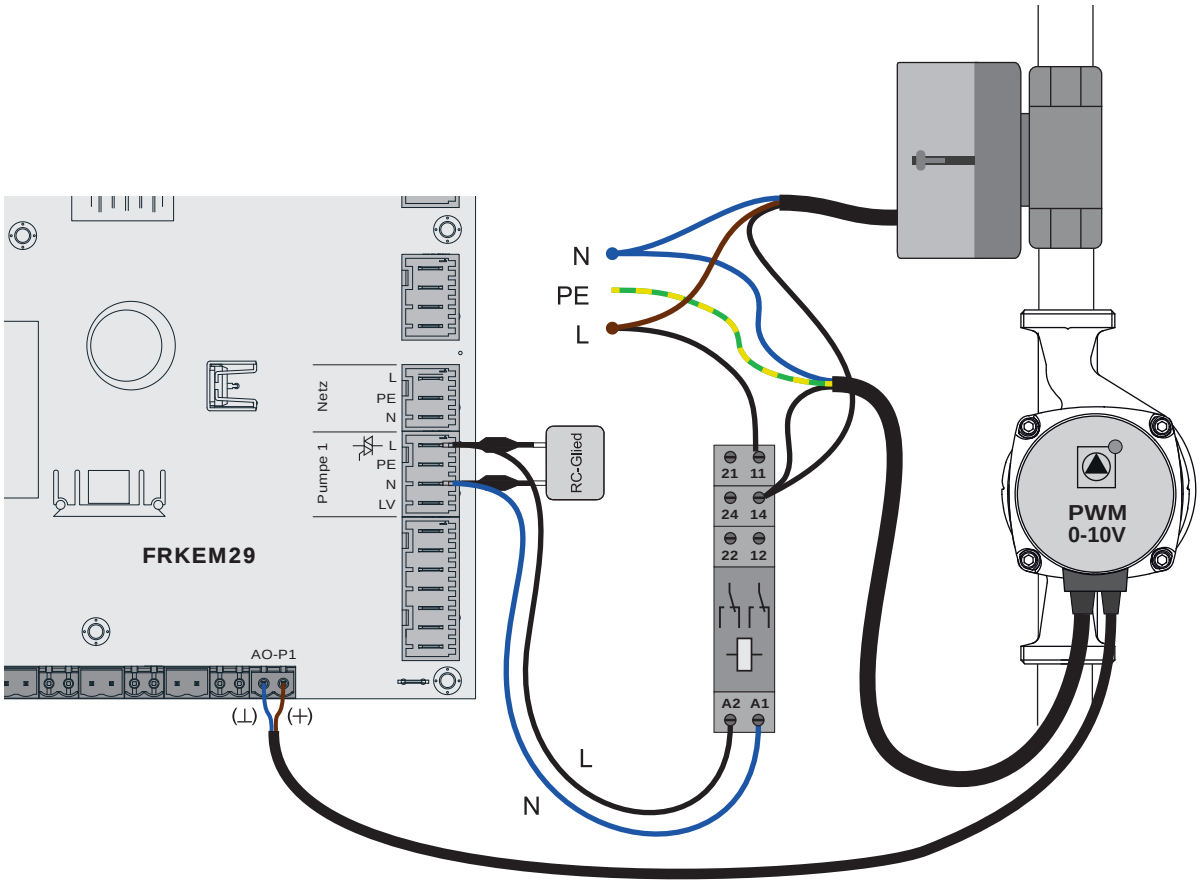
❒ In the relevant menu, set the pump control to “Pump without control signal”

2.1.7 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)

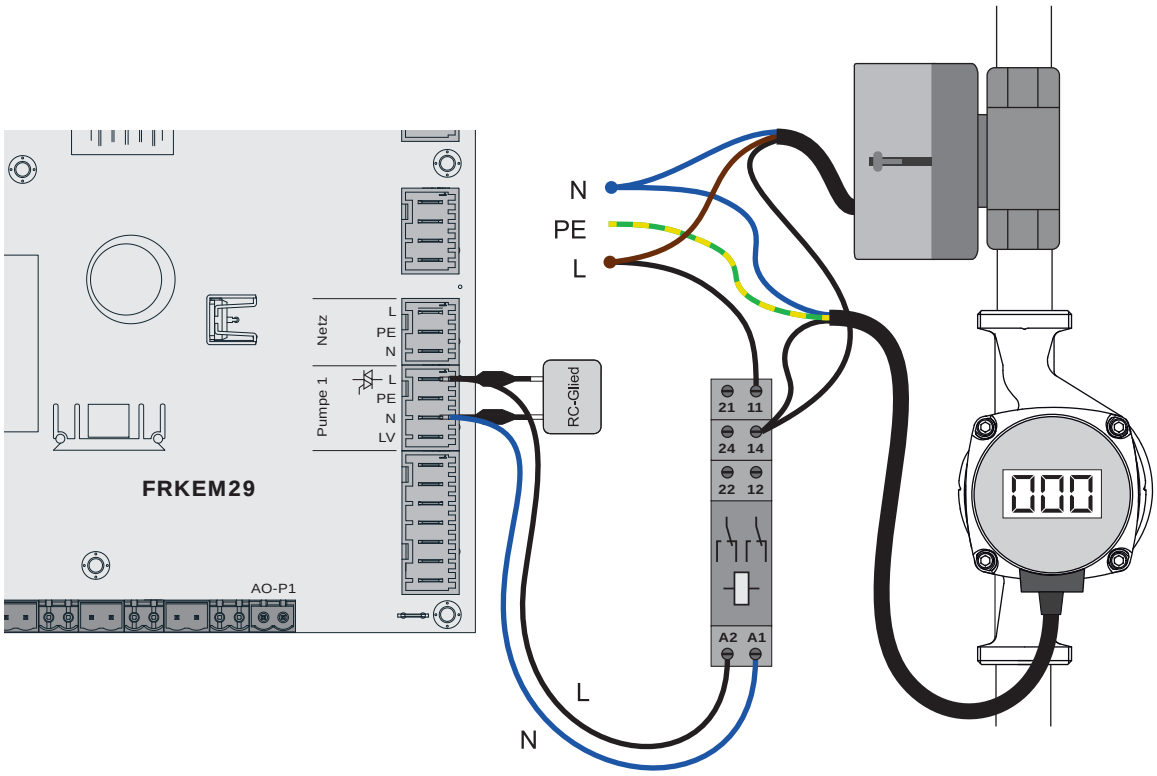
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ❒ 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

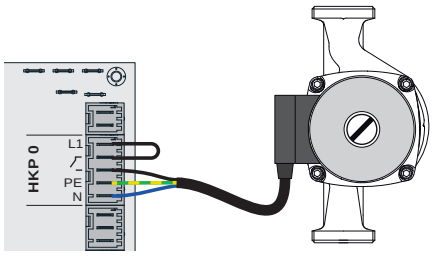
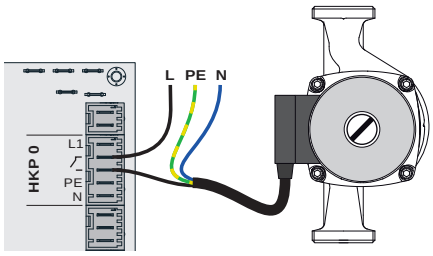
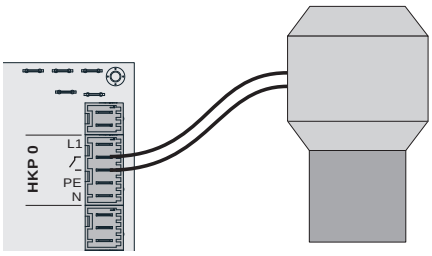
When this type of pump is used, the speed is not controllable! The use of a line regulating valve (e.g.: Setter balancing valve) is recommended!



- ❒ 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”

2.1.8 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
		
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.	The pump must be supplied externally with 2 Ampere. Up to max. 5 Ampere, the floating contact can used to switch the phase. At above 5 Ampere, the pump must be isolated with a relay.	Wire the floating output contact as an enabling signal to control the standby boiler.

2.1.9 Operating signal

On the core module (connection position KM-35), it is possible to issue a floating operating signal. The status is displayed under the “`Standby relay`” output in the “Manual” -> “Digital outputs” menu.

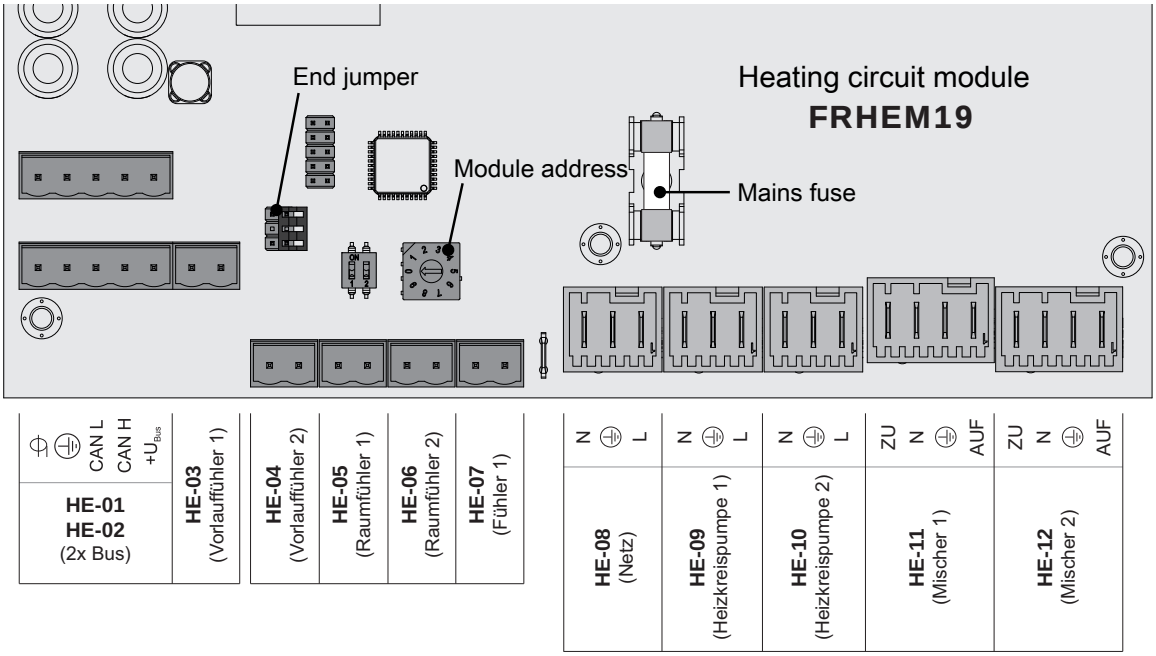
Operating status	Relay status
Boiler off, standby, fault	0
All other operating statuses (e.g. preparation, heating up, pre-heating, ignition, heating, slumber, cleaning, shutdown wait 1, shutdown wait 2, etc.)	1

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" [▶ 31]



Connection / Name		Note
HE-01	BUS	Connection with cable – LIYCY paired 2x2x0.5; ➲ "Connecting the bus cable" [▶ 29] Caution! CAN L and CAN H must not be connected to $+U_{BUS}$!
HE-02	BUS	
HE-03	Flow temperature sensor 1	Connection cable[1)] 2 x 0.75 mm²;
HE-04	Flow temperature sensor 2	
HE-05	Room temperature sensor 1	Connection cable[1)] 2 x 0.75 mm²; shielded if cable length greater than 25 m
HE-06	Room temperature sensor 2	
HE-07	Sensor 1	Connection cable[1)] 2 x 0.75 mm²; 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. ➲ "Heating - General settings" [▶ 47]
HE-08	Mains	Connection cable[1)] 3 x 1.5 mm², fuse 10A
HE-09	Heating circuit pump 1	Connection cable[1)] 3 x 1.5 mm², max. 2.5A / 230V / 500W
HE-10	Heating circuit pump 2	
HE-11	Mixing valve 1	Connection cable[1)] 4 x 0.75 mm², max. 0.15A / 230V
HE-12	Mixing valve 2	

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

Fuses

F2	6.3 AT	HE-09, HE-10, HE-11, HE-12

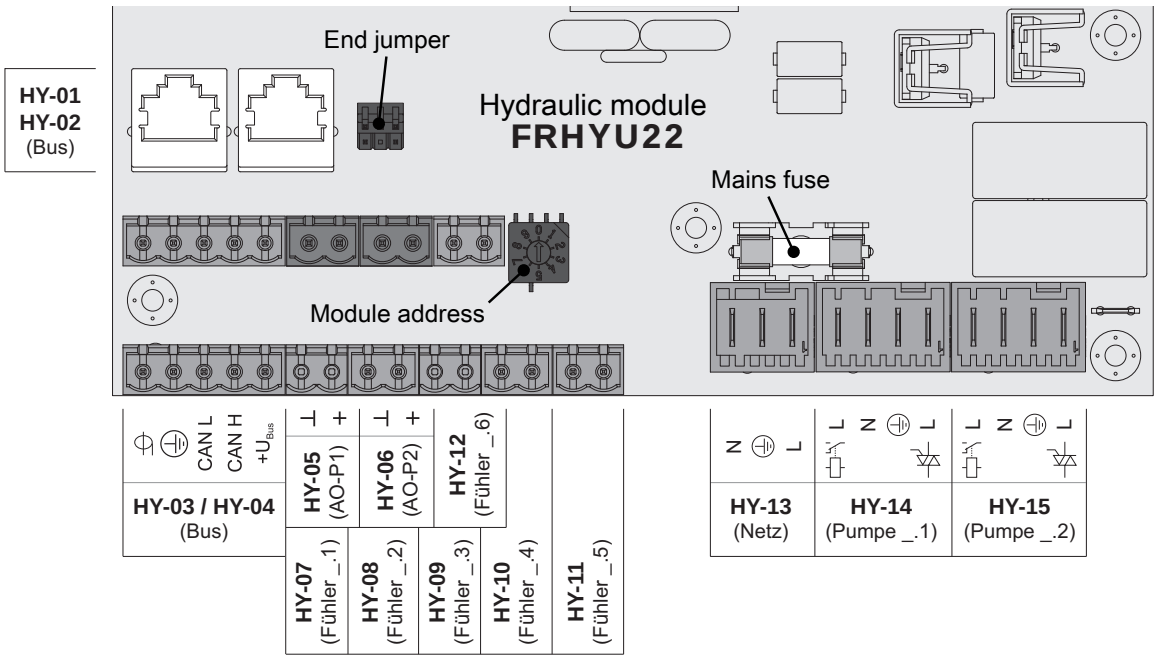
2.2.2 Hydraulic module

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" [▶ 31]

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;
HY-04	BUS	➲ "Connecting the bus cable" [▶ 29] Caution! CAN L and CAN H must not be connected to $+U_{BUS}$!
HY-05	AO-P1	Connection cable[1)] 2 x 0.75 mm²
HY-06	AO-P2	Connection of control signal for relevant pump
HY-07 : HY-12	Sensor _.1 : Sensor _.6	Connection cable[1)] 2 x 0.75 mm², 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-13	Mains	Connection cable[1)] 3 x 1.5 mm², fuse 10A
HY-14	Pump _.1	Connection cable[1)] 3 x 1.5 mm², max. 1.5A / 230V / 280W
HY-15	Pump _.2	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

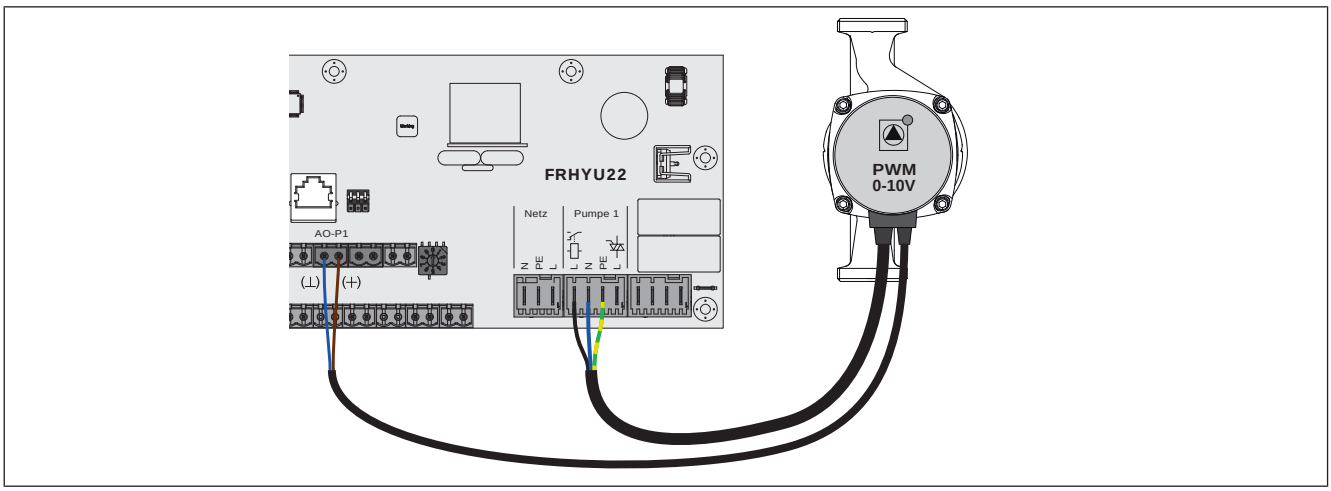
Fuses

F1	6.3 AT	HY-14, HY-15

Connecting a circulating pump to the hydraulic module

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

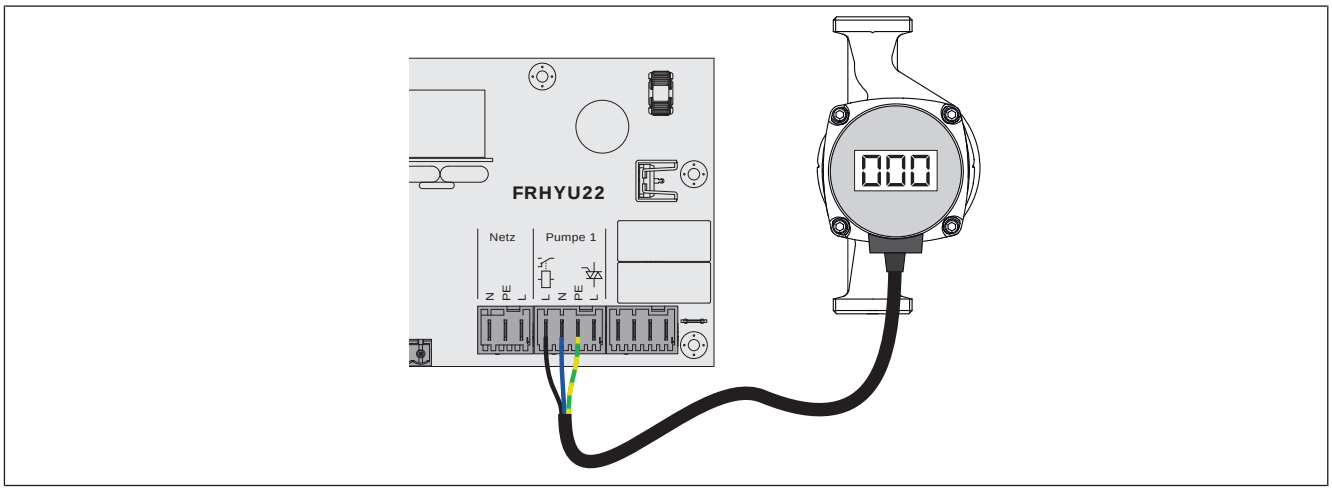
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ❒ 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

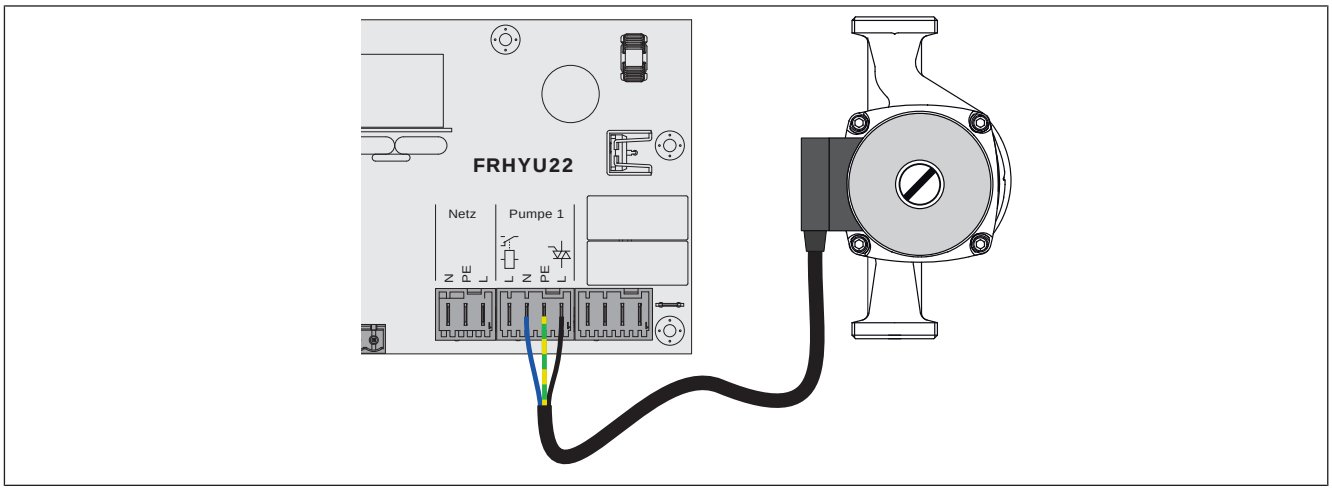
When this type of pump is used, the speed is not controllable! The use of a line regulating valve (e.g.: Setter balancing valve) is recommended!



- ❒ 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)

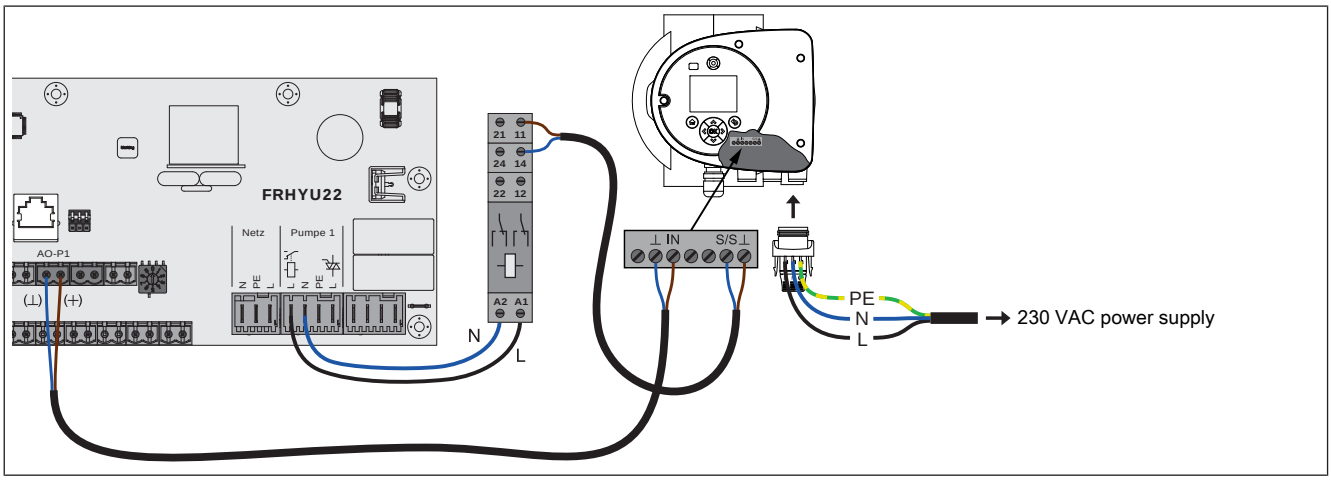
On older pumps without a control signal that are not highly efficient, the speed control is implemented via a pulse package control. Please note that the minimum speed may need to be adjusted on some pumps (default setting: 30%).



- ❒ 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.



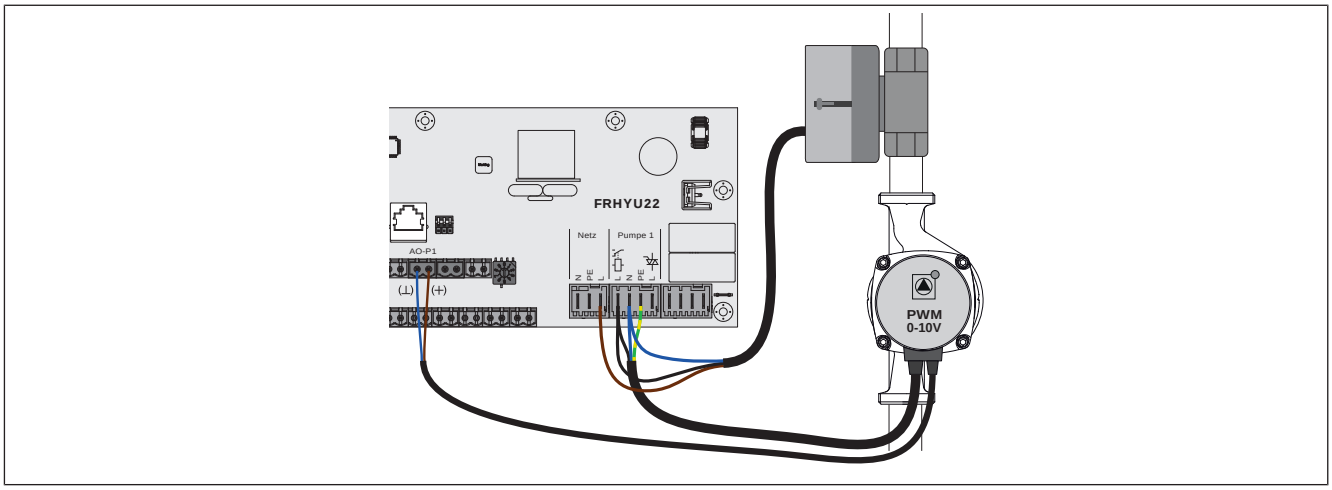
- ❒ Connect the pump relay to output “Pump 1” or “Pump 2” and use the relay output for phase (L)
- ❒ Install and connect two-pole cable (2 x 0.75 mm^2) from connection “AO-P1” or “AO-P2” to the pump and connect terminal “+” with terminal “IN” of the pump
- ❒ Install and connect two-pole cable (2 x 0.75 mm^2) 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)

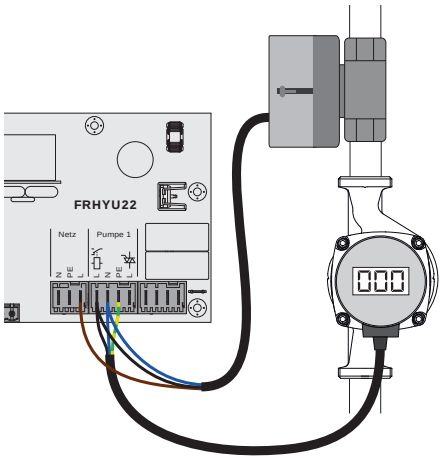
On high efficiency pumps with an additional wired control line, the speed control is implemented via the additional connection for the PDM or 0-10V signal.



- ❒ 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”

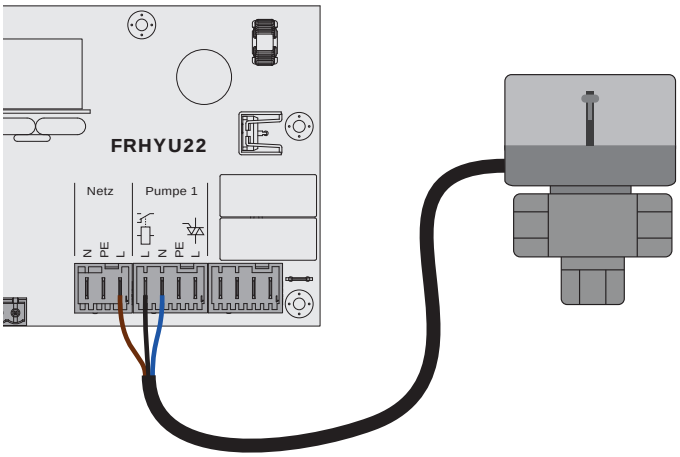
High efficiency pump without control signal

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”

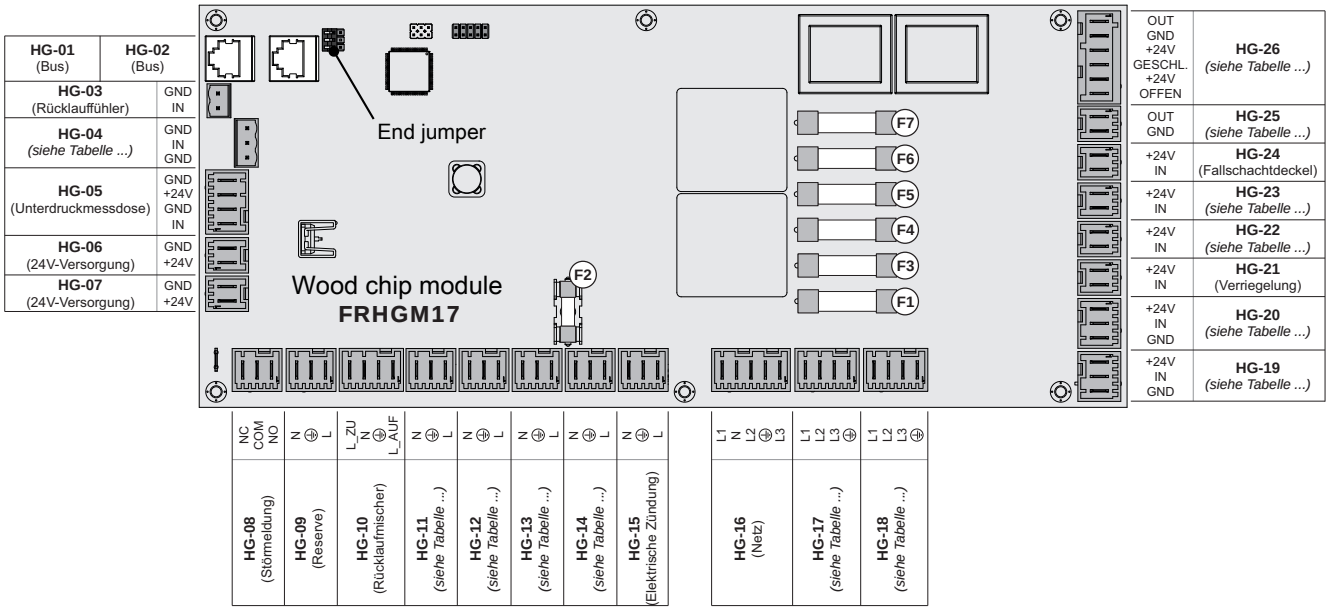
Connecting an isolating valve to the hydraulic module



- ❒ 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 Wood chip module

The wood chip module is included in standard delivery and has the connections of the hardware components for the wood chip boiler:



Connection / Name		Note
HG-01	BUS	Patch cable CAT 5 RJ45 SFTP 1:1 configuration
HG-02	BUS	
HG-03	Return feed sensor	Connection cable[1)] 2 x 0.75 mm^2
HG-05	Underpressure transmitter	
HG-06	24 V power supply	Connection cable[1)] 2 x 0.75 mm^2
HG-07		
HG-08	Fault message	Connection cable[1)] 3 x 1.5 mm^2; floating changeover contact, max. 2A / 24V, 1A / 230V
HG-10	Return mixer	Connection cable[1)] 4 x 1.5 mm^2; max. 0.15A / 230V
HG-11	Combi drive	Connection cable[1)] 3 x 1.5 mm^2
HG-12	External ash removal	
HG-14	HV cleaning	
HG-15	Electric ignition	Use connection cable of the component
HG-16	Mains connection	Connection cable[1)] 5 x 2.5 mm^2; 400 VAC
HG-17	Feed screw	Connection cable[1)] 4 x 1.5 mm^2; max. 0.55kW / 400V
HG-18	Stoker screw	
HG-19	Light barrier gravity shaft	Connection cable[1)] 3 x 0.75 mm^2; normally open contact 24V
HG-20	Monitoring combi drive	Connection cable[1)] 2 x 0.75 mm^2
HG-21	Lock	Connection cable[1)] 2 x 0.75 mm^2; 24V looping through
HG-24	Gravity shaft cover	Connection cable[1)] 2 x 0.75 mm^2; normally open contact
HG-26	Tilt motor grate 1	Connection cable[1)] 6 x 0.75 mm^2

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

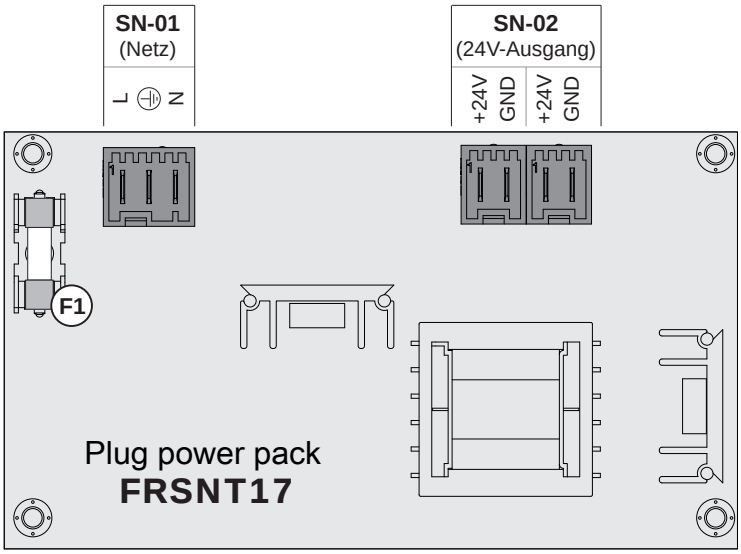
Fuses

F1, F3, F6	2.5 AT	HG-18
F2	6.3 AT	HG-09, HG-10, HG-15

F4, F5, F7	2.5 AT	HG-17

2.2.4 Plug power pack FRSNT17

The plug power pack is designed to supply all of the system consumers with 24 VDC:



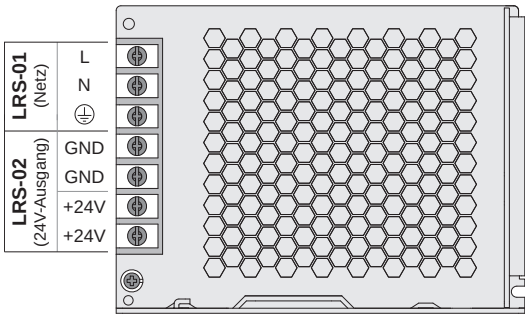
Connection / Name		Note
SN-01	Mains	Connection cable[1)] 3 x 1.5 mm²
SN-02	24 V power supply	Connection cable[1)] 2 x 1.0 mm², max. 2A

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

Fuses

F1	2 AT	SN-02

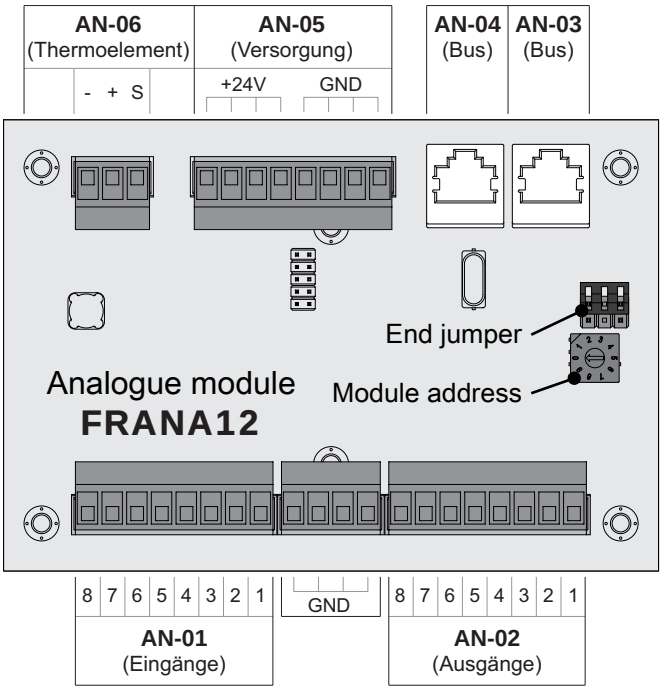
2.2.5 Plug power pack Meanwell LRS-100-24



Connection / Name		Note
LRS-01	Mains	Connection cable[1)] 3 x 1.5 mm²
LRS-02	24 V power supply	2 outputs, max. 4.5A Connection cable[1)] 2 x 1.0 mm²

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

2.2.6 Analogue module



Connection / Name		Note
AN-01	Inputs 1…8	Connection cable[1)] 1 x 0.75 mm²
AN-02	Outputs 1…8	Connection cable[1)] 1 x 0.75 mm²
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[1)] 2 x 1.0 mm² - Pellet boiler: 24 V power supply - 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
1		Actual voltage HV module 1
2		Actual current HV module 1
3		Actual voltage HV module 2
		External power specification (0-10V) On T4e with 2 HV modules, a different input must be used to use the external power specification. The input is set in the “Boiler – General settings” menu accordingly.
4		Actual current HV module 2
5	T4e 300/350	Position feedback of primary air flap

Output		Designation
1		Target voltage HV module 1

Output		Designation
2		Target current HV module 1
3		Target voltage HV module 2
4		Actual current HV module 2
5	T4e 300/350	5 V primary air flap

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 wood chip boiler and pellet boiler

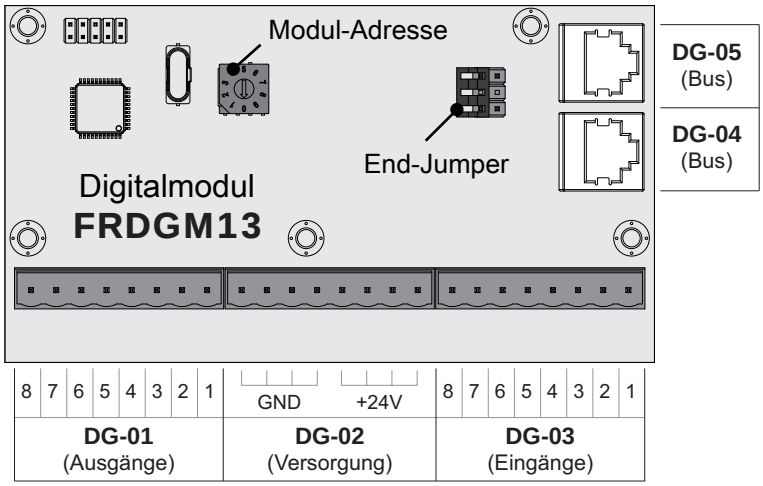
If the signal at the input is above 35%, the boiler starts in continuous load mode; if the signal drops below 30%, the boiler shuts down.

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.

2.2.7 Digital module



Connection / Name		Note
DG-01	Outputs 1…8	Connection cable[1)] 1 x 0.75 mm²
DG-02	Power supply	24 V power supply for the module, connecting cable[1)] 1 x 1.0 mm² Power supply via the 24 V power supply unit
DG-03	Inputs 1…8	Connection cable[1)] 1 x 0.75 mm²
DG-04	Bus	CAT 5 patch cable grey RJ45 SFTP 1:1 configuration
DG-05	Bus	

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 – Digital module with address 1

Input		Designation
1	T4e 300 - 350	SSM pumps
5		Tilt motor 3 open
6		Tilt motor 3 closed
7		Tilt motor 2 open
8		Tilt motor 2 closed

Output	Designation
1	Open tilt motor 2
2	Close tilt motor 2
3	Open tilt motor 3
4	Close tilt motor 3
5	Primary air flap open
6	Primary air flap closed

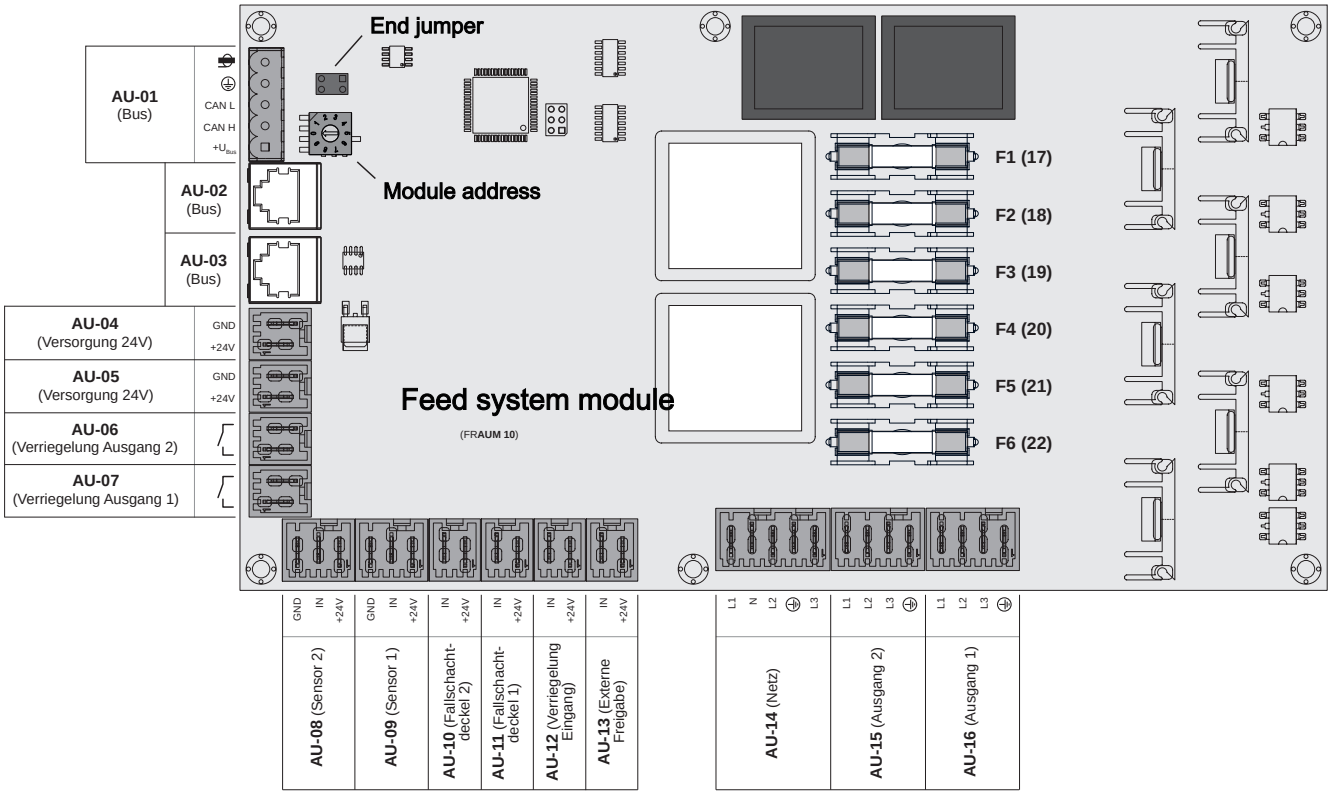
Standard configuration – Digital module with address 3

Input	Designation
1	MIN level sensor
2	MAX level sensor

Input	Designation
5	Safety relay suction turbine

Output	Designation
1	Suction turbine on
2	Start Pellet mole / vibrator
3	1-2-3 suction module – relay 1
4	1-2-3 suction module – relay 2
5	Induced draught fan safety relay
6	1-2-3 suction module – motor 1
7	1-2-3 suction module – motor 2
8	1-2-3 suction module – motor 3

2.2.8 Feed system module



Connection / Name		Note
AU-01	Bus	Port with cable – LICY paired 2x2x0.5; ➲ "Connecting the bus cable" [▶ 29] ❒ Caution! CAN L and CAN H must not be connected to $+U_{BUS}$!
AU-02	Bus	Patch cable CAT 5 RJ45 SFTP 1:1 configuration
AU-03		
AU-04	24V power supply	Connection cable[1)] 2 x 0.75 mm^2
AU-05		
AU-06	Output 2 latch	
AU-07	Lock output 1	

Connection / Name		Note
AU-08	Sensor 2	Connection cable[1)] 3 x 0.75 mm^2, N/O switch contact 254V (e.g. connecting a light barrier)
AU-09	Pellet suction screw 1 sensor	
AU-10	Gravity shaft cover 2	Connection cable[1)] 2 x 0-76mm^2
AU-11	Gravity shaft cover 1	
AU-12	Input latch	
AU-13	External release	
AU-14	Mains	Connection cable[1)] 5 x 2.5 mm^2
AU-15	Combi drive	Connecting cable[1)] 4 x 1.5 mm^2; max. 0.75 kW / 400 V
AU-16	Pellet discharge screw geared motor	
AU-17 : AU-22	F1 : F6	3.15 AT fuses

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

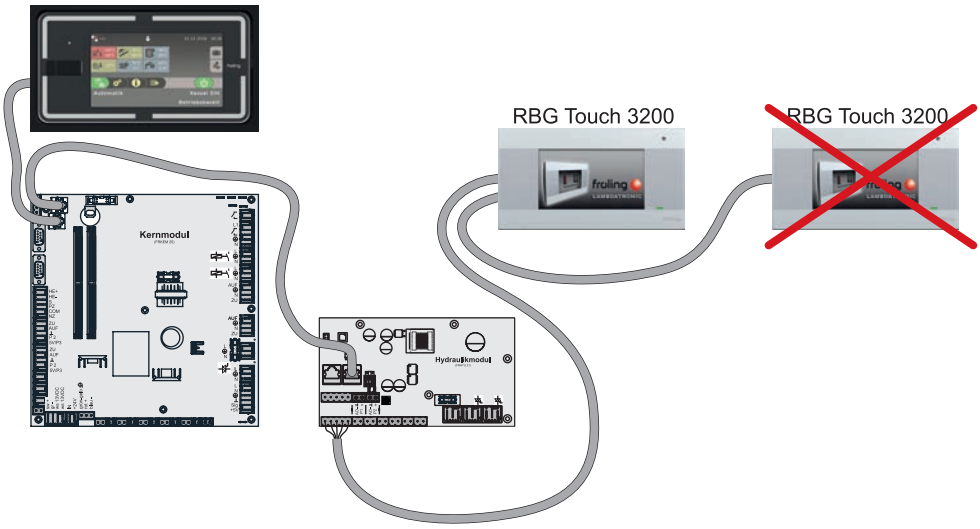
Fuses

F1, F3, F4	3.15 AT	AU-15
F2, F5, F6	3.15 AT	AU-16

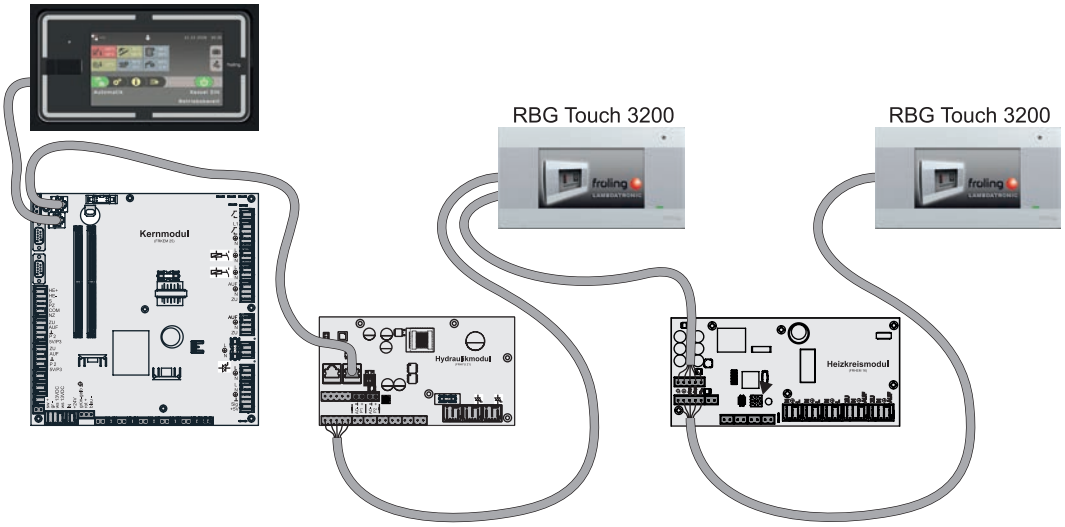
2.3 BUS connection

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.

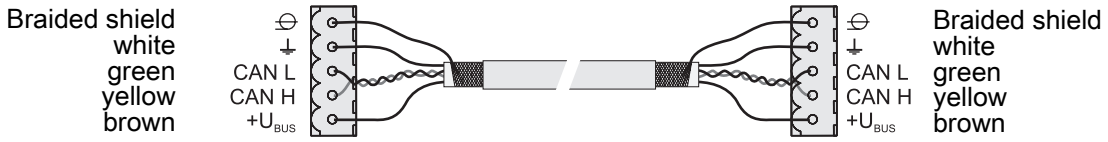


A voltage supply unit must be used for every touch room console (heating circuit module, hydraulic module).



2.3.1 Connecting the bus cable

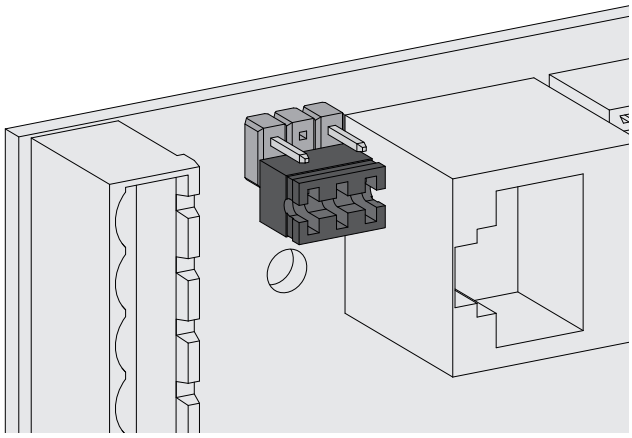
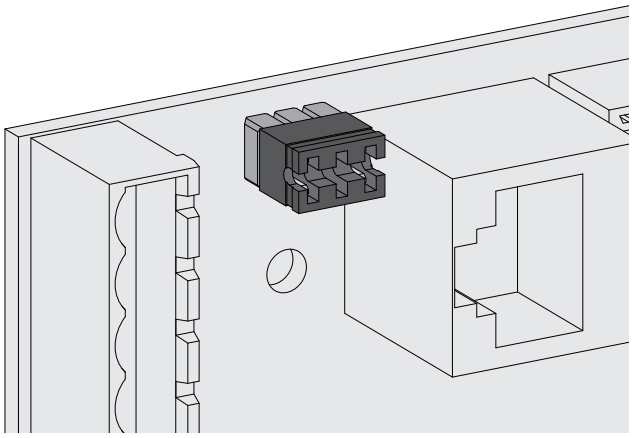
For the bus connections between the individual modules, cable type **LIYCY paired 2x2x0.5** should be used. The connection to the 5-pin plugs should be carried out according to the following diagram:



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.

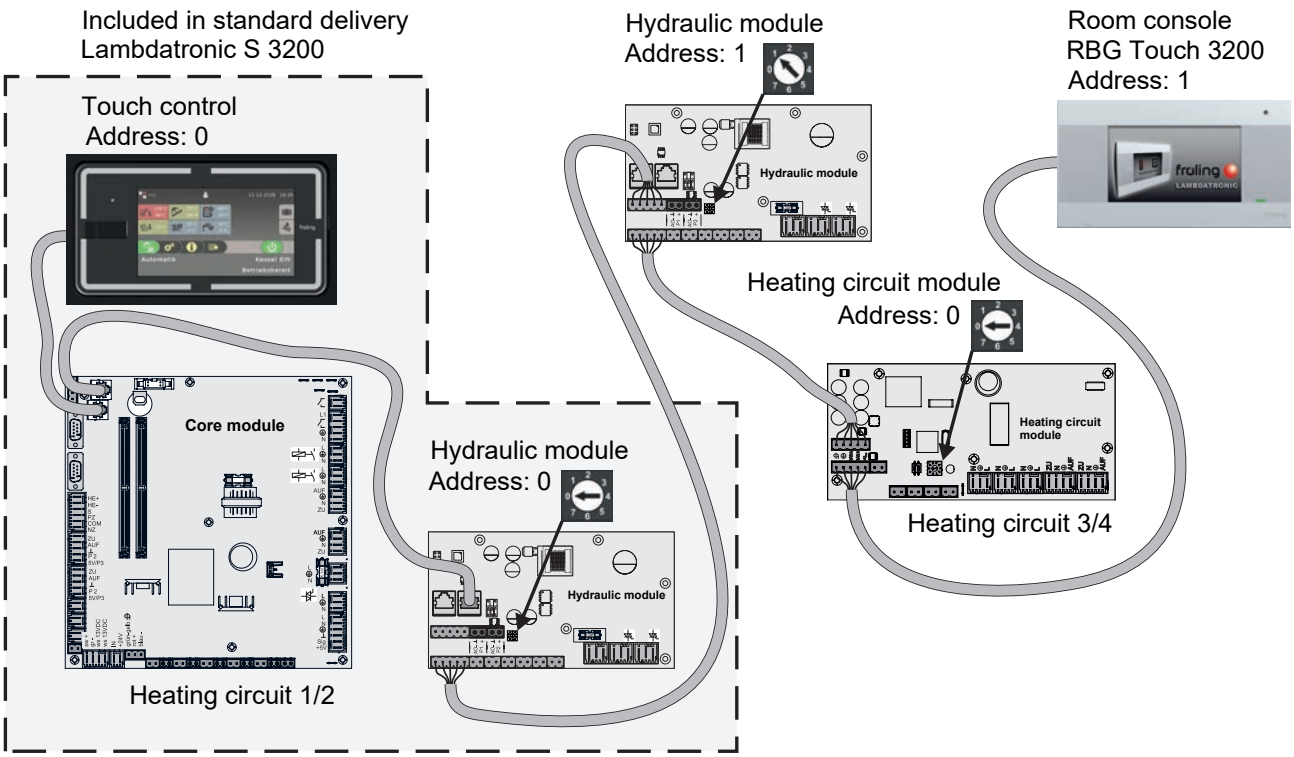
End jumper not set	End jumper set
	

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!

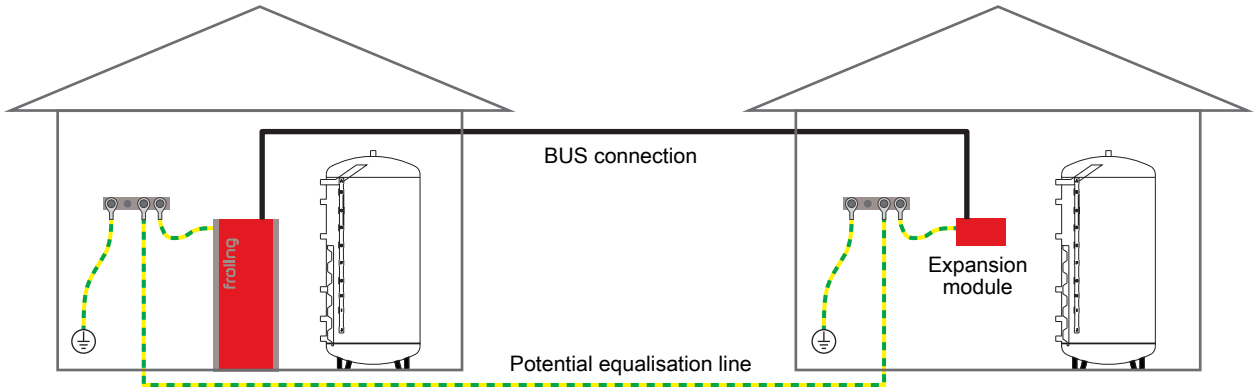


Module address set	Heating circuit module	Hydraulic module	
	Heating circuit	Sensors	Pump
0	03 – 04	0.1 – 0.6	0.1 – 0.2
1	05 – 06	1.1 – 1.6	1.1 – 1.2
2	07 – 08	2.1 – 2.6	2.1 – 2.2
3	09 – 10	3.1 – 3.6	3.1 – 3.2
4	11 – 12	4.1 – 4.6	4.1 – 4.2
5	13 – 14	5.1 – 5.6	5.1 – 5.2
6	15 – 16	6.1 – 6.6	6.1 – 6.2
7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

2.3.4 Potential equalisation / potential separation

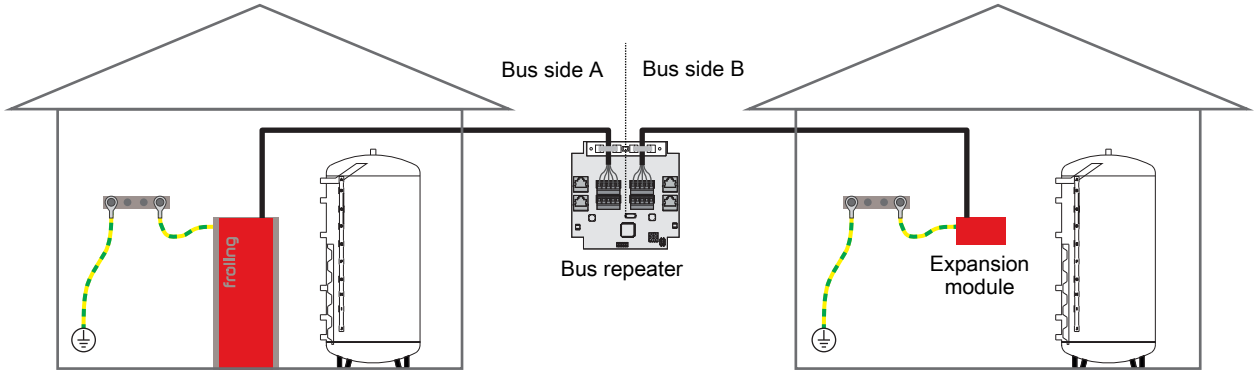
There can be potential shifts between buildings. In this case, equalising currents flow via the bus connection shield which can damage the modules.

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.

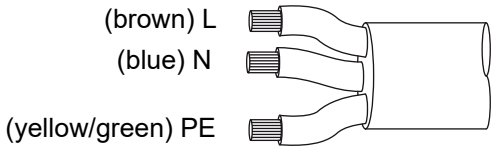
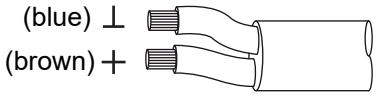
Instead of the potential equalisation, a Fröling bus repeater can be used in the bus connection line to the next building. The potential separation (galvanic isolation) allows the bus network to be split into two separate sub-networks.



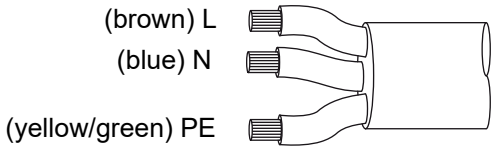
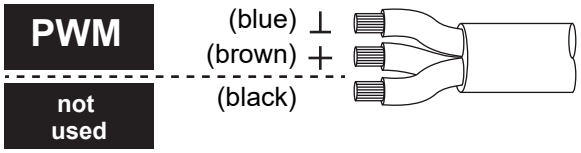
2.4 Connection information according to pump types

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:

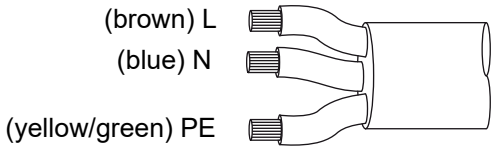
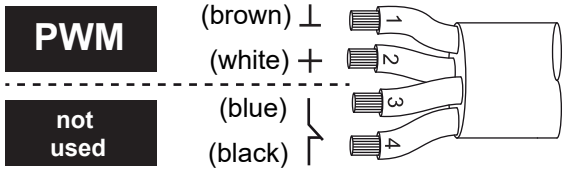
Pump type with 2-pin control cable

Power supply	2-pin control cable
	
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
	
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

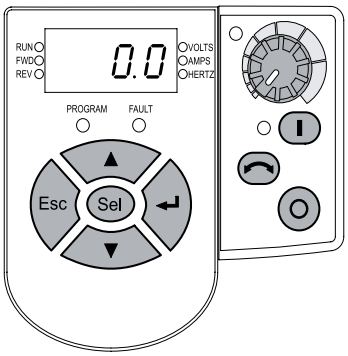
Pump type with 4-pin control cable

Power supply	4-pin control cable
	
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

2.5 Frequency converter

Below is a description of how the input elements of the frequency converter basically work.

2.5.1 Operating elements



Key	Name	Description
Esc	Escape	Go back one step in the program menu. Cancel changes to a parameter value and exit program mode
Sel	Select button	Go forward one step in the program menu. Select a digit when a parameter value is displayed
▲	Up arrow	Scroll down through groups and parameters. Increase/reduce the value of a flashing digit
▼	Down arrow	
↵	Enter	Go forward one step in the program menu. Save a change to a parameter value

2.5.2 Changing parameters

Step	Key	Description
1		Connecting the power supply
2	Esc	3x escape until “0.0” appears in the display
3	↵	The group menu letter flashes when you press the Enter button
4	▲ or ▼	Press the arrow buttons to select the relevant group menu (d,P,t,C,A)
5	↵	Enter the previously selected group menu. The digit on the right flashes and can be changed
6	Sel	Pressing the Sel button allows you to change the second digit from the right
7	↵	Press the Enter button to see the value of the parameter, or press it again to change the value
8	▲ or ▼	Reduce/increase the value. **TIP**: Pressing the Sel button allows you to change the tens column, pressing it again allows you to change the hundreds column
9	↵	Confirm the set value by pressing Enter
10	Esc	Press Escape several times to exit the program menu

Completing the parameter settings

After setting the parameters, you must restart the frequency converter to apply the new settings.

NOTICE

Malfunctions after setting parameters!

If the frequency converter becomes inoperable after setting the required parameters:

- ❒ Perform a factory reset
- ❒ Set the parameters again
  - ↳ The “Start”, “Back” and “Stop” buttons and the “potentiometer” usually have no function after the frequency converter has been programmed.

You can restore the factory settings by setting parameter P 112 to 1. The parameter then automatically returns to the value 0 and the frequency converter displays the message "F048".

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
	Switching on for the first time Queries are made regarding language, facility number, date and time
	Boiler Setting for boiler type, boiler output, fuel, return temperature control and boiler-specific options (ignition, filter, etc.)
	Lambda probe Selection and calibration of the type of sensor used
	Feed system Selection of the existing discharge system (only for boilers with automatic loading)
	Hydraulic system Selection of the hydraulic system (hydraulic system 1, 2, 3, etc.)
	Additional components Selection and activation of the existing load and control components (heating circuits, DHW tank, solar, difference controller, etc.)
	Heating up 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
	Connect Setting parameters required for the boiler to use the “froeling-connect.com” online control (IP address, display password, etc.)
	Heating up program 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

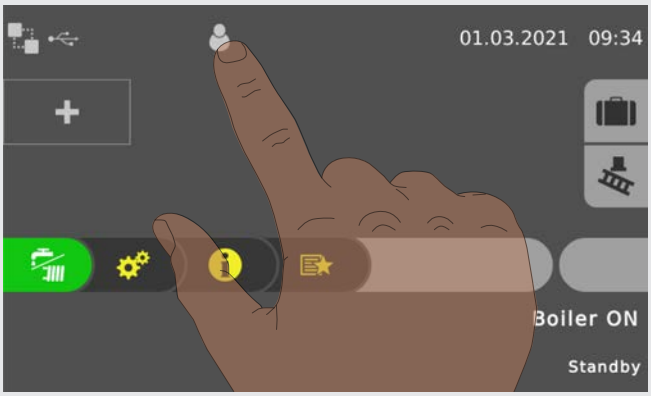
2: Setting the production number (see identification plate)

3: Setting the date and time

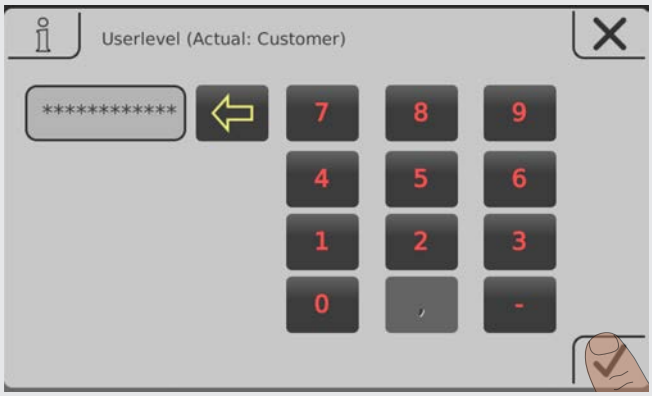
4: Display of the basic screen

3.4 Starting the setting wizard

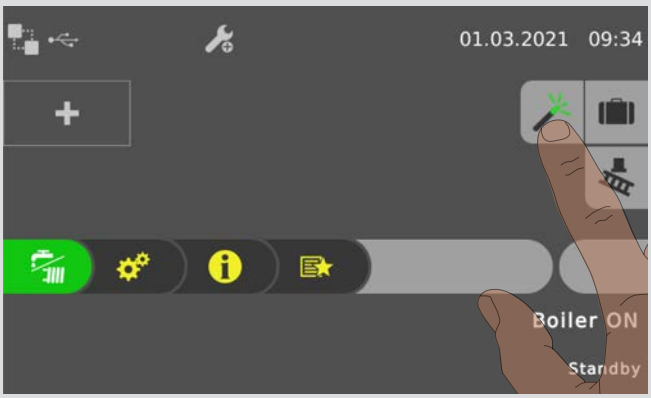
1: Tap the icon to change the user level



2: Type in the service code and confirm

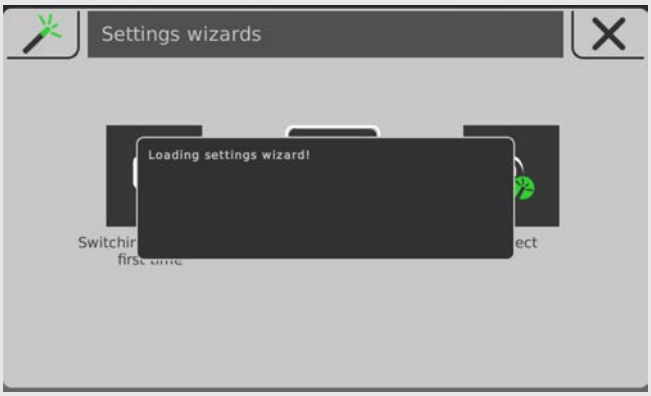


3: Tap the icon of the settings wizard



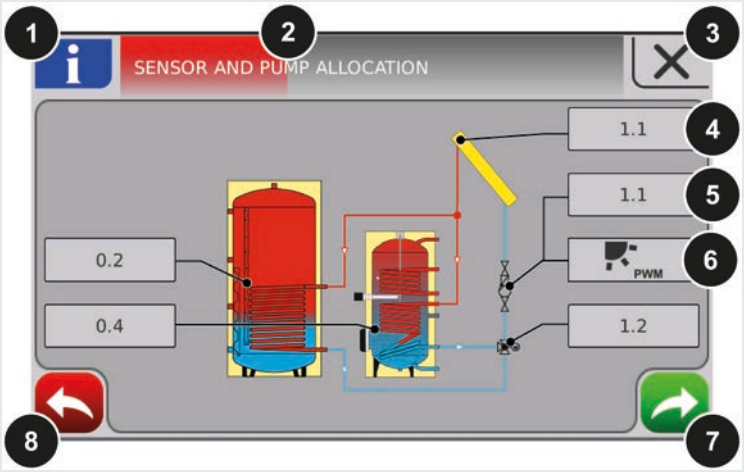
4: Tap the “Boiler” setting wizard

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
	➲ "Activation options of pump outlets" [▶ 96]	
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:	
	Auto: Automatic: heating phases according to the set heating times
	Extra heating: The heating circuit is regulated to the set room temperature with no time limitation. To cancel this function, activate another mode/function
	Setback: Setback mode; the current or next heating phase is ignored
	Continuous setback mode: Heating circuit remains in setback mode until another mode is activated
	Party: 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

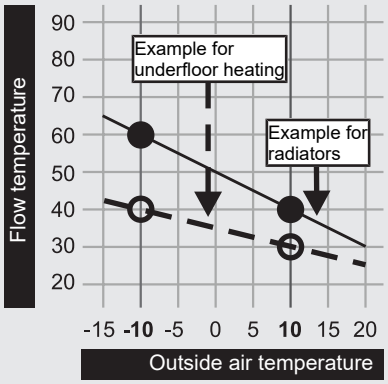
Desired room temperature during heating mode
Prerequisite: Heating circuit used in conjunction with remote control Room temperature which is regulated during the set heating times.

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 +/- 1°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

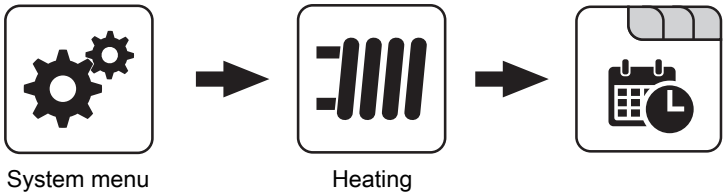
If the temperature at top buffer tank exceeds the set value, the heating circuit is activated regardless of mode (boiler, remote control) and set heating times. The flow temperature is controlled to the value set in the parameter "`Flow temperature SP at outside air temperature of -10°C`". The function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



➲ "Setting times" [▶ 106]

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

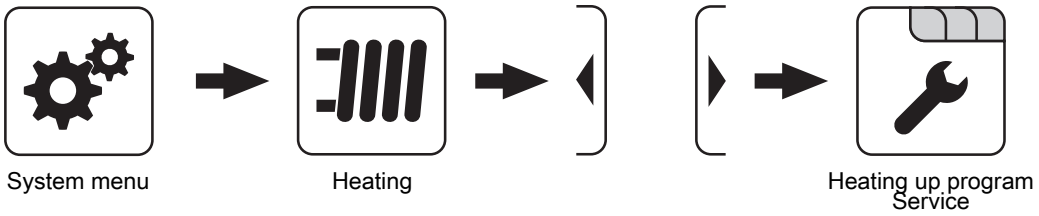
IMPORTANT! Parameter is available only for heating circuits 1 and 2!

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

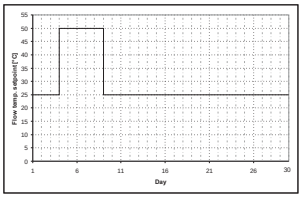
The DHW tank can be loaded via the heating circuit. If there is a requirement from the DHW tank and the criteria for DHW tank loading have been met, the switch valve immediately clears the way for DHW tank loading. The heating circuit pump starts running as soon as the criterion “Load if temperature 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

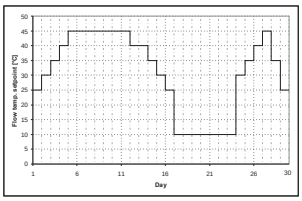


Heating up programs

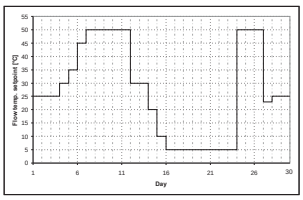
Heating up program 1:



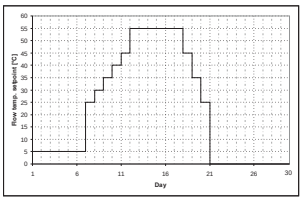
Heating up program 2:



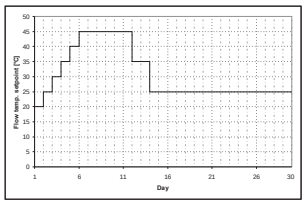
Heating up program 5:



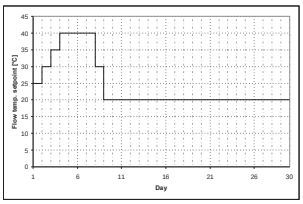
Heating up program 6:



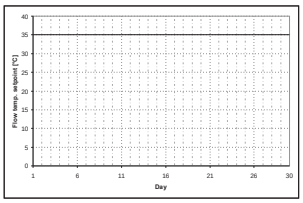
Heating up program 3:



Heating up program 4:

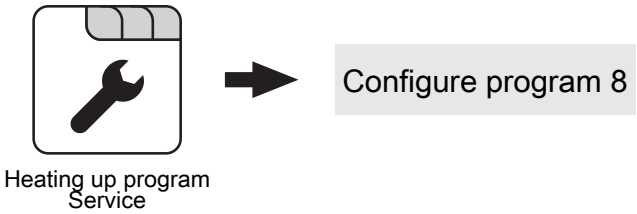


Heating up program 7:



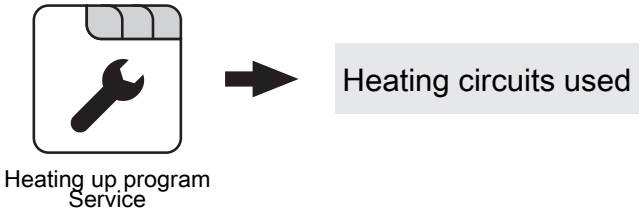
The heating up programs listed are non-binding recommendations. If the heating up program is to be used for floor screed drying, you must consult the manufacturer of the floor finish and/or the installer!

Configure program 8



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



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 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

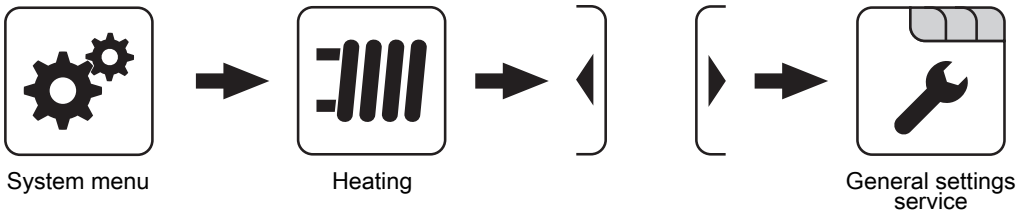
There are set options for the progression of the flow temperature in heating up programs 1 – 6. With heating up program 7 the flow temperature can be selected freely over the entire 30 days.

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!

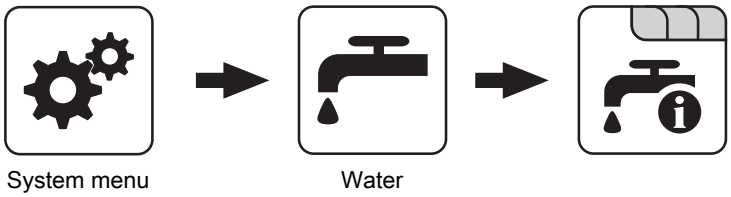
- **NO**: At the sensor connector of the room sensor, a room sensor must be connected to control the room temperature.
- **YES**: At the sensor connector of the room sensor, room thermostats can be connected to control the room temperature.

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" [▶ 106]

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" [▶ 96]

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" [▶ 96]

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" [▶ 96]

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" [▶ 96]

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

System menu → Solar

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.

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.

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. Is 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 charge is 0% at the following temperature (absolute value)
Prerequisite: Master boiler in the cascade or hydraulic system 4 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.

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.

4.4.3 Buffer tank - Service

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"

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" [▶ 96]

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.

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.

Boiler control variable

Display of the signal for the combustion controller.

Position of the air flap

Display of the current position of the air flap.

Residual oxygen content

Display of the current residual oxygen content.

Calculated boiler setpoint

Display of the current boiler temperature setpoint depending on the specified hydraulic system.

Calculated return setpoint

Prerequisite: Maintaining outfeed through return feed mixer

Specifies the calculated setpoint temperature for the return temperature control.

Return sensor

Prerequisite: Return temperature control with mixing valve or bypass pump

Display of the current temperature at the boiler return.

Stoker temperature

Display of the current temperature at the stoker sensor.

Boiler sensor 2

Display of the current temperature at sensor 2.

Remote switching using a room console

Specifies whether the boiler can be switched on and switched off using a room console.

Boiler status

Reports the current status of the boiler.

4.5.2 Boiler - Temperatures

Shutdown if current boiler temperature is higher than boiler setpoint +

If the boiler temperature setpoint is exceeded by this value, the boiler follows the shutdown procedure. 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.

Target temperature difference, flow/return temp

Defines the desired difference between flow and return temperature in boiler heating mode.

Return setpoint delay

Prerequisite: Maintaining outfeed through return feed mixer

Waiting time for calculating the return temperature setpoint adjustment. Once the specified time has passed, the heating system temperatures are evaluated.

Return setpoint boost (output influence)

Prerequisite: Maintaining outfeed through return feed mixer

This parameter determines how heavily the deviation of the actual boiler temperature from the boiler temperature setpoint is weighted.

Return feed min. difference at 100% output

Prerequisite: Maintaining outfeed through return feed mixer

Minimum difference between boiler temperature setpoint and return temperature setpoint. The temperature difference between the boiler outfeed temperature and boiler return temperature should not be below this value. This parameter is applicable when the boiler is at nominal load.

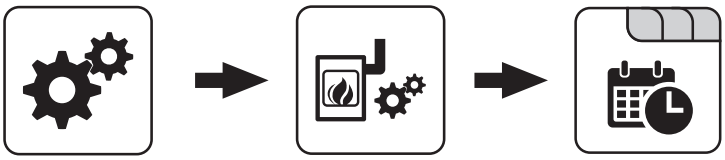
An interpolation is made between the two parameters between partial load and nominal load.

Heating circuit overheat invariable mode

Prerequisite: Variable mode activated or boiler system in the cascade

The boiler setpoint temperature in heating mode is increased by this value compared to the required flow temperature.

4.5.3 Boiler - Times



➲ "Setting times" [▶ 106]

4.5.4 Boiler - Service

Variable mode activated

- **NO:** The boiler temperature is regulated to the boiler temperature setpoint that is set. When used in conjunction with a storage tank, this parameter should be set to “NO”.
- **YES:** The boiler temperature is regulated according to the calculated flow value for the heating circuit/DHW tank.

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!

Function of boiler pump collective fault signal

Defines whether and how the input of the boiler pump’s collective fault message is to be interpreted.

Input for boiler pump collective fault signal

Preferred digital module address of boiler pump collective fault input

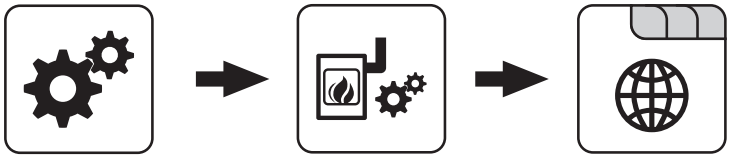
Boiler pump collective fault signal

Current input signal.

Individual evaluation of safety loop available

The safety loop (STB, STB2, water shortage, water pressure) can be directed to individual inputs, so that individual fault messages can be output.

4.5.5 Boiler - General settings



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.

Output warnings through fault message relays

- **NO:** When there is an “error” or “alarm” the common fault relay closes.
- **YES:** In addition to an “error” or “alarm”, the common fault relay closes when a “warning” is present on the boiler.

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”.

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).

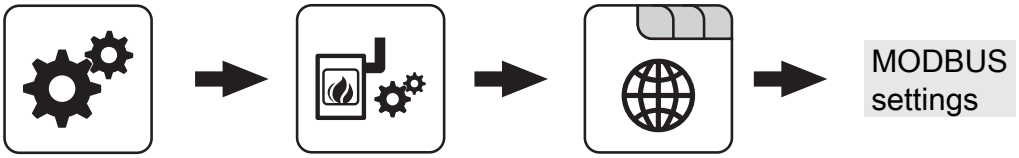
The system is filled with frost protection

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



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)

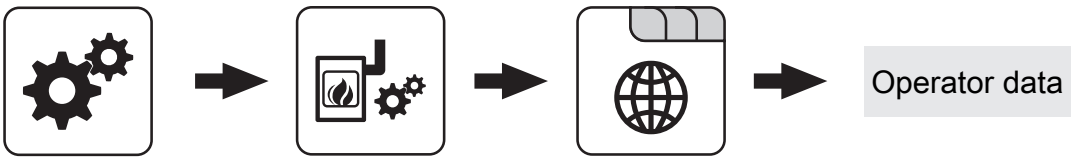
Indicates which Modbus protocol is to be used for the transfer. Which protocol must be used can be found in the documentation of the Modbus system used on site.

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



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

System menu → Boiler 2 →

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" [▶ 96]

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

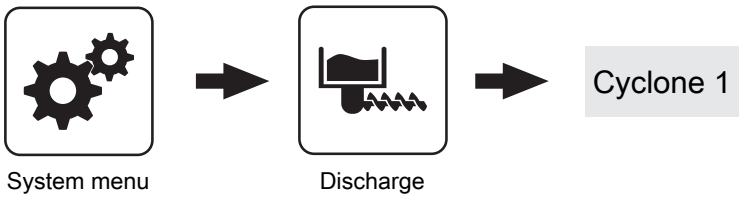
YES: If the valve switches incorrectly, the way it is controlled can be adjusted using this parameter.

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 Feed system

4.7.1 Feed system - Cyclone 1



Cyclone active

- **NO:** Cyclone on the vacuum discharge system is not in use.
- **YES:** Cyclone on the vacuum discharge system is in use.

Active suction system

Prerequisite: 1-2-3 suction module when using up to three identical discharge systems.

Specifies which discharge system is currently being used.

Active probe

Prerequisite: 1-2-3 suction module in combination with RS4 / RS8 pellet suction system

Probe of the active discharge system, which is used for suction.

Cyclone status

Shows the current status of the cyclone.

Status of the vacuum discharge system

Shows the current status of the vacuum discharge system that feeds the cyclone.

Switch-on delay MIN sensor

Duration after which the suction turbine is activated.

Empty the cyclone completely after how many filling operations?

Specifies after how many fillings the cyclone is to be completely emptied.

Maximum time until switching of probe

Prerequisite: Feed system 4 probe switch or 8 probe switch

Time period, during which the cyclone must reach a fill level of 100% from a probe. If this time is exceeded, the change-over unit automatically changes to the next probe. If all probes are started and the fill level of 100% in the cyclone is not reached, an error message appears on the display.

Probe suction reversal for

Prerequisite: RS4 / RS8 pellet suction system

Before switching to the next probe, the probe that was last used is back-flushed for the time set.

Max. runtime of suction fan

Prerequisite: Feed system bag silo or suction screw

If the 100% fill level in the cyclone has not been reached within the specified runtime, the suction turbine switches off.

Vacuum + screw filling run-on after reaching the MAX fill level

Specifies how long the suction screw should deliver material after reaching the maximum fill level in the cyclone. After this runtime, the run-on time of the suction turbine starts (parameter “Suction run-on”)

Suction run-on

When the fill level sensor detects fuel in the cyclone, the suction turbine remains active for the time set.

Shaker motor installed

- **YES:** The vibration motor for improving the discharge rate of the bag silo is installed.

Shaker timing

The default vibration interval timing is 60%:
Time basis: 100 sec. → 60 sec. on / 40 sec. pause

Nominal current for discharge screw

Nominal current of the suction screw motor according to the identification plate on the motor.

During troubleshooting of suction screw, this turns backwards for

Duration, how long should the suction screw turn backwards during troubleshooting.

During troubleshooting of suction screw, this turns forwards for

Duration, how long should the suction screw turn forwards during troubleshooting.

Minimum current monitoring active

- **YES:** A failure of measured phase is detected.

Service hours of suction screw

Prerequisite: Large-scale suction system with one cyclone and 2 rotary valves.

operating hours of suction screw discharge on a GASS.

Suction turbine operating hours

Counter for the operating hours of the suction turbine.

Preliminary suction time

Time before the discharge screw starts.

Suction zone 1 … 3 activated

A suction zone can be activated or deactivated. Deactivated suction zones are skipped when changing the suction zones.

Screw cycle

Discharge screw runtime, minus an adjustable pause time.

Screw at address

Address at which the screw has been connected.

Pellet mole run-on, applies after the MAX sensor triggered

The pellet mole remains activated for the set time when the cyclone is full.

Pellet mole cycle

Total time of a pellet mole's cycle.

Maximum number of suction cycles before changing over the probe

Defines the number of suction cycles before changing over the probe, in order to achieve balanced emptying of the storage room.

Addressing

Specifies to which module the respective suction screw is connected.

Operation hours of pellet mole

Specifies the operating hours of the pellet mole.

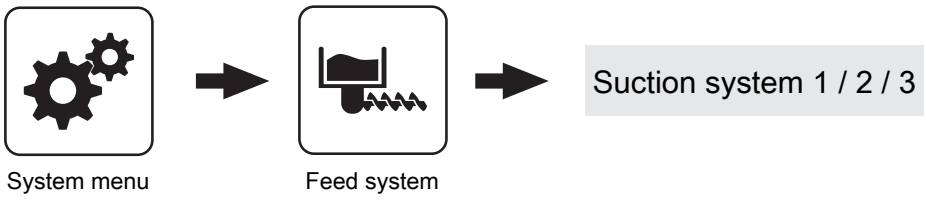
Nominal current of the suction screw

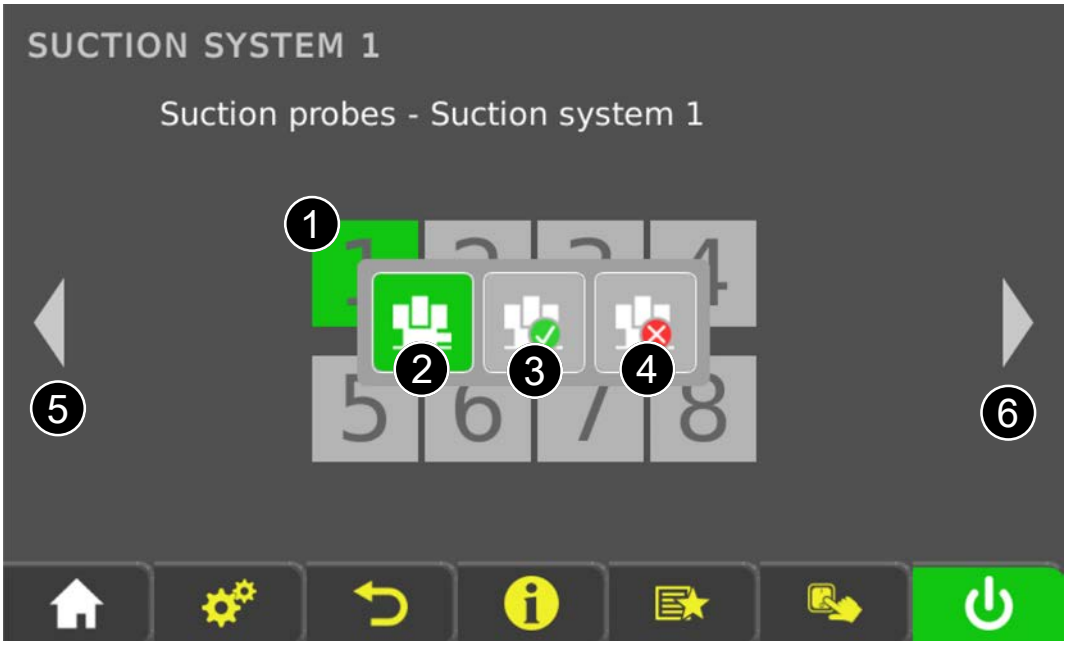
Specifies the nominal current of the suction screw motor according to the identification plate on the motor.

Controlling the suction zones

Suction zones can be activated individually.

Cyclone 1 - suction system



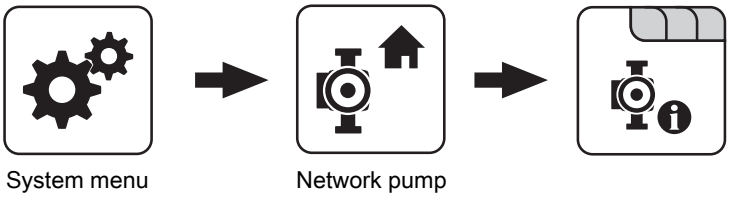


Number	Description
1	Overview of the maximum available suction probes. If the RS4 suction system is selected, only four positions are shown. Tap the respective suction point to open a window in which various functions can be called up.
2	Selected suction point should be started by the selection unit probes. The area of the suction point flashes alternately grey/green until the desired position is reached.
3	Selected suction point is available.
4	If the selected suction point is generally not in use or should not be used due to a problem (suction hose, blockage by pellets, etc.) the suction point can be locked by tapping on this area.
5, 6	If a combination of several RS4/RS8 pellet discharge systems is being used, then these buttons can be used to switch to the other suction systems.

Are positions 1 ... 8 of the change-over unit being used?
To enable/disable the individual suction positions of the RS4 / RS8 suction system.

4.8 Network pump

4.8.1 Network pump - Status



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

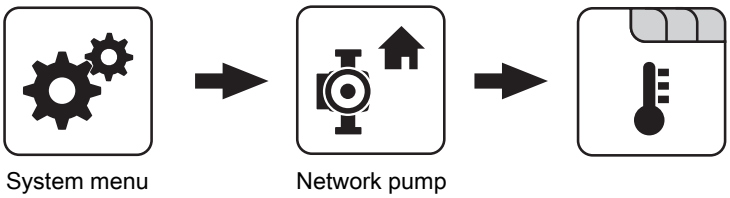
Display of the current return temperature from distributor 2 ...4.

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.

4.8.2 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 1

Prerequisite: Variant 1 and pump for distributor 1 installed

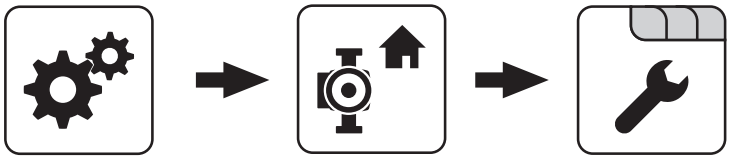
The return temperature from distributor 1 is regulated to the value set here. When the return temperature from distributor 1 reaches the specified value, the pump for distributor 1 starts up at minimum speed.

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.

4.8.3 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" [▶ 96]

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" [▶ 96]

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" [▶ 96]

Minimum speed for distributor 2 ... 4 pump

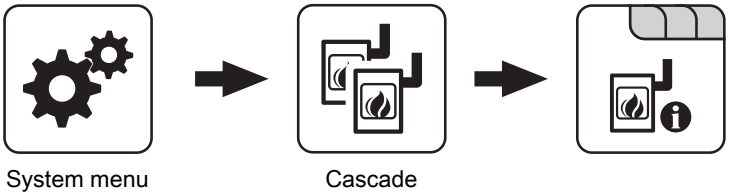
Prerequisite: Variant 2 or variant 3 and pump for distributor 2 ... 4 installed

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.

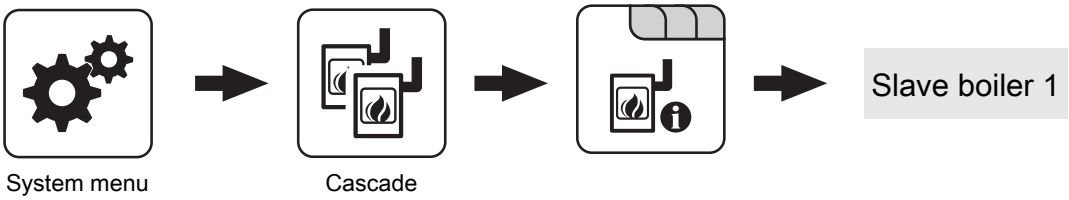
4.9 Cascade

4.9.1 Cascade - Status



Buffer tank charge
Display of the current buffer tank charge.

Cascade - Backup boiler



Slave boiler boiler temperature
Display of the current boiler temperature of the backup boiler.

Slave boiler OK
Display of whether the backup boiler is ready for operation.

Backup boiler is heating
Display of whether the backup boiler is in “`Heating`” operating status.

Slave boiler control variable
Display of the signal for the combustion controller.

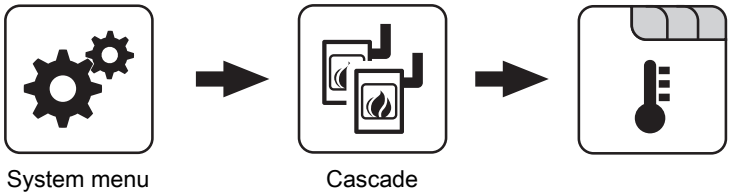
Boiler charging pump speed
Display of the current speed of the boiler loading pump.

Backup boiler flue gas temperature
Displays the current flue gas temperature at the backup boiler. If a flue gas temperature sensor is not connected, the board temperature of the core modules is displayed.

Backup boiler packet age
Specifies when the last data package was sent from the backup boiler (slave) to the main boiler (master).

Backup boiler return sensor
Prerequisite: Backup boiler with return temperature control by means of mixing valve or bypass pump. Displays the current temperature of the boiler return for the backup boiler.

4.9.2 Cascade - Temperatures



Storage tank charge is 100% at boiler setpoint parameter

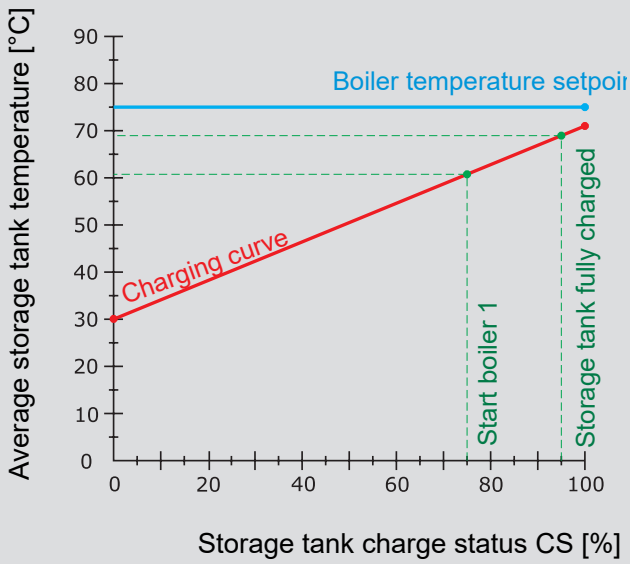
The buffer tank charge is 100% if the average temperature of the buffer tank is below the specified boiler temperature setpoint by the specified value. This parameter defines the end point of the charging curve of the buffer tank.

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.

Start point 1 at storage tank charge

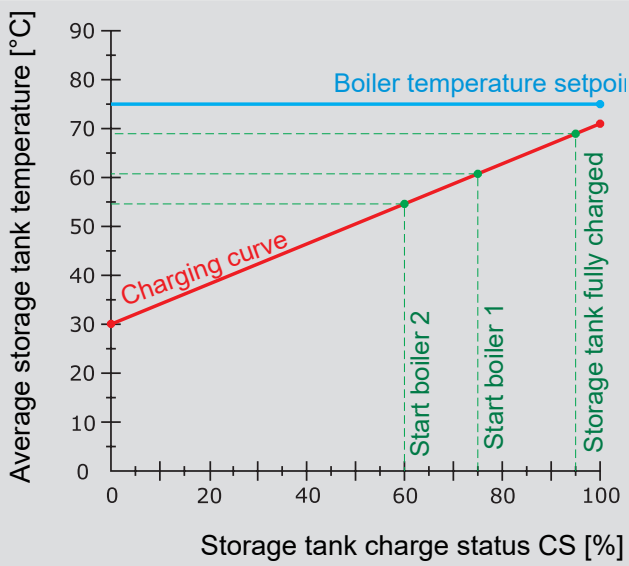
If the storage tank charge is lower than this value, the first boiler is started. This can be the boiler with the highest priority or with the fewest operating hours, and consequently both the master and the slave boiler.



Start point 2 at storage tank charge

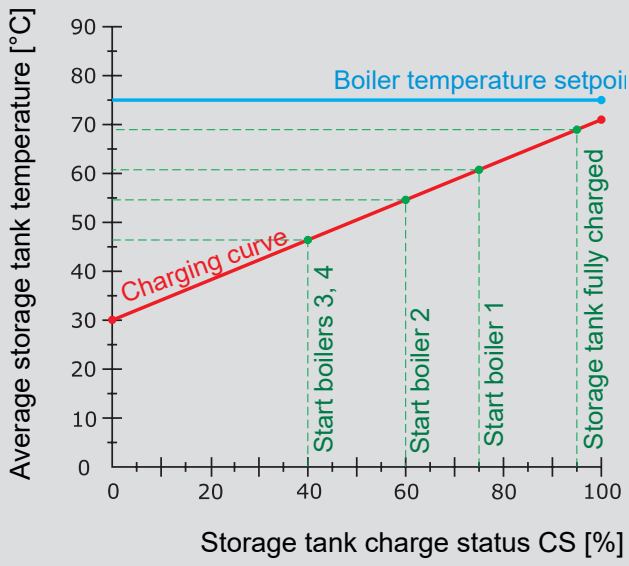
If the storage tank charge is lower than this value, the second boiler is started.

Start point 2 at storage tank charge



Start point 3 at storage tank charge

If the storage tank charge is lower than this value, slave boilers 3 and 4 are started.



Quick start if buffer tank discharge is greater than (% / 10min)]

If the storage tank discharge is greater than the set value within 10 minutes, the boiler with the greatest rated heat output will be started (quick start).

Reduce the overall output of the cascade before the storage tank is fully charged	
When the storage tank charge exceeds the value which is set under “Start point 1 at storage tank charge”, the boiler control variable for the boilers that are still active will be reduced using the boiler loading pump.	

4.9.3 Cascade - Service

Boiler priorities are used to specify the sequence in which the boilers start. Where boilers have the same priority, the boiler currently with the fewest operating hours always starts first.

With this setting the master boiler always starts first as it has the **highest priority**; the boilers then start in numerical order.

Start priority of the master boiler	**1**
Start priority of slave boiler 1	**2**
Start priority of slave boiler 2	**3**
Start priority of slave boiler 3	**4**

With this setting the current **number of operating hours** is used as the start criterion as all boilers have equal priority.

Start priority of the master boiler	**1**
Start priority of slave boiler 1	**1**
Start priority of slave boiler 2	**1**
Start priority of slave boiler 3	**1**

Sensor input of the top sensor switch	
NOTICE! This is displayed only for the master boiler and hydraulic system 0 or variant 1. Specifies the input of the top sensor switch to which the connection is made.	

Sensor input of the bottom sensor switch	
Specifies the input of the bottom sensor switch to which the connection is made.	

Hysteresis for regulating range

NOTICE! Only for boilers that have no storage tank.

The parameter relates to the actual temperature of the cascade (average of all boilers that are currently active).

- **State “Cold start”:** As long as the current temperature of the cascade is lower than the setpoint temperature less the hysteresis value for the control range, further boilers will be started after a delay. As long as the current temperature of the cascade is higher than the setpoint temperature less the hysteresis value for the control range, the system switches to the “control range” status.
- **Status “Control range”:** The boilers that were started will run. As long as the current temperature of the cascade is lower than the setpoint temperature less the hysteresis value for the control range, the system switches to the “cold start” status. As long as the current temperature of the cascade is higher than the setpoint temperature plus the hysteresis value for the control range, the system switches to the “shutdown” status.
- **Status “Shutdown”:** After a delay, each boiler will be shut down in succession. As long as the current temperature of the cascade is lower than the setpoint temperature plus the hysteresis value for the control range, the system switches to the “control range” status. As long as the current temperature of the cascade is higher than the setpoint temperature plus the hysteresis value for the control range and the hysteresis value for the quick output reduction, the system switches to the “quick shutdown” status.
- **Quick shutdown status:** After a delay, each boiler will be shut down in succession. As long as the current temperature of the cascade is lower than the setpoint temperature plus the hysteresis value for the control range and the hysteresis value for the quick output reduction, the system switches to the “shutdown” status.

During a cascade, if boilers 3 and 4 have no storage tanks they cannot be modulated and they are run at an elevated boiler setpoint temperature (the setpoint temperature of the cascade plus the hysteresis value for the control range and the hysteresis value for the quick output reduction.

Hysteresis for quick output reduction

NOTICE! Only for boilers that have no storage tank.

The parameter relates to the actual temperature of the cascade (average of all boilers that are currently active).

- **State “Cold start”:** As long as the current temperature of the cascade is lower than the setpoint temperature less the hysteresis value for the control range, further boilers will be started after a delay. As long as the current temperature of the cascade is higher than the setpoint temperature less the hysteresis value for the control range, the system switches to the “control range” status.
- **Status “Control range”:** The boilers that were started will run. As long as the current temperature of the cascade is lower than the setpoint temperature less the hysteresis value for the control range, the system switches to the “cold start” status. As long as the current temperature of the cascade is higher than the setpoint temperature plus the hysteresis value for the control range, the system switches to the “shutdown” status.
- **Status “Shutdown”:** After a delay, each boiler will be shut down in succession. As long as the current temperature of the cascade is lower than the setpoint temperature plus the hysteresis value for the control range, the system switches to the “control range” status. As long as the current temperature of the cascade is higher than the setpoint temperature plus the hysteresis value for the control range and the hysteresis value for the quick output reduction, the system switches to the “quick shutdown” status.
- **Quick shutdown status:** After a delay, each boiler will be shut down in succession. As long as the current temperature of the cascade is lower than the setpoint temperature plus the hysteresis value for the control range and the hysteresis value for the quick output reduction, the system switches to the “shutdown” status.

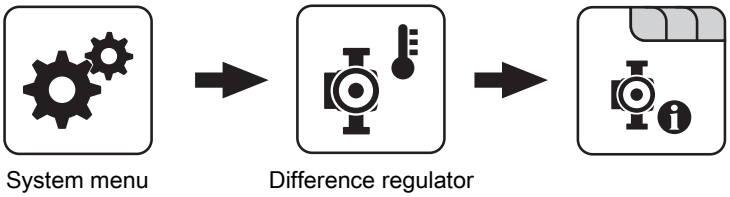
During a cascade, if boilers 3 and 4 have no storage tanks they cannot be modulated and they are run at an elevated boiler setpoint temperature (the setpoint temperature of the cascade plus the hysteresis value for the control range and the hysteresis value for the quick output reduction.

Delay for the request of the boiler from a flue gas min. temp

For a cascade that has no storage tanks, the request for a further boiler / switching off a boiler is subject to a delay.

4.10 Difference regulator

4.10.1 Difference regulator - Status

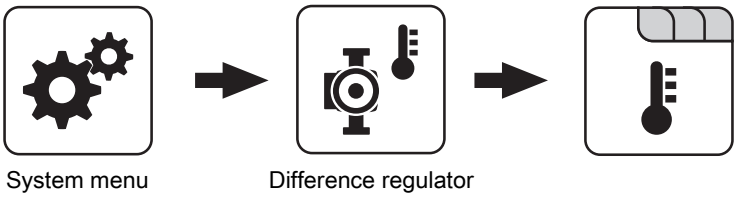


Heat source temperature
Display of the current heat source temperature of the differential controller (e.g. tiled stove with water pocket, …).

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



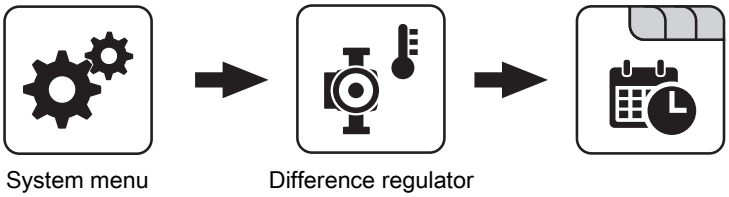
Startup differential
Temperature difference between heat source and heat sink which must be reached to activate the pump of the differential controller.

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.

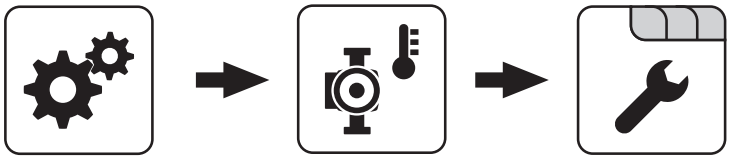
Maximum temperature for heat sink
When the heat sink reaches this value, the pump of the differential controller is deactivated.

4.10.3 Difference regulator - Times



➲ "Setting times" [▶ 106]

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" [▶ 96]

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

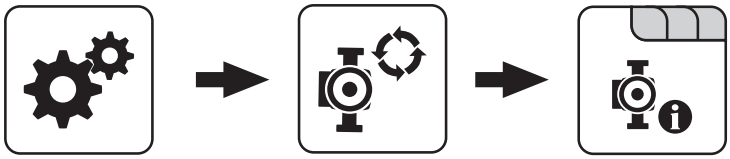
Sensor input to which the heat sink sensor is connected.

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

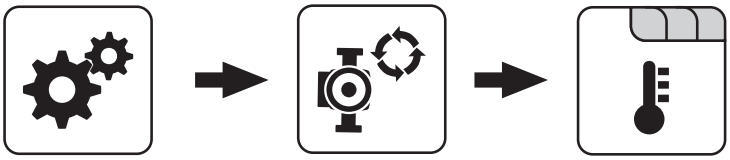
If the flow sensor is implemented as a push-button:

- **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!

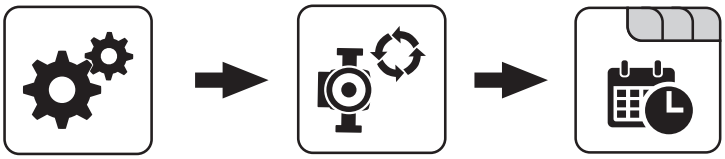
Circulation pump run-on

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.

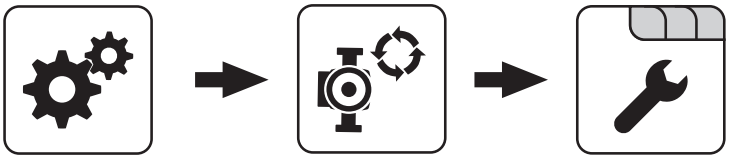
NOTICE! Parameter only relevant when using a flow switch!

4.11.3 Circulation pump - Times



➲ "Setting times" [▶ 106]

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.

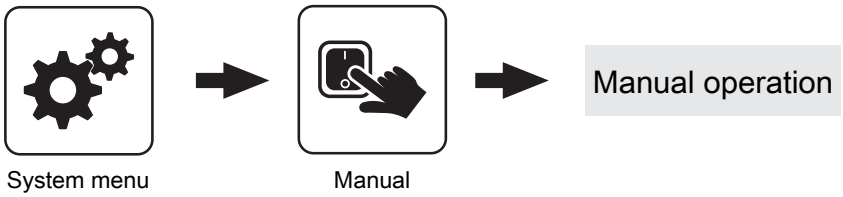
➲ "Activation options of pump outlets" [▶ 96]

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!

Stoker ON

- **ON:** The stoker screw drive is activated.

Feed screw ON

- **ON:** The feed screw drive is activated.

Suction screw of cyclone 1 … 2

- **ON:** The drive of the suction screw at cyclone 1 is activated.

Ignition

- **ON:** The hot air blower / ignition rod for igniting the fuel is activated.

Oufeeder - manual

- **ON:** The stoker and feed screw drive is activated.

Ash screw

- **ON:** The ash screw drive is activated.

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.

Clean electrostatic separator manually- only while the boiler is off / in standby mode

The cleaning of the electrostatic precipitator can be started manually.

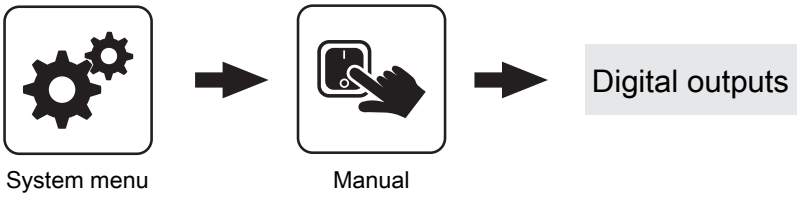
Grate drive

The grate drive manual controls can be used to move it back and forth, and also to switch it off.

Suction screw for the active suction zone

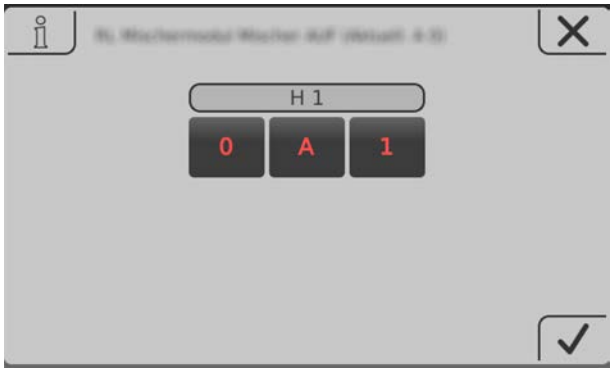
If a 1-2-3 suction module is used, the suction screw for the suction zone that is currently active is manually controlled.

4.12.2 Manual - Digital outputs

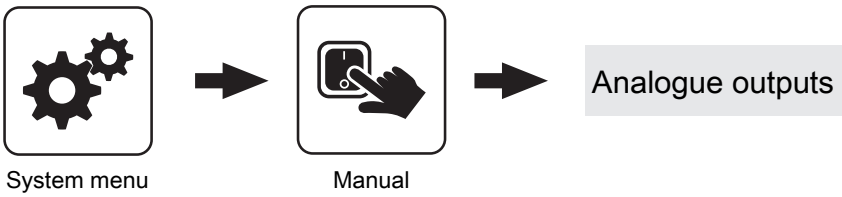


The parameters displayed depend on the boiler configuration!

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

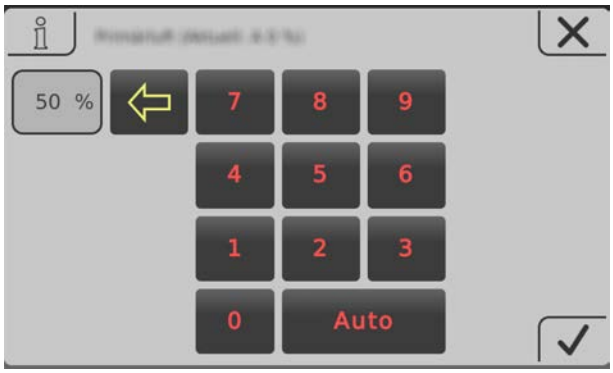


4.12.3 Manual - Analogue outputs

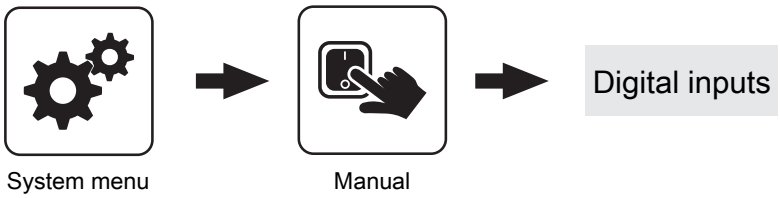


The parameters displayed depend on the boiler configuration!

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

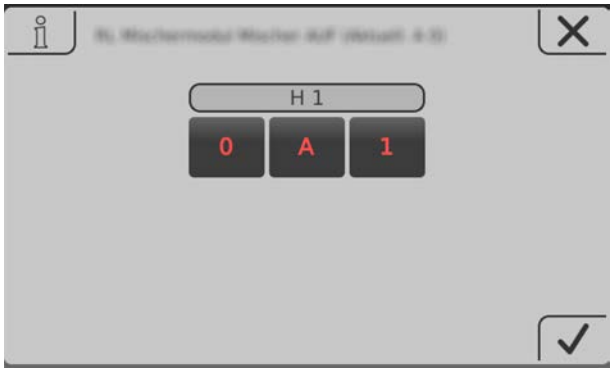


4.12.4 Manual - Digital inputs



The parameters displayed depend on the boiler configuration!

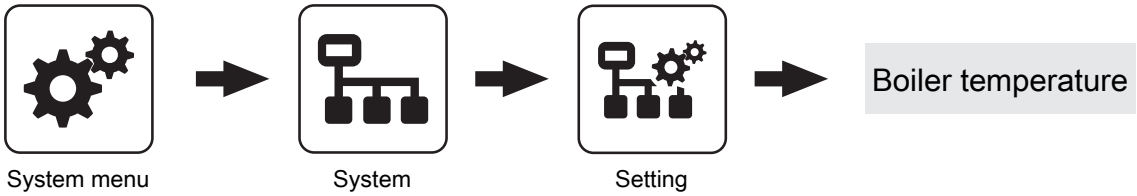
- **A 0**: Automatic, Off; **A 1**: Automatic, On
- **1**: Manual, On
- **0**: Manual, Off



4.13 System

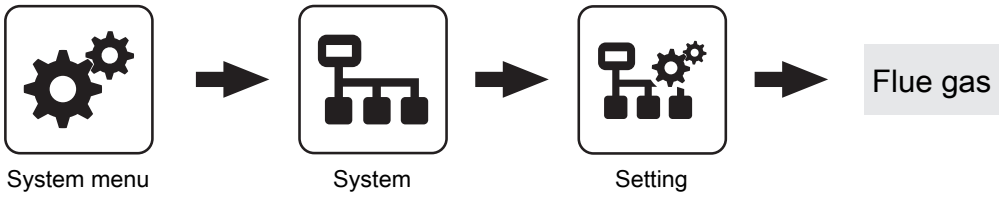
4.13.1 System - Setting

Setting - Boiler temperature



➲ "Boiler - Temperatures" [▶ 57]

Setting - Flue gas



Minimum flue gas temperature	
Lowest operation point of flue gas temperature for continuous operation.	

Maximum flue gas temperature

Specifies the maximum flue gas temperature setpoint in °C.

NOTICE! When using the TI wood chip boiler, the upper range of the output decrease is calculated in conjunction with the predefined flue gas control band.

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 - Flue gas difference for start process

When the boiler controller changes to “Pre-heating” status the current value of the flue gas temperature is stored. When the flue gas temperature rises by the value set here during “Pre-heating” or “Ignition” status, the boiler controller switches to “Heating” status.

Safety time

If the condition “Minimum difference between flue gas and boiler temperature in HEATING” is not fulfilled for the set duration, the message “Safety time expired, flue gas temperature too low for too long” appears on the display.

Flue gas temperature, below which boiler switches to OFF status

If the flue gas temperature is below this value for the duration of the "Safety time", the boiler switches off.

Boiler flue gas difference for fire out

If the current boiler temperature plus the set value is greater than the current flue gas temperature, the boiler switches off.

Feed time until there is a fuel quantity suitable for ignition

Specifies the time for which the stoker is running in heat-up mode until there is enough material in the combustion chamber to start ignition.

Duration of pre-heating

Time during which only the ignition is activated. The fuel slide-in is not active for this duration.

Infeed during ignition

Defined fuel feed-in for the “Ignition” status duration.

Maximum ignition duration

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

Minimum output

Minimum value of boiler control variable which can be used to operate the boiler.

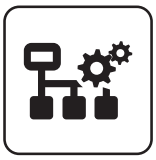
Switch off ignition if the oxygen is reduced by

If an oxygen reduction of 50% of the set value is detected in the “Pre-heating” operating status, the system prematurely switches to the “Ignition” operating status.

Securely switch off the ignition when above

Flue gas temperature at which the ignition is deactivated at the latest.

FGR



Setting → Flue gas → FGR

FGR flap position at partial load

At “Heating“ and “Empty stoker“ status, the FGR flap regulates between the setting values of the “FGR flap position at partial load“ and “FGR flap position at nominal load“ depending on the flue gas temperature.

FGR flap position at nominal load

At “Heating“ and “Empty stoker“ status, the FGR flap regulates between the setting values of the “FGR flap position at partial load“ and “FGR flap position at nominal load“ depending on the flue gas temperature.

Reduce underpressure at 100% FGR by

A certain value is deducted from the underpressure setpoint depending on the FGR flap position.

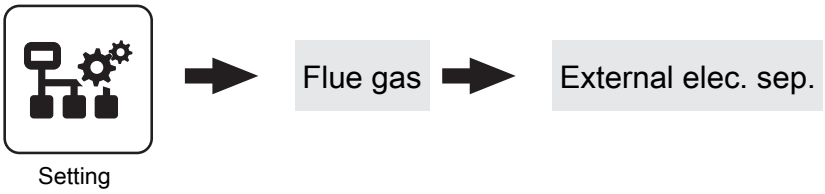
Startup criteria for FGR - Flue gas temperature

The FGR flap is regulated from this flue gas temperature; the flap closes below the set value.

ID fan control for FGR cleaning

Desired control of ID fan during boiler status “FGR cleaning“.

External elec. sep.



State

Electrostatic separator status

Displays the current operating status of the electrostatic separator as a numeric code. The following statuses are possible:

- Status “0”: Separator deactivated
- Status “1”: Separator OFF
- Status “2”: Separator ON
- Status “3”: Measuring mode
- Status “4”: RFI
- Status “5”: Wait for bypass flap
- Status “6”: Cleaning - Pause
- Status “7”: Cleaning - Rinse
- Status “8”: Wait for water sensor
- Status “9”: Waiting for drying time
- Status “10”: Separator error
- Status “11”: Quick cleaning
- Status “12”: Waiting for drying time
- Status “13”: Cleaning – Waiting
- Status “14”: Cleaning – Shaking
- Status “15”: Cleaning – Waiting

Electrostatic separator return signal

Shows the status of the electrostatic separator as a numeric code. Following status values are possible:

- Status "0": No error
- Status "1": Power supply fault
- Status "2": RS485 error
- Status "3": Temperature box error
- Status "4": High voltage error
- Status "5": Wait for ready-to-measure state
- Status "6": Values critical
- Status "7": Measure
- Status "8": Measuring mode error

Water detected

Shows the status of the water sensor in the ash drawer. If the water sensor detects a water level that is too high, the electrostatic separator is deactivated.

Time until next cleaning

Shows the remaining time (in minutes) until the next cleaning process.

Electrostatic separator operating hours

Shows the operation hours since the electrostatic separator was first activated.

Number of cleaning processes

Shows the total number of cleaning processes since the electrostatic separator was first activated.

Output level HV module 1 … 4

Displays the current output of the respective HV module as a numeric code. The following displays are possible:

- Output “0”: The current output of the HV module is between 0 - 25%
- Output “1”: The current output of the HV module is between 25 - 50%
- Output “2”: The current output of the HV module is between 50 - 75%
- Output “3”: The current output of the HV module is above 75%

Service

Enable electrostatic separation function

Used to activate/deactivate the electrostatic separator's function. When the electrostatic separator is deactivated, the bypass flap is open and the flue gas is fed directly into the chimney.

Time until bypass flap is open

Specifies the time for opening the bypass flap in seconds. The specified time must correspond at least to the actuating time of the flap drive.

Close the bypass flap if the electrostatic separator is inactive

This parameter is set to "NO" by default and should only be changed after consultation with the manufacturer.

Cleaning interval

Specifies after how many operation hours of the electrostatic separator a cleaning cycle must be started. Depending on the raw dust content, this value is set between 4 and 8 hours.

Duration of cleaning cycle

Defines the total time for a cleaning process. Via this duration, the spray valve is periodically switched on and off.

Switch-on duration of spray nozzle. Overall cycle 10 sec

Defines the cycle of the spray valve, which is repeated until the total time (parameter "Duration of cleaning cycle") has elapsed. The cycle of the spray valve is set in percentages of 10 seconds.

Example: On-time of spray valve: 60%, duration of cleaning cycle: 23s;
Spray value is switched on for 6 seconds, waits for 4 seconds. This cycle is repeated until the total time is reached. (6s ON - 4s OFF - 6s ON - 4s OFF - 3s ON)

Drying time

Defines the waiting time after a cleaning cycle before the HV electrodes are activated again.

Is there a siphon fitted?

By default this parameter is set to "YES" and cleaning of the filter is performed according to the specified interval. In case of problems with the drain system (e.g. blocked duct) this parameter can be set to "NO" in the interim. The cleaning times are then adjusted so that the collection tank is not overfilled.

Quick/enforced cleaning active?

Specifies whether the function of the quick/compulsory cleaning should be active.

Quick/compulsory cleaning: If the output of the HV module is below 25% for a defined period, a quick cleaning is carried out during operation. If the output of the HV module remains below 25%, then a set waiting time is observed until the next quick cleaning.

Duration of quick cleaning

Defines the on-time of the spray valve during a quick cleaning.

Minimum time between quick/compulsory cleaning

Specifies the waiting time between two quick cleanings in minutes.

Cleaning can be performed from

In conjunction with the "Cleaning can be performed until" parameter, this defines a time window in which the automatic cleaning of the separator may be activated.

Cleaning can be performed until

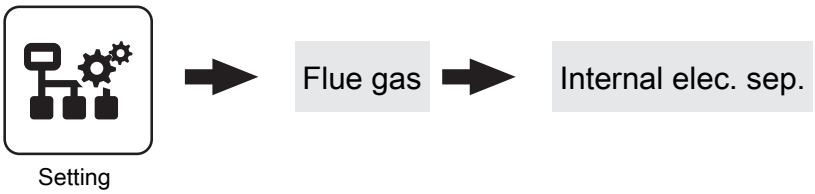
In conjunction with the "Cleaning can be performed from" parameter, this defines a time window within which the automatic cleaning of the separator may be activated.

IO allocation

Setting of the relevant address for the respective component for the inputs and outputs on the digital module.

- Address HV in 1
- Address HV in 2
- Address water sensor 1
- Address water sensor 2
- Safety switch address
- Address HV out 1
- Address HV out 2
- Address bypass flap open
- Address washer valve 1
- Address washer valve 2

Internal elec. sep.



State

Electrostatic separator status

Displays the current operating status of the electrostatic separator as a numeric code. The following statuses are possible:

- Status “0”: Separator deactivated
- Status “1”: Separator OFF
- Status “2”: Separator ON
- Status “3”: Measuring mode
- Status “4”: RFI
- Status “5”: Wait for bypass flap
- Status “6”: Cleaning - Pause
- Status “7”: Cleaning - Rinse
- Status “8”: Wait for water sensor
- Status “9”: Waiting for drying time
- Status “10”: Separator error
- Status “11”: Quick cleaning
- Status “12”: Waiting for drying time
- Status “13”: Cleaning – Waiting
- Status “14”: Cleaning – Shaking
- Status “15”: Cleaning – Waiting

Electrostatic separator return signal

Shows the status of the electrostatic separator as a numeric code. Following status values are possible:

- Status "0": No error
- Status "1": Power supply fault
- Status "2": RS485 error
- Status "3": Temperature box error
- Status "4": High voltage error
- Status "5": Wait for ready-to-measure state
- Status "6": Values critical
- Status "7": Measure
- Status "8": Measuring mode error

Voltage feedback HV module 1

Actual voltage of the HV modules in kV.

Current feedback HV module 1

Actual current of the HV module in mA.

Time until next cleaning

Shows the remaining time (in minutes) until the next cleaning process.

Electrostatic separator operating hours

Shows the operation hours since the electrostatic separator was first activated.

Number of cleaning processes

Shows the total number of cleaning processes since the electrostatic separator was first activated.

Number of flashovers

Shows the total number of flashovers since the electrostatic separator was first activated.

Absorbed energy

Shows the total amount of absorbed energy since the electrostatic separator was first activated.

Power HV module 1

Actual output of the HV module in W.

Output level HV module 1 … 4

Displays the current output of the respective HV module as a numeric code. The following displays are possible:

- Output “0”: The current output of the HV module is between 0 - 25%
- Output “1”: The current output of the HV module is between 25 - 50%
- Output “2”: The current output of the HV module is between 50 - 75%
- Output “3”: The current output of the HV module is above 75%

Feedback HV module 1 ... 2

Displays the feedback from the respective HV module:

- Off
- Start
- Normal operation
- Excessive temperature HV box
- Error
- Restart

Service

Enable electrostatic separation function

Used to activate/deactivate the electrostatic separator’s function.

Number of HV modules

Specifies the number of HV modules used. One or two modules are used, depending on the output of the boiler.

Max. output of HV modules

This is used to set the output power of the HV module in Watts. If two modules are used, the output of one module must be set here. If more than one module is used, HV modules with the same output power should always be used.

Startup criteria for HV modules - flue gas temperature

If the flue gas temperature of the boiler exceeds the set value, the HV modules are switched on. If the flue gas temperature falls below the set value during heating mode, the HV modules remain switched on.

HV cleaning system

Defines the type of cleaning system for the HV electrode of the e-filter. Cleaning takes place either by means of vibrator or air flush.

Number of cleaning cycles per heating hour

Determines the number of cleaning processes per boiler operating hour in heating mode. Together with the cleaning duration (parameter “Duration of cleaning cycle”), the total cleaning time is calculated.

Example: Number of cleaning cycles per heating hour = 3, duration of cleaning cycle = 3s, heating hours until cleaning = 4 h,
Results in a cleaning time of 36 seconds (4 x 3 x 3)

Duration of cleaning cycle

Defines the total time for a cleaning process. During this time the shaker is switched on.

Cleaning active during heating

- **YES:** When the time for cleaning is reached (parameter “Cleaning interval”) and no blocking window is active (menu System => Set => Cleaning), the HV modules are switched off in heating mode. After a pause of 15 seconds the electrode is cleaned and after a further pause of 15 seconds the HV modules are switched on again.
  IMPORTANT: For the cleaning after switching off the boiler, the cleaning in heating mode is taken into account!
  Example: Cleaning interval = 5 h; cleaning is carried out after 5 h heating mode. If the boiler switches off in a controlled manner after 7 h, the cleaning time of the electrode is only calculated for the 2 h in heating.
- **NO:** The electrode is cleaned only after the boiler has been switched off.

Cleaning interval

Specifies after how many operation hours of the electrostatic separator a cleaning cycle must be started.

Minimum target control for HV module(s)

Defines the output of the HV module up to which it can be reduced in the event of flashovers. If the controller detects a defined number of flashovers at the minimum setpoint control, the HV module switches to standby mode for a certain period of time.

Maximum target control HV module 1 ... 2

Determines the maximum output of the HV module up to which the voltage is increased in a defined interval (parameter “Interval voltage increase HV controller”).

Interval for voltage increase of the HV controller

If the controller does not detect a flashover within this set time, the voltage is increased by 1 percent.

Interval for voltage decrease of the HV controller

After a flashover, a voltage reduction is applied. Within the set interval, the voltage can only be reduced by 1 percent. If at least one flashover occurs again at the next interval, the voltage is reduced again by 1 percent.

Start value of the HV controller

Defines the starting point of the HV controller start ramp (parameter “Start ramp HV controller”).

Max. residual oxygen level at which the electrostatic separator may be active

If the measured residual oxygen exceeds the set value, the electronic separator is switched off (hysteresis 2%).

Max. number of flashovers in the start-up phase

If the set number of flashovers is detected after activation of the elec. separator, the ramp-up phase with increased control speed is completed and the system is controlled at the set speed.

Duration of quick cleaning

Defines the on-time of the spray valve during a quick cleaning.

Quick/enforced cleaning active?

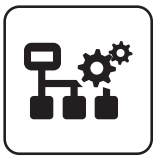
Specifies whether the function of the quick/compulsory cleaning should be active.

Quick/compulsory cleaning: If the output of the HV module is below 25% for a defined period, a quick cleaning is carried out during operation. If the output of the HV module remains below 25%, then a set waiting time is observed until the next quick cleaning.

Minimum time between quick/compulsory cleaning

Specifies the waiting time between two quick cleanings in minutes.

Cyclone separator



Setting → Flue gas → Cyclone separator

Status

Cyclone separator operating mode

Displays the current mode of the cyclone separator.

Cyclone separator ash screw operating mode

Displays the current mode of the ash screw of the cyclone separator.

Error status of the cyclone separator

Displays the current error status of the cyclone separator.

Underpressure at cyclone separator infeed

Displays the current underpressure upstream of cyclone separator.

Cyclone separator safety switch

Displays the current status of the safety switch.

Cyclone separator overpressure detected

Indicates whether an overpressure has been detected upstream of the cyclone separator.

Due to the cyclone separator, the boiler control variable is limited to

Indicates how much the boiler control variable is limited by the cyclone separator in percent.

Cyclone separator ID fan controller

Indicates the percentage at which the ID fan of the cyclone separator is being controlled.

Service

Setpoint under-pressure at cyclone infeed

The cyclone ID fan regulates to this underpressure during operation.

Minimum ID fan activation at the cyclone separator

Minimum value at which the cyclone separator can be activated.

Runtime of the ash screw per heating hour

Indicates the length of time during which the ash can be discharged to the ash container. The duration is calculated on the basis of the heating hours of the boiler since the ash screw was last operational.

Cyclone separator Kp under-pressure monitor

Proportional value of the PI controller of the cyclone ID fan controller.

Tn cyclone separator under-pressure monitor

Reset time of PI controller of cyclone ID fan controller.

Ratio of boiler induced draught fan to cyclone separator

Determines the ratio to the boiler's induced draught speed in which the induced draught of the cyclone separator is controlled.

Maximum ID fan activation at the cyclone separator

Maximum ID fan control in the cyclone separator.

Speed monitoring of the cyclone separator ash screw active

If the speed monitoring function is active, an error message is output if no feedback is detected at the speed sensor despite activation of the cyclone separator's ash screw.

Target underpressure upstream of the cyclone is in preparation

During the PREPARATION mode, the negative pressure in the cyclone is controlled to this setpoint.

IO allocation

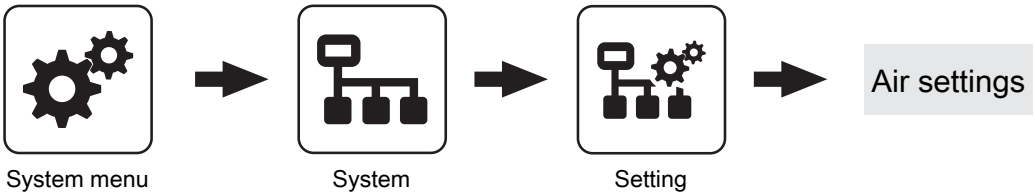
AO ID fan cyclone separator

Indicates the analogue module output at which the ID fan of the cyclone separator is connected.

AI underpressure transmitter

Indicates the analogue module input at which the underpressure transmitter of the cyclone separator is connected.

Setting - Air settings



Minimum ID fan speed

Lower operation point of the ID fan characteristic line.

Maximum ID fan speed

Percentage of the maximum speed that the induced draught fan may be set to perform.

Opening of air flap at 0% control

At 0% control of the air flap, the air flap remains open by the specified value.

Opening of air flap at 100% control

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

Opening of air flap during pre-heating

In "Pre-heating" status, the air flap is opened to this value.

Opening of air flap during ignition

In "Ignition" status, the air flap is opened to this value.

Opening of air flap during shutdown

In "Shutdown" status, the air flap is opened to this value.

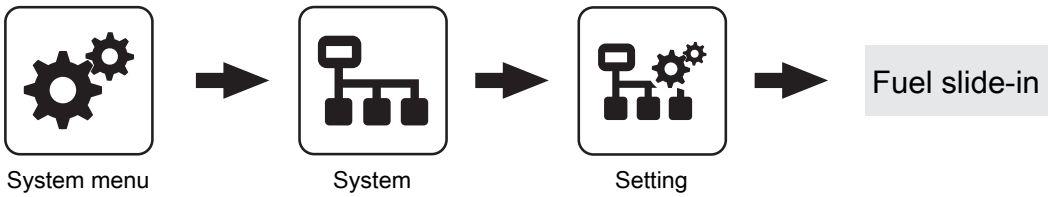
Maximum air damper correction due to residual O2

The air damper setpoint position is changed to this maximum extent due to the residual O2.

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 - Fuel slide-in



Slide-in control

Adjustable parameters for the fuel slide-in controller.

NOTICE! Factory setting - do not change!

Slide-in control start phase

In the first 30 minutes in the heating status, the stored feed control value is used to limit the nominal load operation. The function is deactivated with setting “0”.

Ratio of heating to ignition feed rate

In Heating status, the feed control value is stored in the nominal load operation. At the next start, the ignition feed rate is calculated and controlled via the ratio setting.

Infeed during ignition

Defined fuel feed-in for the “Ignition” status duration.

Activation delay for slide-in

Indicates the period during which the boiler approaches the feed rate in a ramp to the feed rate in heating mode when changing from the “Ignition” to “Heating” status.

Minimum infeed

Minimum feed rate of feed screw.

Start value of the infeed regulator

The feed controller starts at this value when the boiler starts up.

The minimum feed time of the feed screw is

Minimum time that the feed screw is on.

Delivery time feed screw

Time for calculation of feed.

Time feed screw is on until stoker screw

Runtime ratio between feed screw and stoker screw.

The time until the stoker is full is

Total time that the feed screw is on, until the fuel falls onto the grate (= stoker is full).

The time until the stoker is empty is

Theoretical runtime of the feed screw until there is no more fuel in the stoker.

During troubleshooting of stoker, it turns forwards for

Duration, how long should the stoker turn forwards during troubleshooting of stoker.

During troubleshooting of stoker, it turns backwards for

Duration, how long should the stoker turn backwards during troubleshooting of stoker.

During troubleshooting of feed screw, it turns forwards for

Duration, how long should the feed screw turn forwards during troubleshooting.

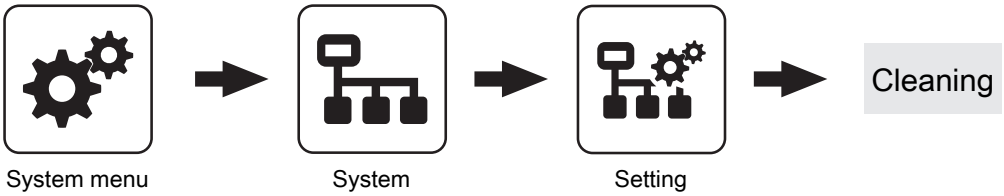
During troubleshooting of feed screw, it turns backwards for

Duration, how long should the feed screw turn backwards during troubleshooting.

Motor pause before reversal of the direction of rotation of the feed screw

At a change of direction, the screw is paused for the set time.

Set - Cleaning



Number of hours heating after which cleaning is performed

If the boiler has passed the set time in “Heating” status, the boiler shuts down for a cleaning cycle.

How often is the grate 1 ... 2 rocked during cleaning?

Defines the number of times the first combustion grate is rocked during “Rock grate” status.

Permitted start processes with blocked ash screw

Defines the number of boiler start processes that can be carried while the ash screw is blocked. Once the specified number has been reached, no further start process is permitted.

The cleaning may start from

Time from which cleaning is enabled. A time limit for the heat exchanger function is not recommended.

The cleaning may run until

Time from which cleaning is blocked. A time limit for the heat exchanger function is not recommended.

Runtime of the cleaning per heating hour

Specifies how long the cleaning per operating hour of the boiler should be in the heating status. If the boiler is switched off after 5 hours of heating operation, cleaning takes five times as long as the time set here.

Minimum duration shutdown

Minimum duration of “Awaiting shutdown” status, in which the remaining fuel is burned on the combustion grate.

Cleaning after standby

- **YES:** When the boiler switches off, the combustion chamber grate is only tipped and cleaned after the next start command. The remaining bed of embers cools down and when fully cooled falls into the ash screw.
- **NO:** In “Cleaning” operating status, the combustion grate is rocked and thereby cleaned.

During troubleshooting of ash screw, it reverses direction for

Specifies how long the ash screw should turn in the opposite direction in the event of a fault.

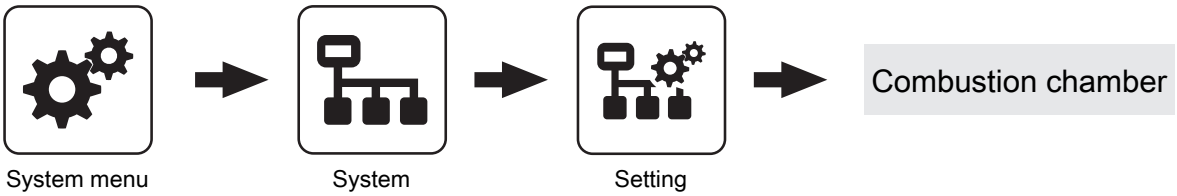
Minimum runtime in heating mode until grate 1 ... 3 are cleaned

The boiler has to be in “Heating“ status for the set time at least before the grate is cleaned. The number of combustion grates depends on the boiler type.

Nominal current of the ash screw

Nominal current of the ash screw drive in accordance with the motor identification plate.

Setting - Combustion chamber



Under-pressure in the boiler at maximum output

At maximum boiler output the specified underpressure has to be kept.

Underpressure in the boiler at maximum output during start phase

Underpressure that must be maintained during the start phase at max. output.

Underpressure at minimum output

At minimum boiler output the specified underpressure must be kept.

Start infeed reduction from pressure deviation of

If the differential pressure exceeds the value set here, the feed rate is reduced.

Control pressure during preparation (seal control)

In “Preparation” status, the minimum underpressure specified must be reached.

Control pressure tolerance during preparation (seal control)

In “Preparation” status, a maximum deviation for the parameter ‟Control pressure during preparation (seal control)‟ can be reached.

The duration of the preparation is

Duration of the seal check during “Preparation” status.

Underpressure during pre-heating

In “Pre-heating” status, the specified underpressure is required as a minimum.

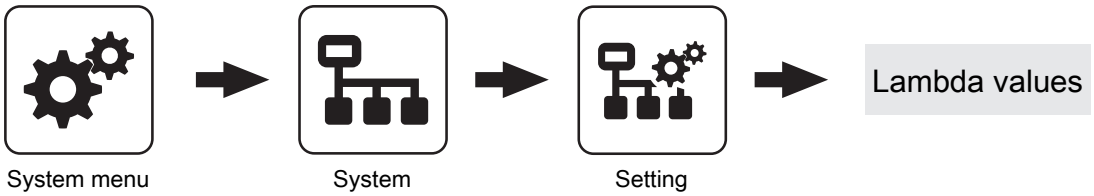
Underpressure during shutdown

In “Shutdown” status, the specified underpressure is required as a minimum.

Minimum output

Minimum value of boiler control variable which can be used to operate the boiler.

Setting - Lambda values



Residual oxygen content setpoint

Residual oxygen content which is regulated during “Heating” operating status.

Maximum deviation of residual O2 from setpoint

Within this tolerance range, with reference to the residual oxygen content setpoint, the residual oxygen controller does not activate.

O2 setpoint increase for partial load

In partial load operation of the boiler, the residual oxygen content to be reached is increased by the specified value.

No infeed when residual O2 below

If the current residual oxygen content falls below the set value, the fuel slide-in stops.

Residual oxygen content, above which fire is out

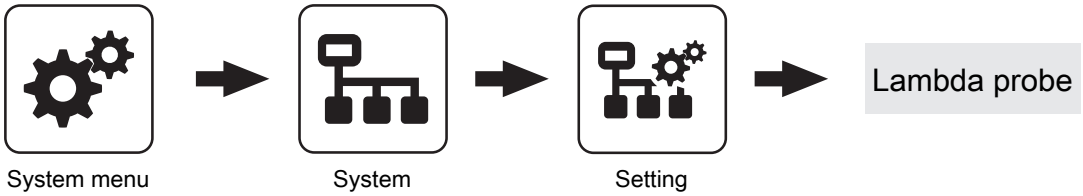
If the current residual oxygen content in “Heating” status exceeds the specified value, the safety time begins to run.

Slide-in control

Adjustable parameters for the fuel slide-in controller.

NOTICE! Factory setting - do not change!

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% O2)

- **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.

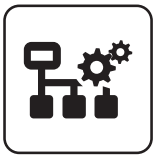
Minimum time at standstill

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.

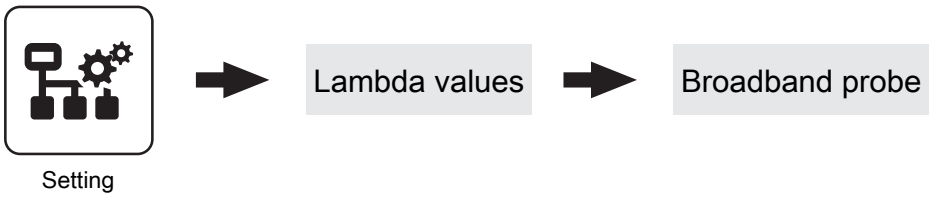
Lambda probe correction value

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



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

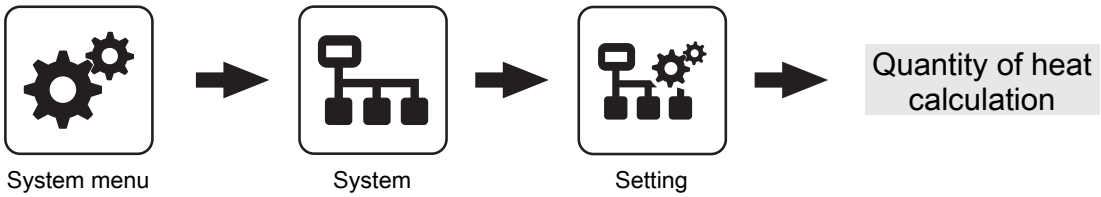
The measured pump current of the broadband probe is displayed.

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



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.

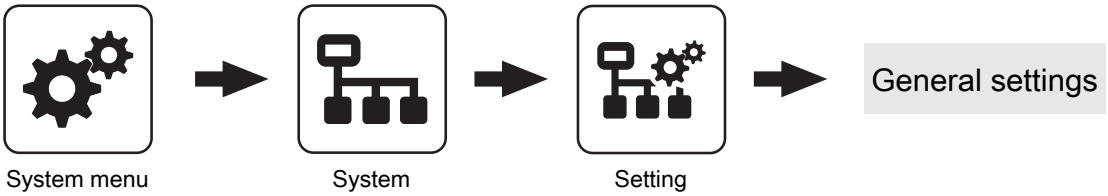
➲ "Calculating the feed output of the circulating pump" [▶ 99]

Flow rate at 100% pump rotation speed

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

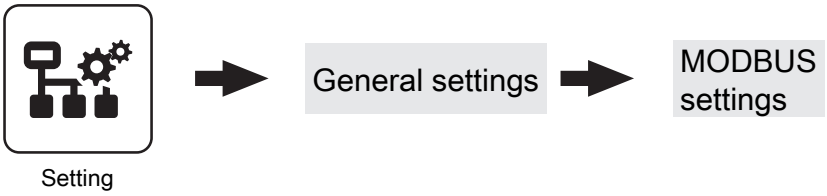
➲ "Calculating the feed output of the circulating pump" [▶ 99]

Setting - General settings



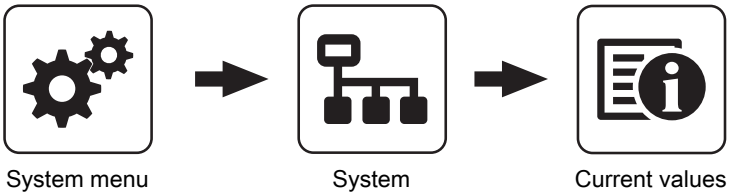
➲ "Boiler - General settings" [▶ 59]

MODBUS settings



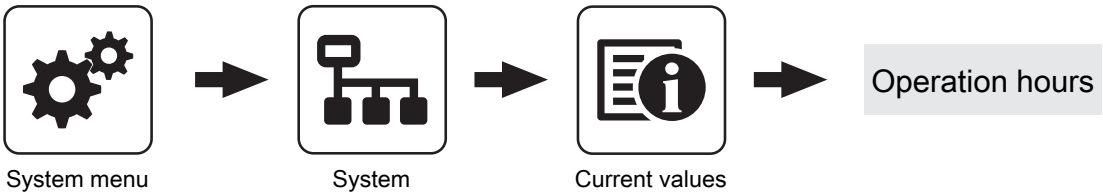
➲ "Boiler - General settings - MODBUS settings" [▶ 60]

4.13.2 System - Current values



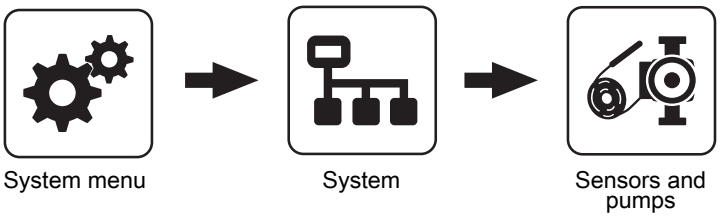
Display of the current value for the relevant parameter. The parameters displayed depend on the boiler configuration!

Operation hours



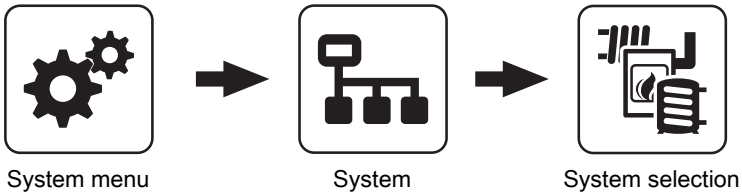
Display of the current number of operation hours of the respective unit and respective components. The parameters displayed depend on the boiler configuration!

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.

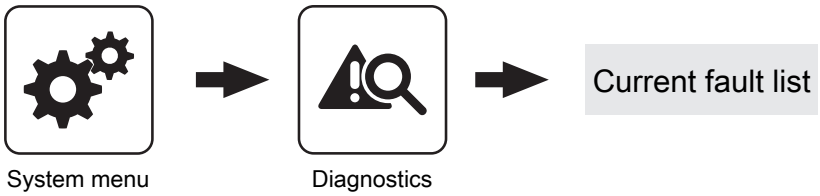
4.13.4 System - System selection



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

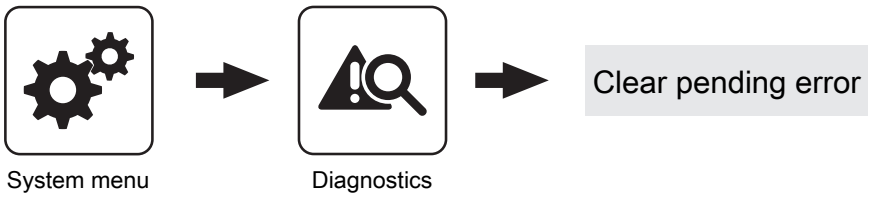
4.14 Diagnostics

4.14.1 Diagnosis – Current fault list



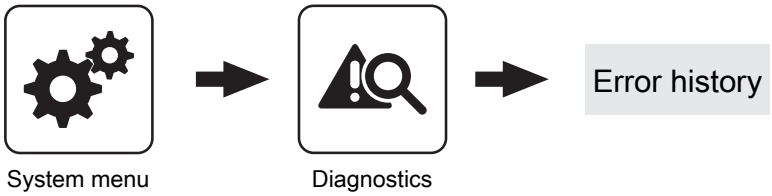
Display of the current fault messages. In addition, you can also invoke time information here, such as when the fault occurred, when the fault was acknowledged and when the fault was cleared.

4.14.2 Diagnosis – Clear pending error



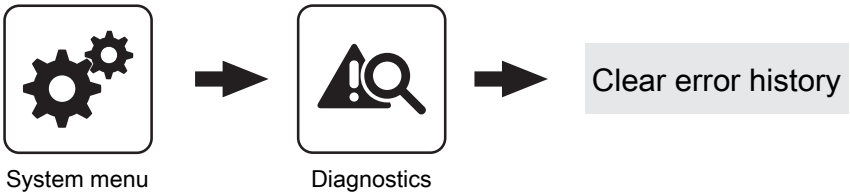
Used to delete current faults in the fault list. Depending on the system configuration, the status LED can flash red even though no fault messages are pending. This function can also be used to delete pending fault messages that are not visible.

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

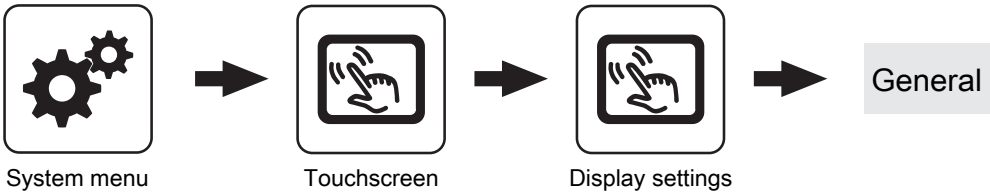


The entire error history can be deleted using this function. From this time on, the error history will be filled again with new fault messages.

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.

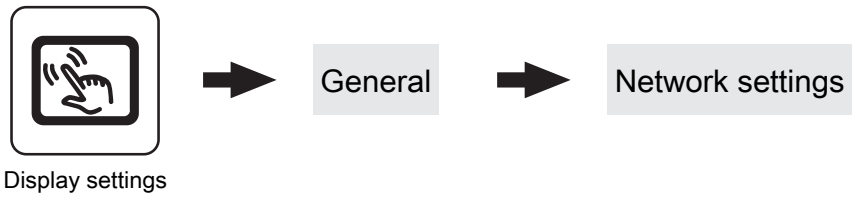
Maximum backlight
The brighter it is in the room, the more the background of the touch display is illuminated. This is where you can limit the maximum backlight.

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".

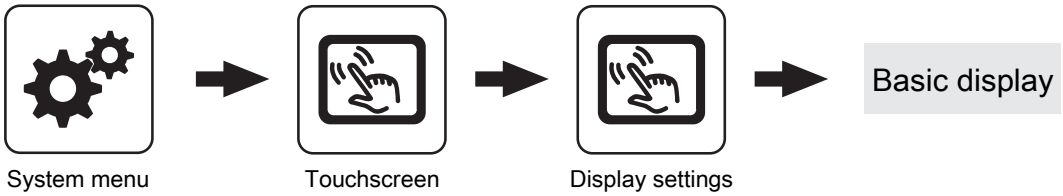
Module address
This is where you can change the module address if it is incorrectly set. Module address 0: Boiler console Module address 1-7: respective room console 3200 with touchscreen **NOTICE! Once you have changed the module address, you will need to restart the boiler controller (switch main switch on boiler off and on)!**

Network settings



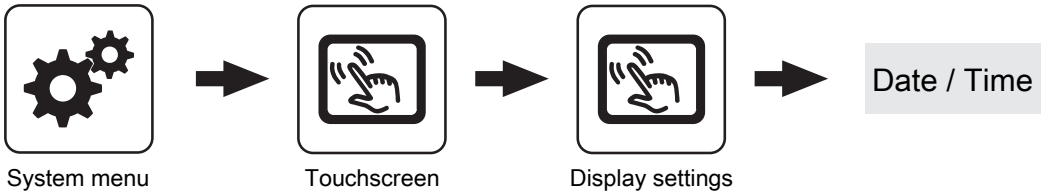
Obtain IP address automatically
▪ **On:** The address in the local network (IP address), the subnet mask, default gateway and DNS server are automatically assigned by the router/server. ▪ **Off:** IP address, subnet mask, default gateway and DNS server can be manually set.

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.

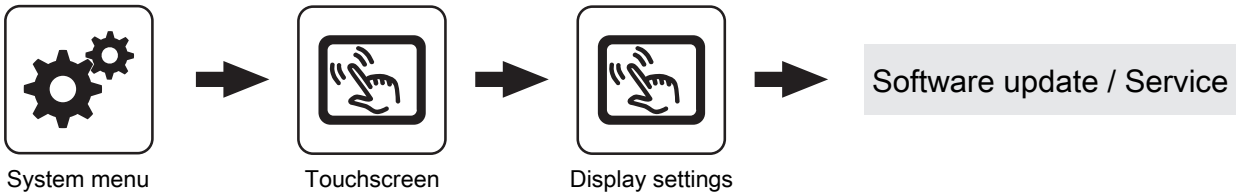
Display settings - Date / Time



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



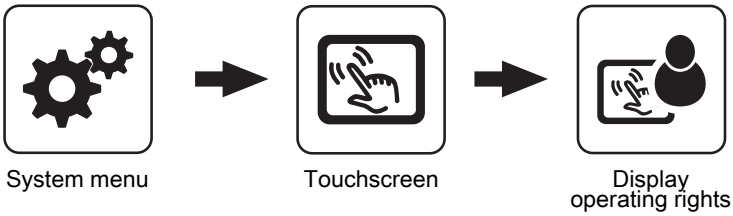
Calibrate screen
➲ "Calibrating the touchscreen" [▶ 108]

Restart control Carry out update
➲ "Software update Lambdatronic 3200" [▶ 110]

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:

Allow access to heating circuit 01 ... 18?
Specifies whether heating circuit 01 … 18 can be accessed from touchscreen 1 … 7.

DHW tank system:

Allow access to DHW tank 01 ... 08?
Specifies whether DHW tank 01 … 08 can be accessed from touchscreen 1 … 7.

Buffer tank system:

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

Solar panel system:

Allow access to solar system 01?
Specifies whether solar system 01 can be accessed from touchscreen 1 … 7.

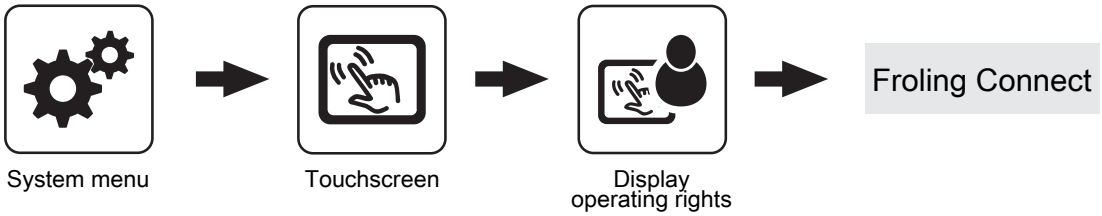
Heating system:

The parameters displayed depend on the configuration.

Boiler:

Switch boiler on/off via room console
If this function is activated, the respective room console is enabled for switching the boiler on and off. In order to be able to operate the boiler, remote switching on the boiler display must also be activated.

Froling Connect



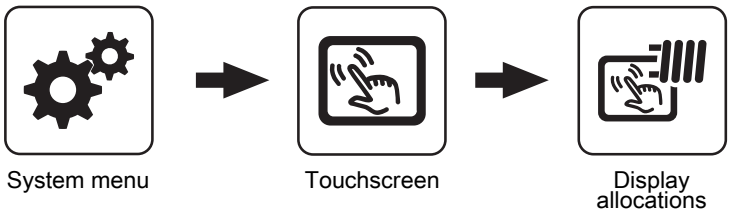
For connection via the froeling-connect.com online platform using a touchscreen, the issue of a password is required.

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 touchscree 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 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 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

Availability of the listed operating statuses depend on the set boiler type!

Preparation	The boiler is ventilated, the Lambda probe heated and the ash screws are switched on; underpressure test.
Heating up	The stoker is filled with fuel and a quantity of fuel that can be ignited is pushed onto the grate.
Close BBF	The burn back protection system (burn-back flap) closes. (depending on the boiler type).
Pre-heating	The fan-assisted ignition switches on and the fuel is pre-warmed until a flame forms. For this period infeed is deactivated.
Pre-heating – Ignition	
Ignition	The fan-assisted ignition ignites the fuel. The flame is distributed throughout the entire combustion chamber. Control of the induced draught fan and infeed for this operating status are defined in the "Ignition" parameter menu.
Open BBF	The burn back protection system (burn-back flap) opens. (depending on the boiler type).
Heating	The boiler controller controls combustion according to the boiler setpoints.
Heating - Cleaning	The output of the boiler and the infeed unit are reduced and the grate is cleaned. After cleaning the boiler output is increased again.
Empty stoker	The stoker is emptied according to procedure.
Awaiting shutdown	Safety time during which the residual material on the grate is burnt.
Fan run-on 1	1. Safety time during which the residual material on the grate is burnt.
Fan run-on 2	2. Safety time during which the residual material on the grate is burnt.
Stopped	The combustion process has ended.
Tip grate	The grate opens / closes a specified number of times.
Cleaning	The grate is tipped and the boiler is ventilated for 1 minute. The stoker switches on and the ignition opening is cleared by blowing. The ash screw runs and the grate open / close twice the specified number of times during the entire procedure. This operating status can only be opened in "`Boiler off`" mode. The status that follows is “`Boiler off`”, and the boiler must be activated by pressing the start key.
Standby	The boiler is ready to start and is waiting for a heat requirement (a start command).
Cleaning possible	Operating status for boiler cleaning tasks, which is activated after the service key has been pressed and a cleaning cycle has been carried out. The grate is in open position, the tipping grate and ash screw can be switched off and on manually.
Boiler off	The boiler controller now only controls the connected heating components. All parts of the boiler are deactivated. Lambda probe heating remains active for 1 hour after the operating status has been reached.
Fault	CAUTION - There is a fault!
TS (Troubleshooting)	If a fault occurs during heating (up), the boiler will switch to “`Troubleshooting`” status. In this status the stoker is emptied at minimum fuel feed-in (Parameter: “`The time until the stoker is empty is`”) whilst the ignition fan is active. The boiler then switches to “`Shutdown wait`” status and “`Tilt grate`”. It will remain in this status for at least 30 mins depending on the boiler output, the fuel used and the parameters set.

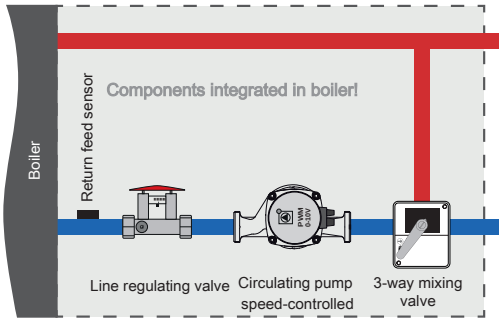
5.4 Determination of the quantity of heat

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.

The return temperature control comes fitted with a 3-way mixing valve. The relevant return feed sensor is already wired. The position in the boiler is specified for the installation of the line regulating valve. Please refer to the information in the installation instructions for the boiler.

Return temperature control with mixing valve (factory fitted)

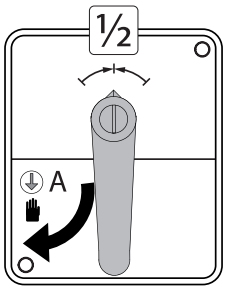


5.4.2 Functioning and configuration

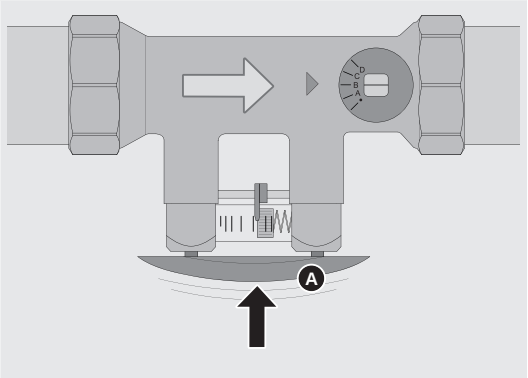
Software version V50.04 – B05.19 at minimum is required for the heat quantity calculation to work. The difference between the boiler temperature and the boiler return temperature as well as the flow of the circulating pump are used to calculate the heat quantity.

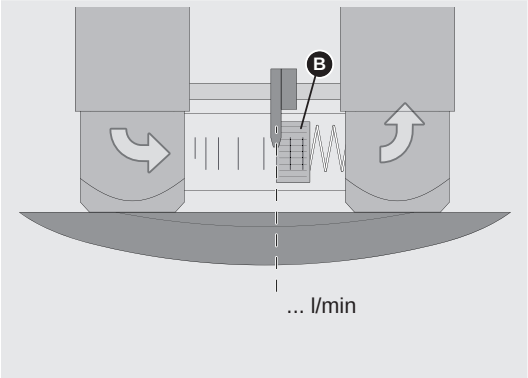
Calculating the feed output of the circulating pump

Boiler with 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

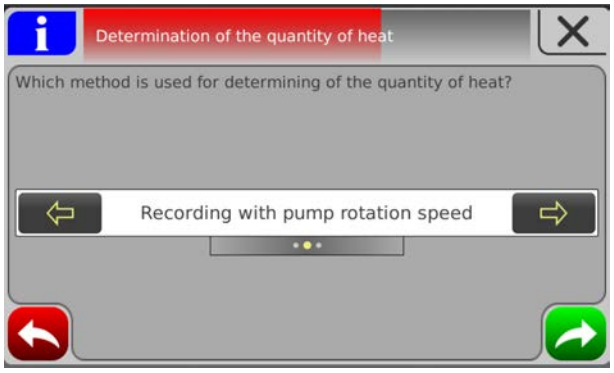




- ❒ Press the handle (A) on the line regulating valve
- ❒ Read and record the flow rate in l/min at the underside of the floater (B)
- ❒ Activate the circulating pump in manual operation at 50% speed
- ❒ Press the push bar on the line regulating valve; make a note of the flow on the scale

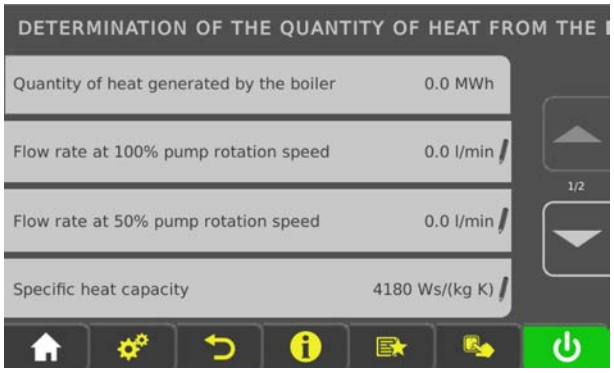
Setting the type of heat quantity calculation

- ❒ 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 Boiler modes

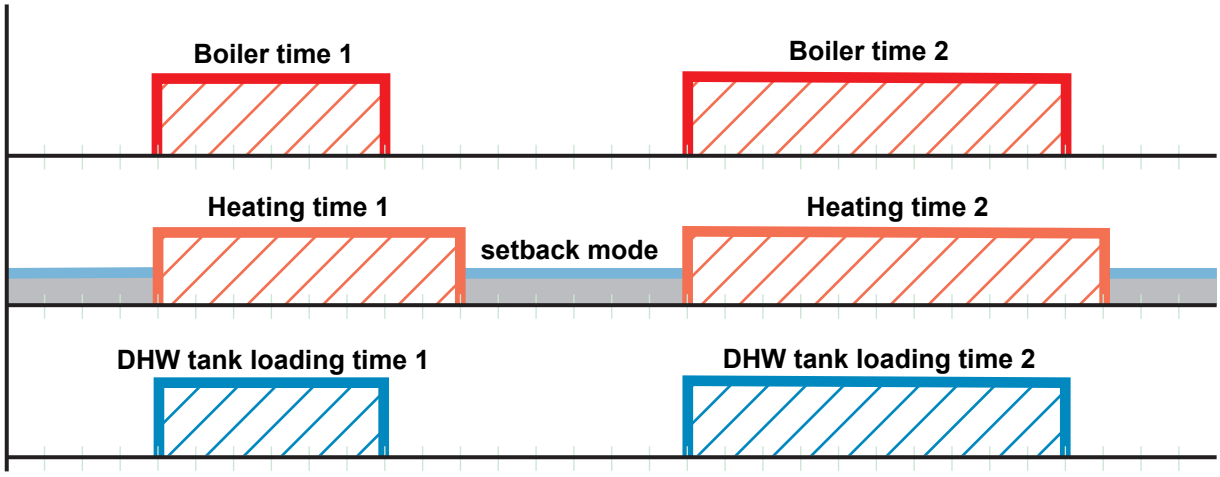
5.5.1 "Automatic” mode without storage tank

When “`Automatic`” is selected without a storage tank, the boiler only produces heat during the specified boiler times. Outside these times the boiler follows the shutdown procedure and switches to "`Standby`" status. It is, therefore, important to note that in this mode the heating circuits and DHW tank are only supplied with heat during the boiler times.

In Example 1 the boiler times have been set to cover the necessary heat requirement. The heating times and DHW tank loading times have been set within the boiler time range, with the heating time being extended approximately one hour beyond the boiler time. This allows the residual energy in the boiler to be used by the heating circuits after the end of the boiler time.

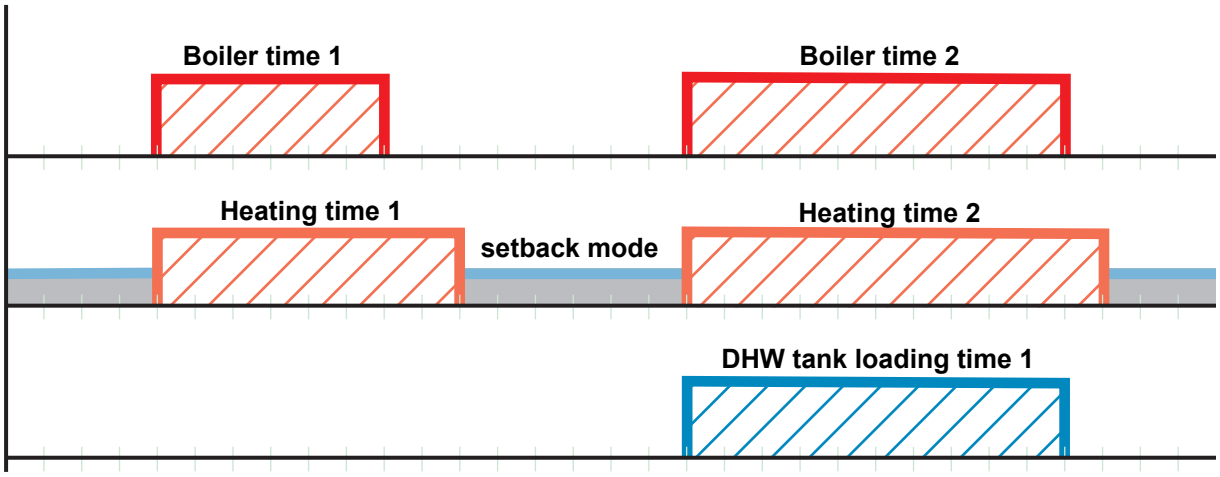
Note that outside the boiler times for setback mode, heat is only available until the boiler temperature falls below the setting value (parameter "`Minimum boiler temperature to release all pumps`").

Example 1: "Automatic” mode without storage tank



Tip: In systems with solar panels, choose the DHW tank loading time so that solar energy can be used.

Example 2: "Automatic” mode without storage tank with solar panel system



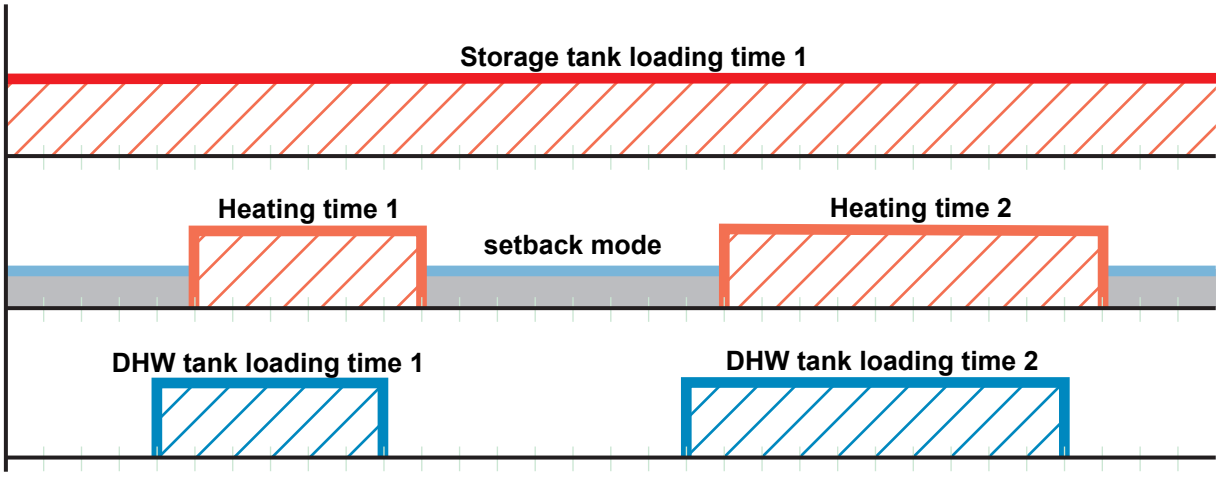
5.5.2 “Automatic” mode with storage tank

When “`Automatic`” is selected with storage tank, the boiler only produces heat if the storage tank actually requests heat within the specified storage tank loading time. Outside these times the boiler is in "`Standby`" status.

The heating times should be set within the storage tank loading times so that the provision of heat is guaranteed over the entire heating time.

Note that the heating circuit and DHW tank are only supplied with heat for as long as the storage tank temperature is sufficient for the demand.

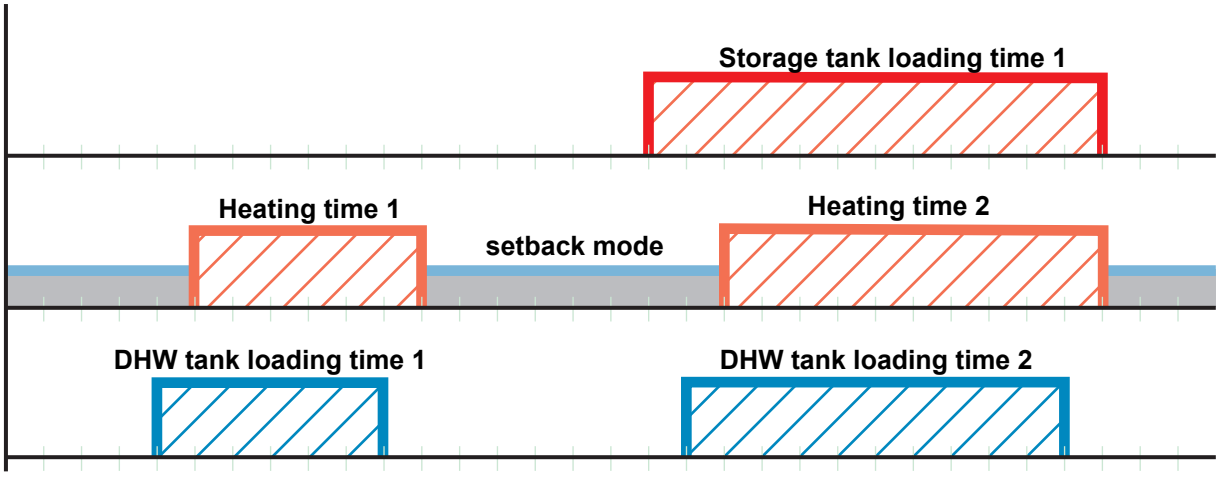
Example 1: “Automatic” mode with storage tank



Tip: In systems with a storage tank and solar panels, choose the storage tank loading time so that solar energy can be used.

In order to ensure that there is sufficient heat at the start of the DHW tank loading time and heating time, we recommend setting the storage tank charging time to begin before the start of the DHW tank time or heating time.

Example 2: “Automatic” mode with storage tank and solar panel system

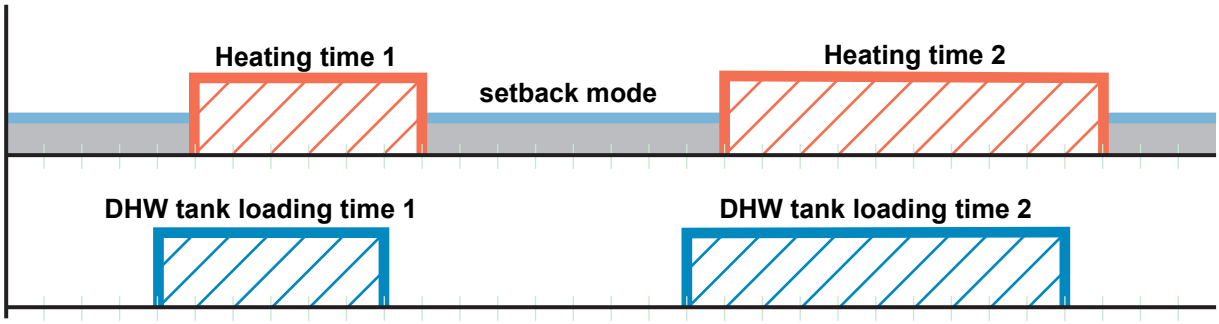


5.5.3 “Continuous load” mode without storage tank

When “`Continuous load`” is selected, the boiler produces heat around the clock, in other words it tries to maintain its boiler temperature setpoint 24 hours a day. The boiler time settings are ignored in this mode.

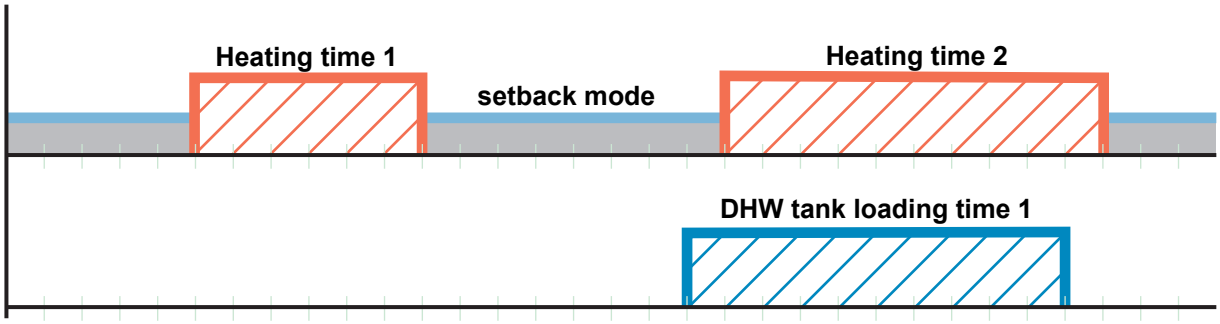
The heating times and DHW tank loading times can be distributed throughout the day as required.

Example 1: “Continuous load” mode



Tip: In systems with solar panels, choose the DHW tank loading time so that solar energy can be used.

Example 2: “Continuous load” mode with solar panel system



5.5.4 “Continuous load” mode with storage tank

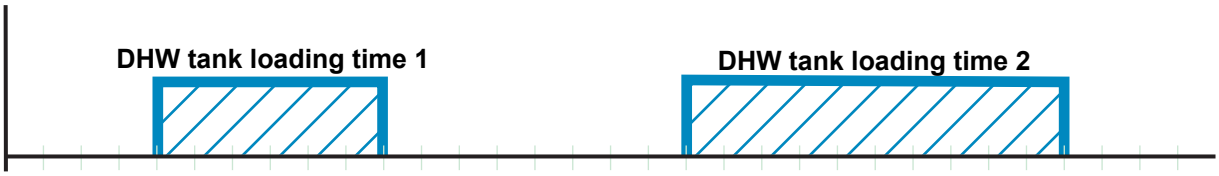
To ensure efficient operation, set systems with a storage tank to “`Automatic`” mode rather than “`Continuous load`” mode.

➲ "“Automatic” mode with storage tank" [▶ 102]

5.5.5 “Domestic hot water” mode without storage tank

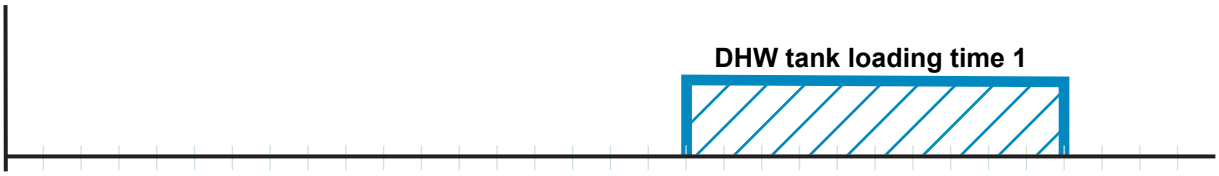
When “`Domestic hot water`” is selected, the boiler only produces heat if the DHW tank actually requests heat within the specified DHW tank loading time.

Example 1: “Domestic hot water” mode without storage tank



Tip: In systems with solar panels, choose the DHW tank loading time so that solar energy can be used.

Example 2: “Domestic hot water” mode without storage tank with solar panel system

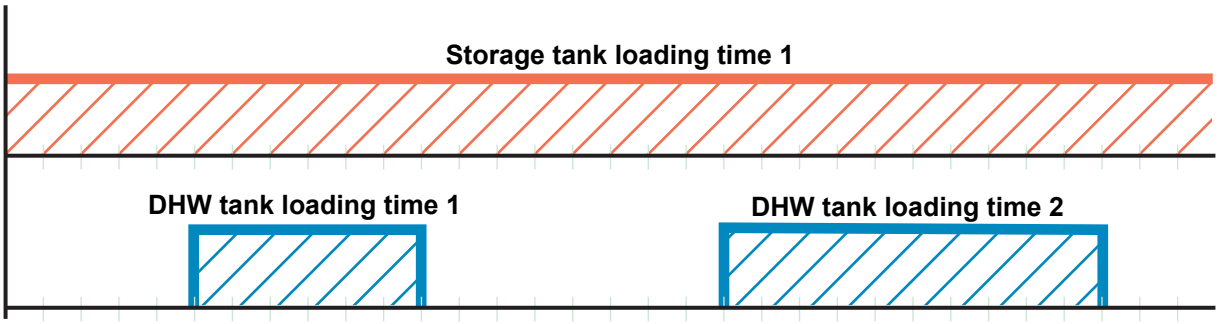


5.5.6 “Domestic hot water” mode with storage tank

In systems with a storage tank, note that in “`Domestic hot water`” mode, the storage tank loading times remain active as the DHW tank is supplied with heat from the storage tank.

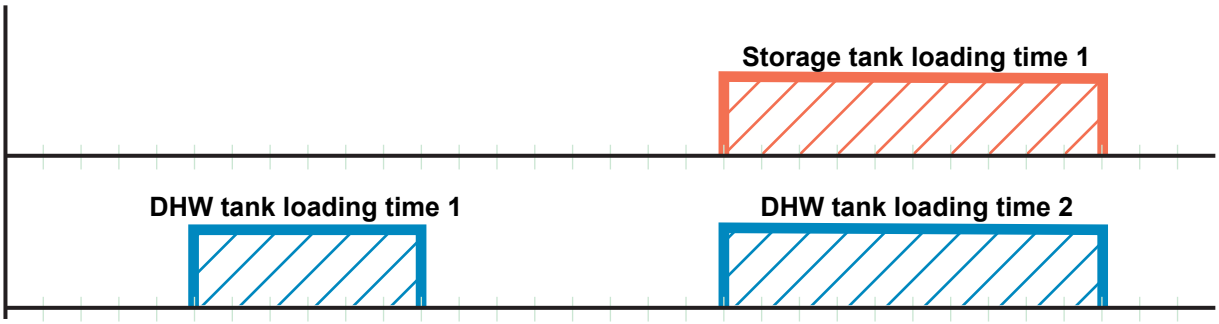
Within the storage tank loading time the boiler only produces heat if the storage tank temperature is below the minimum value and the DHW tank is requesting heat.

Example 1: “Domestic hot water” mode with storage tank



Tip: In systems with a storage tank and solar panels, choose the storage tank loading time so that solar energy can be used.

Example 2: “Domestic hot water” mode with storage tank and solar panel system



5.6 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

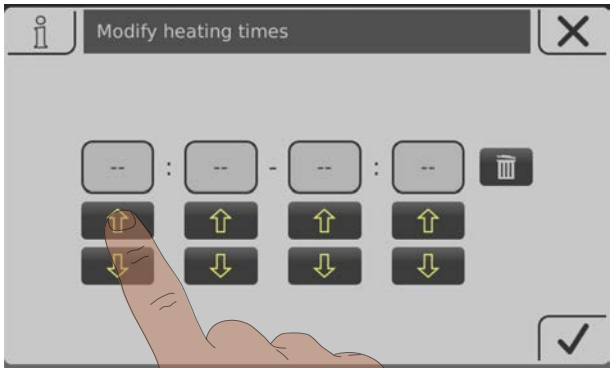
❒ Tap the symbol under the day of the week

↳ The edit window will appear

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

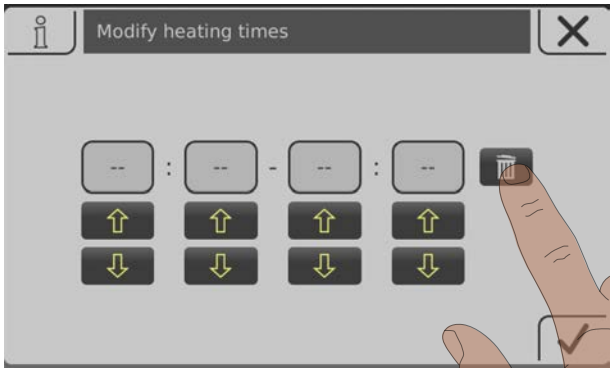
❒ Tap the desired time window

❒ 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.

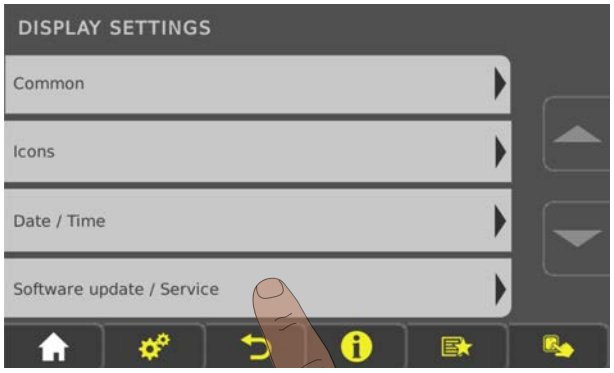


5.7 Calibrating the touchscreen

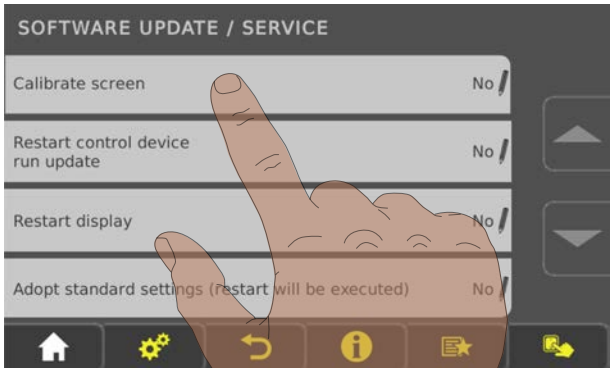
If the touchscreen stops working properly, it will need to be calibrated.

❒ Go to the “Display settings” menu

❒ Scroll down until the “Software update / Service" submenu appears and open the submenu

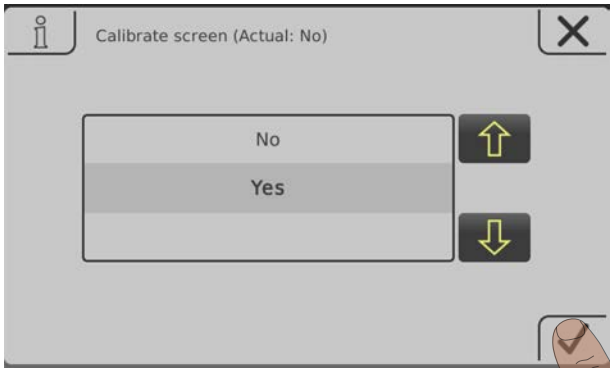


❒ In the “Software update / Service" menu open the “`Recalibrate touch control`” parameter



❒ Set the parameter to “YES” and confirm at the bottom right

↳ The touchscreen will restart and begin calibrating



To calibrate the touchscreen, you much 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.

5.8 Software update Lambdatronic 3200

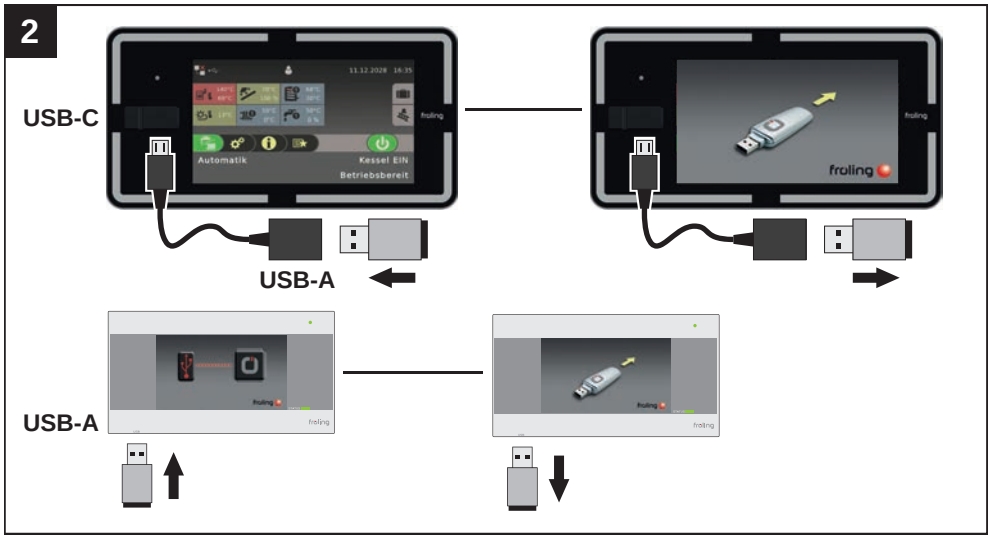
The following description shows the software update process for systems with Lambdatronic 3200 and a touch control in the system environment (also applies to systems with button boiler console and touch room console). The Froling Flash Update Wizard (core module) as well as a USB storage device is necessary 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" [▶ 111]

❒ Perform software update of all touch controls



➲ "Carrying out a software update on the touch control" [▶ 113]

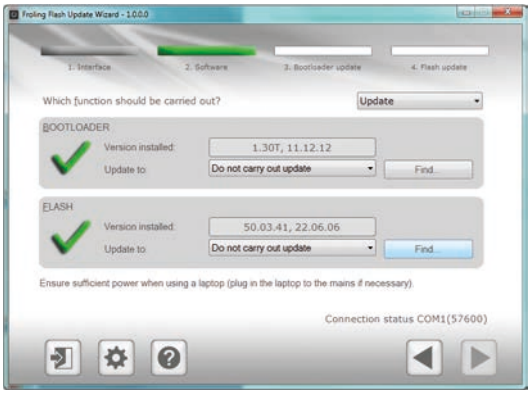
❒ Close Flash Update Wizard - restart controller

➲ "Finishing a software update" [▶ 114]

5.8.1 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

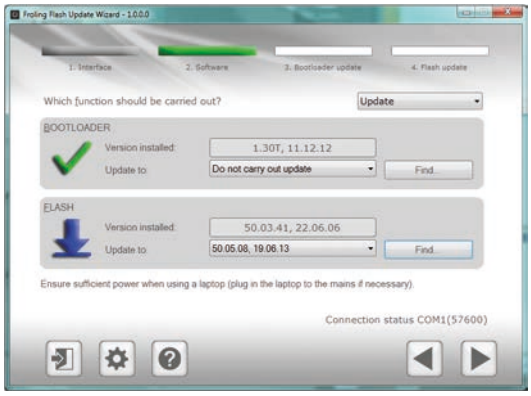
↳ A window is displayed where you can search for the Flash file

❒ Navigate to the folder where the file is saved

❒ Select the Flash (*.s19) file and click on the "Open" button

Starting the Flash update

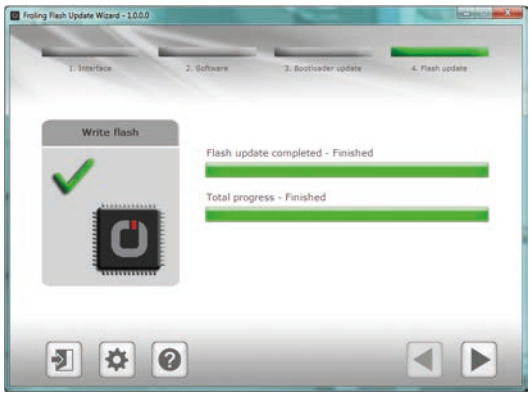
After selected the desired Flash file, it will be displayed next to the "Update to:" field:



❒ 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!

5.8.2 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!

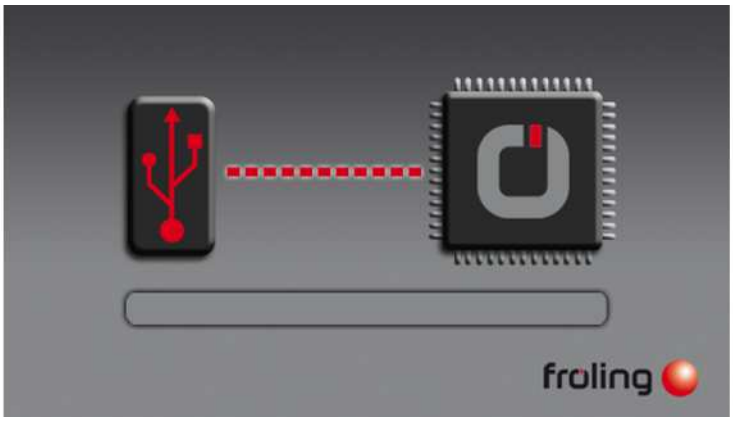
❒ Insert the USB stick with the necessary data (autostart.txt, froresetdemo.inc, frorestart.inc, rootfs.ubi, update, V 60.01 B01.38.15 K37) into the USB port.

↳ 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

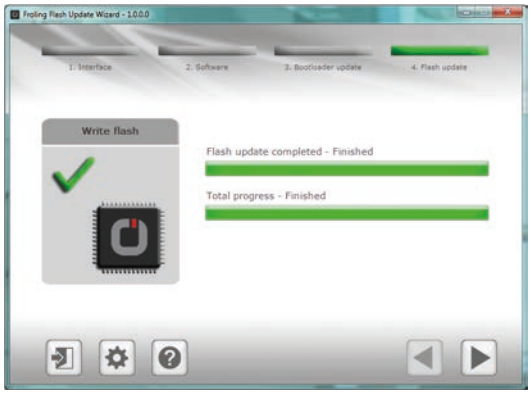
The touch control software is up-to-date following the restart.

❒ Perform updates to any other touch controls

5.8.3 Finishing a software update

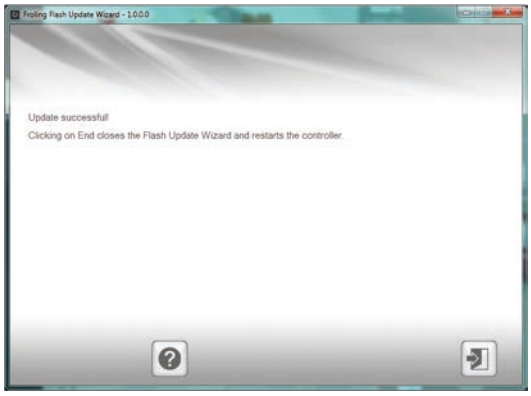
When the software update has been performed on all touch controls, the Flash Update Wizard must be ended correctly.

End flash update



❒ Click on the "Next" button

↳ The completion window appears



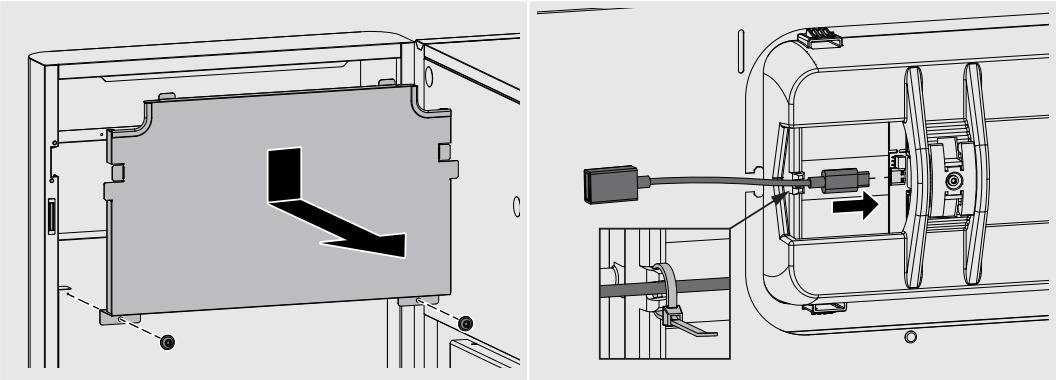
❒ Clicking on "Close" closes the Flash Update Wizard and restarts the boiler controller

↳ 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!

5.9 USB data recording

❒ Switch off the boiler using the main switch



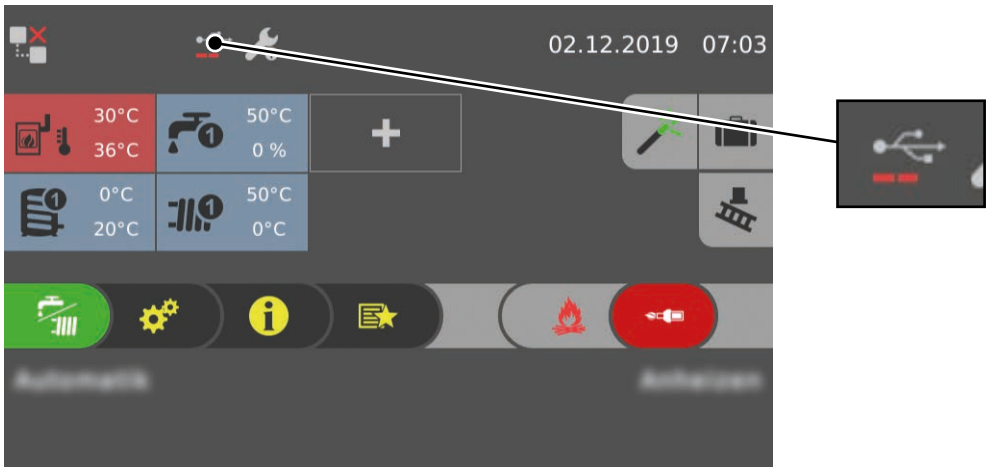
❒ Open the insulated door and disassemble cover plate on inside of the door

❒ Connect USB C - USB A adapter cable to the display bushing and secure cable on display housing using cable ties

❒ 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.

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