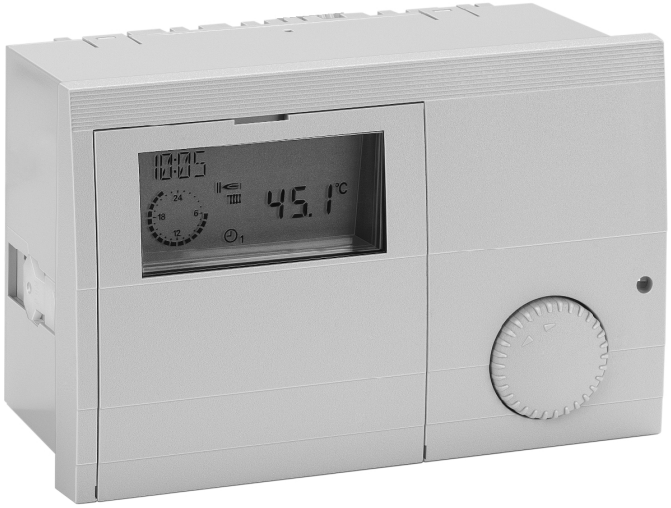
E8.5064 V1

System Manager

Operating instructions



Please observe the safety instructions and read through this manual carefully before commissioning the equipment.

Safety information

Power connection regulations

Please note the connection conditions specified by your local electrical power supply company and the VDE regulations. Your heating control system may only be installed and serviced by appropriately authorised specialists.

⚠ For fixed devices, a facility for mains disconnection in accordance with EN 60335 must be installed in compliance with the installation specifications (e.g. switch).

⚠ The mains lines insulation must be protected against damage caused by overheating (e.g. insulation hose).

⚠ The minimum distance to installation objects in the vicinity must be chosen so that the permitted ambient temperature is not exceed during operation (see table - Technical Data).

⚠ If the system is not installed properly, persons using it are at put at risk of fatal or serious injury (electric shock).
Ensure the controller is de-energized prior to performing any work on the controller!

Safety

Please read and keep in a safe place

Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator.

Warranty conditions

If the system is not installed, commissioned, serviced and repaired properly, it will render the manufacturer's warranty null and void.

Conversion

All technical changes are prohibited.

Transport

On receipt of the product, check that the delivery is complete. Report any transport damage immediately.

Storage

Store the product in a dry place. Ambient temperature: see Technical data.

Important text passages

! Important information is highlighted by an exclamation mark.

⚠ This attention symbol indicates dangerous situations.

Note

! The operating manual describes the maximum version of the controller, meaning that not all statements are relevant for your device.

General Notes

! With regard to installation, operation, and maintenance, the following instructions must be observed. This device must only be installed by a specialist technician. Improperly performed repairs can subject users to considerable risks.

! To comply with applicable regulations, the instructions for assembly and operation must be readily available at all times and must be handed over to the responsible engineer when working on the device for his attention.

Description

Declaration of conformity

CE

We the manufacturer declare the product E8.5064 is in conformity with the fundamental requirements of the following directives and standards.

Directives:

– 2004/108/EC, 2006/95/EC

Standards:

– EN 60730-1, EN 60730-2-9

The manufacture is subject to the quality management system in accordance with DIN EN ISO 9001.

Eurasian Customs Union

EAC

The product E8.5064 V1 meets the technical specifications of the Eurasian Customs Union (the Russian Federation, Belarus, Kazakhstan).

Function

The device contains a number of functions and must be set in accordance with use. The following functions are mapped in the System Manager:

- Cascade modulating HS
- Cascade switching HS
- Control of 2 HS or 2-stage HS via relay
- Water heating, 2 mixed heating circuits, as well as 2 extra functions
- Demand-related circulation pump control
- Automatic toggle between summer and winter time
- Activation of a timer is possible

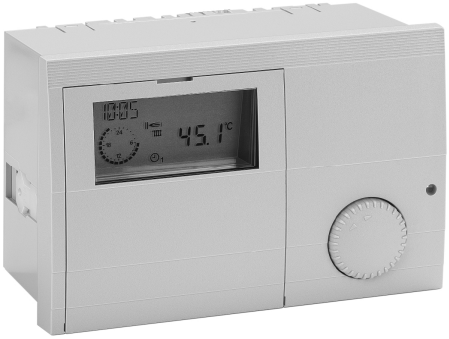
Contens

Part1: Operation

For initial start-up or the "level Installation" please read the installation manual.

Operation in normal mode

(operating flap closed)



Operating elements

Change the set operating mode

Operating mode selection

Turn the knob to select the operating mode required. The operating mode selected is indicated by a symbol at the bottom of the display. It takes effect when the setting is not changed for 5 s.

The following operating modes are available for selection:

Standby/OFF
(Heating OFF and hot water preparation OFF, only frost protection mode) Exception: see F15 Function page 55

AUTOMATIC 1 (Automatic mode 1)
(Heating according to timer program 1; HW according to HW program)

AUTOMATIC 2 (Automatic mode 2)
(Heating according to timer program 2; HW according to HW program)

HEATING (Day mode)
(24 h heating with comfort temperature 1; HW according to HW program)

REDUCING (Night mode)
(24 h heating with reduced temperature; HW according to program)

SUMMER (Summer mode)
(Heating OFF, HW according to HW program)

Service (automatic reset after 15 min)
Boiler regulated at Boiler temperature = max. boiler temperature= see page 33 ; when the boiler temperature has reached 65 °C, the consumers are regulated to their flow temperature to dissipate heat (cooling function).

! The cooling function must be explicitly enabled in the consumer circuits by means of a set value.

Effect of the operating mode

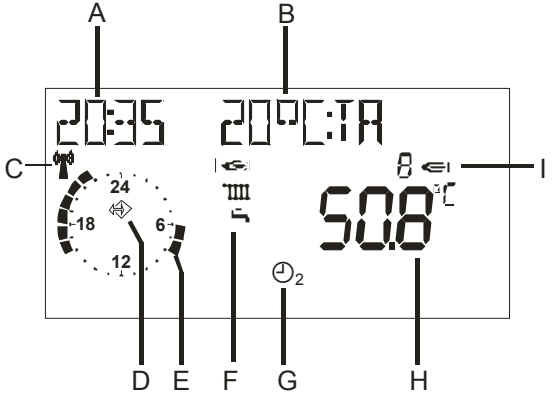
The operating mode set here affects the boiler regulation and the integrated heating circuits of the controller.

Each heating circuit can be assigned a separate operating mode from the one set by means of the "operating mode" parameter in the user level of the corresponding heating circuit.

When the "⏻ = Standby/OFF", and "🛏 = Summer mode" operating modes are set, they have a reducing effect on system controllers with respect to all heating circuits and consumer circuits in the entire system.

! For mixer controllers the reduction of operating mode is only effective for internal heating circuits.

Display in normal operation



! Due to the tolerances of sensors, deviations of +/- 2 K (2 °C) are normal between various temperature displays. Temperatures which change rapidly can have higher deviations for short periods due to the different time-related behaviour of various sensors.

! The display of the current heating program applies to the device's first heating circuit.
In case of having two heating circuits the display can be set to the 2nd circuit

Explanations

A Current time

B Freely selectable display
(refer to "DISPLAY SEL" parameter)

C DCF reception OK
(only if receiver is connected via eBUS)

D Bus icon (if this icon does not appear, check data line to connected CAN controllers
=> check eBUS via DISPLAY level)

E Display of the active heating program for the first heating circuit
(here: 6:00 to 08:00 hrs. and 16:00 to 22:00 hrs.)

F Status display: internal burner 1 relay ON; heating mode; hot water preparation

G Mode selector switch, the display applies to all internal heating circuits for which a separate operating mode has been selected via the "MODE" set value (here: $\mathbb{O}_2$ => Heating according to timer program 2).

H Display of current temperature of HS 1 or header temperature in the case cascades

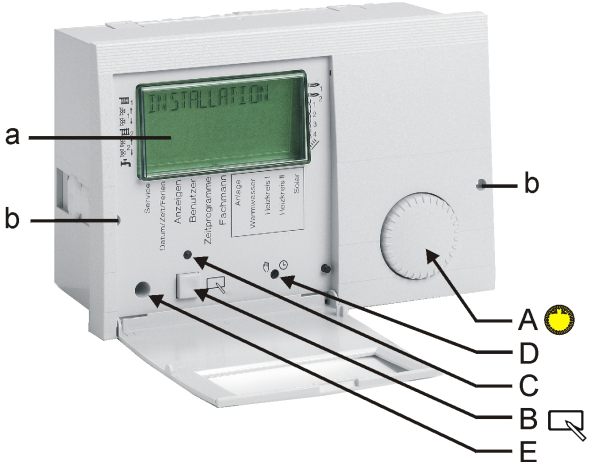
I Display of numbers of active heat generators
(only applies to cascades)

! With HS1 BUS = 5 is indicated firmly here 0

Changing the settings

The operating flap must be opened first in order to change or request set values.

=> Controller switches to Operation mode



a Display indicating the current level

b Holes to unlock the controller fixation.
Insert a thin screwdriver deep into the holes and then lift up the controller.

Operating elements

A => Shaft encoder
Search for value/level or adjust value

B => Programming key

- Select a value level
- Select a value level to change
- Save a new value

C => Change display
LED ON => The value in the display can be changed by actuating the shaft encoder (A).

D => Manual-Automatic switch.
In Manual mode, all the pumps and first burner stage are switched on. The mixers are not changed/accessed ("DISPLAY EMERGENCY OPERATION").

Limitation (switch-of with 5 K hysteresis):

- Burner => MAX T-MODULE (expert)
- Heating circuit pumps => MAX T-FLOW (expert)
- Cylinder charging pump => T-DHW I (user)

⚠ Caution, overheating, e.g. with floor or wall heating! => Set mixer by hand!

E => PC connection via optical adapter

Operating level

	General	SERVICE
		DATE/TIME/HOLIDAY
Open operating flap	⟳ Turn anticlockwise ↗	
	⟳ Turn clockwise ↘	
	Display	INSTALLATION
		HOT WATER
		HEAT CIRCUIT I
		HEAT CIRCUIT II
		SOLAR/MF
	User	INSTALLATION
		HOT WATER
		HEAT CIRCUIT I
		HEAT CIRCUIT II
		SOLAR/MF
	Time programs	CIRCL TIME
		HOTW-PROG
		HTG-PROG I 1
		etc...
	Expert	INSTALLATION
		HOT WATER
		HEAT CIRCUIT I
		HEAT CIRCUIT II
		SOLAR/MF
	Expert FA	INSTALLATION

Operation is divided into different areas:

General - Display - User - Time programs - Expert - Expert FA.

Opening the hinged control panel cover automatically takes you to the display and indicator area.

- The current area "DISPLAY" appears in the display for a short time (1 clock circuit).
- After the clock circuit the display switches to the current operating level "INSTALLATION".
- This is displayed for a short time (1 clock circuit) when you switch to a new area.

⟳ Select the level in which the value to be adjusted or displayed can be found using the rotary knob.

Press Prog button! => Open/select level

⟳ Search for value using rotary knob

Press Prog button! => Select value
LED lights up => adjustment can now be made

⟳ Modify value using rotary knob

Press Prog button! => Store value - LED goes off

When the operating flap is first opened after voltage is applied, the level SETUP is displayed once only. Once the values grouped here have been set the controller is operable.

Areas

General

Value selection summary
Service => for service engineers
Date/Time/Holiday => for users

Display

System value display (e.g. sensor values and setpoints). No adjustments can be made. Operating errors are therefore excluded in this area.

User

Summary of settings that can be made by the operator.

Time programs

Summary of time programs for heating circuits, the hot water circuit and extra functions where applicable

Expert

Summary of values for which expert knowledge is required to make settings (installation technician).

⚠ Values in the expert level are protected by a code no. (damage/malfunction possible).

Expert FA (only for FA via BUS)

Summary of values transmitted by the automatic firing device.

Levels

The settings in the different areas are sorted into operating levels

- INSTALLATION
- HOT WATER
- HEATING CIRCUIT I
- HEATING CIRCUIT II
- SOLAR/MF

Installation

All display values and settings that relate to the heat generator or the entire system and cannot be assigned to a consumer circuit.

Hot water

All display values and settings that affect central hot water preparation and circulation.

Heating circuit I/II

All indicator and set values that relate to the corresponding consumer circuit (also, for example, as decentral hot-water circuit).

Solar/MF

All indicator and set values that relate to solar energy recovery and settings for the multifunction relay.

! An overview of all settings can be found on the following pages.

Part 2: Overview of display values and settings

Hinged cover OPEN ➔ search for level to the left with ⟲, open with ☜

General area

(Select main level using ⟲ and open with ☜)

Date/Time/Holiday

This area contains a series of different values in order to provide rapid access.

(Select values/value group using ⟲ and open with ☜)

Date/time => Value group (General -> Date/Time/Holiday level) All the values in this group are set in sequence => adjust using ⟲ => continue with ☜	
TIME (Minutes)	Current minutes blink and can be adjusted
TIME (Hours)	Current hours blink and can be adjusted (seconds are set to "00" when stored)
YEAR	Adjust current year
MONTH	Adjust current month
DAY	Adjust current day (date)

! If a heating system controller has been set to be the TIME MASTER (time setting for all controllers, see EXPERT/INSTALLATION) or a DCF (Radio time receiver) has been installed in the system, the time is blanked out on all the other controllers in the system.

! There may be a time difference of up to 2 minutes per month (correct time if necessary). If a DCF receiver is connected the correct time is always displayed.

The current weekday is calculated automatically. Checking can take place using the selectable additional display in the standard display => set to "Day"

It is possible to change from summer to winter time by entering the date.

Holiday => Value group (General -> Date/Time/Holiday level) All the values in this level are set in sequence => adjust using ◯ => continue with ⇨	
YEAR START	Set current holiday start year
MONTH START	Set current holiday start month
DAY START	Set current holiday start day
YEAR STOP	Set current holiday end year
MONTH STOP	Set current holiday end month
DAY STOP	Set current holiday end day

Summer time => Value group (General -> Date/Time/Holiday level) All the values in this level are set in sequence => adjust using ◯ => continue with ⇨	
MONTH START	Set month for start of summer time
DAY START	Set earliest day for start of summer time
MONTH STOP	Set month for start of winter time
DAY STOP	Set earliest day for start of winter time

! Please do not enter the day of travel as the start date, but the first day of the holiday (no more heating from this day).

! Please do not enter the day of travel as the end date, but the last day on which there is to be no heating. When you arrive home the house should be warm and there should be hot water.

! Stop holiday function => e.g. for early return by pressing the program switch.

! Not with Time Master or DCF

! The default setting is valid for Central European time zones. A modification is only required if the date for the time change is changed by political decree.

! The earliest date on which the change will occur must be set. The controller performs the time change on the Sunday following this date at 2:00 am or 3:00 am.

! If no time change is required, please set MONTH STOP to the same value as MONTH START and DAY STOP to the same value as DAY START.

Service

This area contains values for the customer service engineers in order to provide rapid access.

(Select operating level using ◯ and open with ☐)

Relay test => Value group (code no. required) (General -> Service level) Select relay using ◯ => relay switches	
00	No relay
01	A1: Pump, heating circuit 1
02	A2: Pump, heating circuit 2
03	A3: Hot water charging pump
04	A4: Mixer OPEN, heating circuit 2
05	A5: Mixer CLOSED, heating circuit 2
06	A6: HS 1 ON
07	A7: HS2 ON [2-stage:HS 1 + 2 (after 10 s) ON]
08	A8: Mixer OPEN heating circuit 1/Multifunction 1
09	A9: Mixer CLOSED heating circuit 1/Multifunction 2
10	A10: Multifunction 3
11	A11: Collector pump/Multifunction 4

Hinged cover OPEN ➔ search for level to the left with ◯, open with ☐

A code number must be entered for this function.

☐ Select Relay Test => "Code number" level

Code number Entry

☐ Start code number entry => [LED]
◯ Select 1st digit
☐ Confirm entry
◯ Select 2nd digit
☐ Confirm entry
◯ Select 3rd digit
☐ Confirm entry
◯ Select 4th digit
☐ Confirm entry

=> "Relay Test"

RELAY TEST

☐ Start relay test
◯ Select relay => Relay switches
◯ Select next relay or use
☐ to stop relay test

SENSOR TEST

Start sensor test with ↩, use ◯ to select sensor => temperature is displayed; Use ↩ to stop sensor test

Sensor test => Value group (General -> Service level) Select sensor using ◯ => value is displayed	
F1	Buffer storage temperature Lower
F2	Buffer storage temperature middle or room temperature heating circuit 1
F3	Upper buffer storage temperature
F5	Flow temperature, heating circuit 2
F6	Upper hot water temperature
F8	Heat generator /header temperature
F9	Outside temperature
F11	Flow temperature heating circuit 1 or temperature multifunction 1
F12	Hot water temperature lower or temperature multifunction 2
F13	Solid fuel boiler temperature or collector 2 or temperature multifunction 3
F14	Collector 1 temperature or temperature 4
F15; Light; 0 - 10 V I	Room temperature heating circuit 2 or measured value of the light sensor or voltage value 0 - 10 V input

Other entries (General -> Service level) Select value using ◯ => value is displayed	
SW NO XXX-XX	Software number with index
CASC MANUAL (1 - 8; only with code no.)	Starting different burner stages of the cascade
BURNER TIME (1 - 8)	↩ Burner time for all stages
BURNER START (1 - 8)	↩ Burner start for all stages
LIMITER TEST (1 - 8)	Safety temperature limiter test with heat generator temperature display Start with ↩ (hold down)!
SERVICE (only with code no.)	Input of date or operating hours for service messages
RESET USER 00	Load user parameter factory settings (except language)
RESET EXPERT 00 (only with code no.)	Load expert parameter factory settings (except sensors)
RESET T-PRG 00	Load time program factory settings
RETURN	Exit level using ↩

SW NO XXX-XX

Display software number with index (please specify if you experience problems/have questions about the controller)

CASC MANUAL (only with code no.)

(only for cascades and only in that operating mode “Service“ => see operating mode selection)
With ☜ open level and select burner stage using ⟳.

After the heat generator ☜ has been selected the output for this heat generator can be set.

With respect to multi-stage heat generators, the second stage can be activated by means of presetting an output value > 50 %.

After closing the service functions the entries are reset automatically .

BURNER TIME and BURNER START

☜ => Display of current value ☜ Return
Hold down ☜ until indicator "RESET" goes out => Reset display

LIMITER TEST

Use ☜ to open level and select heat generator with ⟳.
=> Display heat generator temperature.
☜ Hold down prog. button until LIMITER activates
Burner I ON
all pumps OFF
all mixers CLOSE
The temperature can be observed in the display.

SERVICE

Input of values for the yearly service message or operating hours.
Delete active maintenance display:
Open control panel cover, press prog. button ☜, set repeat value to "00" using ⟳ and confirm with ☜.

Delete programmed annual message:
In the General/Service level, set value for
SERVICE=>DAY or
SERVICE => OPERATNG HOURS to hyphens.

RESET …

The three value groups can be reset to the factory setting using the Reset function.
Select function using ☜, set to "01" using ⟳ and confirm with ☜.

Display Range

! Display only - no adjustment possible. Display only appears if the sensor is connected and the value is present in the system, otherwise "----" or no display.

INSTALLATION	
(HS => heat generator) use ⊙ to select parameters	
T-OUTSIDE	Outside temperature
EXT SETPOINT	External set value specification (0 - 10 V)
T-HEADER DES	HS/Header set value (cascade)
T-HEADER	HS/Header temperature (cascade)
T-HS	Level ⮹ => Temperature and Status of the HS (HS 1 - HS 8)
T-SOLID FUEL	For HS2 = Solid fuel boiler (A7)
T-RETURN 1	Return flow temperature of HS 1
T-RETURN 2	Return flow temperature of HS 2
T-BUFFER T	Buffer storage tank temperature removal
T-BUFFER M	Buffer storage tank temperature charging zone HS
T-BUFFER B	Buffer storage tank solar zone
T-STORAGE 3	Temperature of storage tank 3 (e.g. solar pool-heating)
MOD DEPTH 1-8	Modulation degree of HS (BUS)
RETURN	Exit level using ⮹

T-OUTSIDE

The measured outside temperature is smoothed for control purposes. The smoothed value is displayed here.

EXT SETPOINT

The 0 - 10 V input can be used to preset an accumulative set value for the control system (see V-CURVE p. 34).

T-HEADER DES (Heat requirement)

Corresponds to the maximum required temperature of the consumer circuits from the heating system (incl. hot water preparation). The mixer circuits request the temperature + heating curve distance (expert value)

T-HS 1 (and T-HS 2 - 8 where cascades apply)

Measured current temperature of the corresponding heat generator. Additionally it is indicated whether the heat generator is switched on (➫), in the case of two-stage heat generators the status of the second stage is also displayed (II ➫).

BUFFER-T/M/B

(only if buffer storage is installed)
Buffer storage tank temperatures in the discharge area, the charging area and the infeed of alternative energy.

MOD DEPTH (only in the case of HS via BUS connection)

Only if a modulating heat generator is connected via BUS and transmits this value.

Hot water	
T-DHW DES	Current hot water set temperature according to heating program and operating mode
T-DHW	Current hot water temperature
T-DHW L	Temperature of HW tank in the lower section (infeed)
T-CIRCL	Return flow temperature of the circulation
RETURN	Exit level using ⇦

Heating circuit I/II	
T-ROOM DES A	Current room set temperature according to heating program and operating mode
T-ROOM	Current room temperature
HUMIDITY ***)	Display of room humidity (if value is available)
T-POOL DES *)	Swimming pool temperature setting
T-POOL *)	Current swimming pool temperature
T-DHW DES **)	Hot water temperature setting
T-DHW **)	Current hot water temperature
T-FLOW DES	Current flow temperature setting
T-FLOW	Current flow temperature
N-OPTI-TIME	Previous time required to heat up with heat-up optimisation activated
RETURN	Exit level using ⇦

! Display only appears if the sensor is connected and the value is present in the system.
If the set value is not present it is masked out, or hyphens appear in the display (- - - -).

T-DHW L (storage tank lower temperature)

For example for solar infeed or for active charge-through function (CHARGE-THROUGH = 01). Display hot-water tank temperature in infeed area.

T-ROOM DES A (current value for set room temperature)

If a control unit is connected there will be no display "- - - -" => display on control unit

T-ROOM (room temperature)

Only if a sensor or a FBR is connected.

***) These values only appear if the heating circuit is programmed as a controller for the pool.

****)These values only appear if the heating circuit is programmed as a hot water circuit.

*****) These values only appear if an operating device is connected and parameters have been set for the corresponding heating circuit.
“- - - -„ => no humidity sensor available in control device

! This page only displays those parameters where the corresponding functions have been implemented and activated.

Solar/MF	
T-MF1	Temperature MF sensor 1 (=F11)
T-MF2	Temperature MF sensor 2 (=F12)
T-MF3	Temperature MF sensor 3 (=F13)
T-MF4	Temperature MF sensor 4 (=F14)
T-SOL PANEL 1	Temperature collector 1
T-DHW	Upper hot water temperature
T-DHW L	Hot water temperature infeed
RETURN	Exit level using ⮹

Solar integration

See the description for multifunction 1 - 4 under Expert.

T-MF(1 - 4)

A sensor is assigned to the four available multifunction relays respectively. If the sensor is not used by another standard function, a function that requires the sensor may be selected for the relay. In this case the measured value is displayed here.

In some special cases, e.g. when selecting the functions "return flow temperature increase“ or "collector pump“ the measured value is additionally displayed as T-RETURN under installation or as T-SOL PANEL under Solar/MF

User Area

All the settings that can be made by the operator of the system.

INSTALLATION			
All settings that cannot be assigned to a consumer circuit (consumer circuits: heating circuits and HW).			
Select value, adjust and save			
Designation	**Value range**	**Default**	**IV*)**
GERMAN	Acc. to version	GERMAN	
CONTRAST	(-20) - (20)	00	
DISPLAY SEL	Sensor, weekday, ...	- - - -	
SELECT PROG	Heating circuit 01, Heating circuit 02	01	
RETURN	Exit level using		

***) IV = Internal Values:**
Space for entering the parameters stored in the system!

Hinged cover OPEN ➔ search for level to the right with , open with

GERMAN => Language

Select controller language

CONTRAST

Adjust intensity of display

DISPLAY SEL

Select additional display in standard operation

- - - -	=> no additional display
WEEKDAY	=> Day of week (Mo, Tu, We, ...)
T-OUTSIDE	=> Outside temperature
T-FLOW 1	=> Flow temperature, heating circuit 1
T-FLOW 2	=> Flow temperature, heating circuit 2
T-DHW	=> Hot water temperature (upper)
T-HS	=> Heat generator temp
T-ROOM 1	=> Room temperature, heating circuit 1=> *)
T-ROOM 2	=> Room temperature 2=> *)
T-SOL PANEL 1	=> Collector 1 temperature => **)

*) only with remote control connected
**) only if corresponding configuration applies

SELECT PROG

Select heating circuit whose heating program is shown in the standard display.

Hot water			
Designation	**Value range**	**Default**	**IV**
1X DHW	00, 01 (OFF/ON)	00 = OFF	
T-DHW 1 DES	10 °C - 70 °C	60 °C	
T-DHW 2 DES	10 °C - 70 °C	60 °C	
T-DHW 3 DES	10 °C - 70 °C	60 °C	
BOB-VALUE	0 K - 70 K	0 K	
CIRCL-P-DHW	00, 01 (OFF/ON)	00 = OFF	
ANTILEGION	00, 01 (OFF/ON)	00 = OFF	
RETURN	Exit level using ⮌		

Hot water short time heating function

ANTILEGION = 01 => Every 20th time that heating takes place or once per week on Saturday at 01:00 hrs the storage tank is heated up to 65 °C.

It is possible to set up your own hot water short time heating function using the third hot water enable facility.

1X DHW (1x Hot water)

01 => The storage tank is enabled for charging (e.g. for showering outside hot water times).

Charging starts when the temperature falls below "temperature setting 1" by the switching hysteresis. After charging, the value is automatically set to "00“ .

T-DHW 1-3 DES (Hot water temperature setting)

Required hot water temperature setting
T-DHW 1 DES => used in first enable time,
T-DHW 2 DES => used in second enable time ,
T-DHW 3 DES => used in third enable time of hot water program.

Special application – flow heater

Without storage tank sensor connection, this function is available for external boilers with bus connection.

T-DHW 1 => in operation 24 hours

BOB-VALUE (Operation Without Burner)

Energy saving function for solar or solid fuel integration
For settings **> "0"** the burner is not activated for hot water preparation until the hot water temperature has dropped below the temperature setting by the set value + the switching hysteresis.

! Alternative external energy sources with a bus connection may affect this function (e.g. SD3-Can).

CIRCL-P-DHW (Circulation with hot water)

01 => The circulation pump runs when the hot water is enabled, but the circulation program is disabled.

ANTILEGION (Hot water short time heating function)

01 => Activation of hot water short time heating function

Heating circuit I/II			
Designation	**Value range**	**Default**	**IV**
MODE	----,⏻,◴1,◴2,☼,☽	- - - -	
T-ROOM DES 1***)**	5 °C - 40 °C	20 °C	
T-ROOM DES 2***)**	5 °C - 40 °C	20 °C	
T-ROOM DES 3***)**	5 °C - 40 °C	20 °C	
T-REDUCED***)**	5 °C - 40 °C	10 °C	
T-ABSENCE	5 °C - 40 °C	15 °C	
T-LIMIT DAY	----, (-5) °C - 40 °C	19 °C	
T-LIMIT N	----, (-5) °C - 40 °C	10 °C	
HEATSLOPE	0.00 - 3.00	1,20	
ADAPTION	00, 01 (OFF/ON)	00 = OFF	
ROOM INFL	00 - 20	10	
T-ROOM ADJ	(-5.0) K - (5.0) K	0,0 K	
OPT HEAT UP	00, 01, 02	00	
MAX OPT-TIME	0:00 - 3:00 [h]	2:00 [h]	
OPT REDUCED	0:00 - 2:00 [h]	0:00 [h]	
PC-ENABLE	0000 - 9999	0000	
RETURN	Exit level using ⮌		

***)** depending on function selector Heating circuit T-POOL, T-DHW, T-FLOW-DAY or T-FLOW REDUC (see page 48)

MODE

- - - - => The controller programming switch applies in this case.
When setting an alternative operating mode this only applies to the assigned heating circuit.

When the "⏻ = Standby/OFF", and "🛏 = Summer mode" controller programming switch operating modes are set, this has a reducing effect on all heating circuits and consumer circuits in the entire system.

T-ROOM DES 1 - 3

Required room temperature setting
T-ROOM DES 1 => used in first enable time,
T-ROOM DES 2 => used in second enable time,
T-ROOM DES 3 => used in third enable time of active heating program for this heating circuit.

T-REDUCED

Required room temperature setting during night reduction

T-ABSENCE

Required room temperature setting during holidays

T-LIMIT DAY/T-LIMIT N (Day/Night)

Only valid if the function is activated => Set value "Expert/Heating circuit/PUMP MODE= 01=> Pump switching according to heating limit"

If the outside temperature that is measured and calculated by the controller exceeds the heating limit specified here by 1 K (= 1 °C), heating is disabled, the pumps switch off and the mixers are closed. The heating is enabled again when the outside temperature drops below the set heating limit.

T-LIMIT DAY => applies during heating times
T-LIMIT N => applies during reduction times

"----" => The heating limit is deactivated. The circulation pump is switched in accordance with the standard function (see chapter entitled "Circulation pump control")

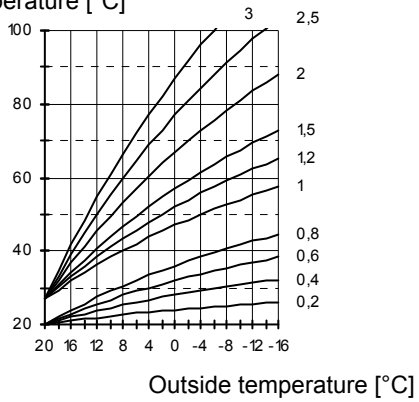
HEATSLOPE

The gradient of the heat slope indicates by how many degrees the flow temperature changes if the outside temperature rises or drops by 1 K.

Setting tip:

At cold outside temperatures, room temperature too low => Increase heat slope (and vice-versa)

At high outside temperature (e.g.16 °C) room temperature too low => correction via set room temperature



Heat slope diagram (setting aid)

Setting 0 => Room control only

! The heat slope can best be set at outside temperatures below 5 °C. The change in heat slope setting must be made in small steps and at long intervals (min. 5 to 6 hours) because the system must first adjust to the new values each time the heat slope is changed.

Guideline values

- Underfloor heating S = 0.4 to 0.6
- Radiator heating S = 1.0 to 1.5

ADAPTION (Heat slope adaptation)

Only active if an FBR analogue room device is connected (room sensor + operating mode selection) and an outdoor sensor.

Function for automatic heal slope setting

Starting Conditions:

- External temperature < 8 °C
- Operating mode is automatic (I or II)
- Duration of lowering phase at least 6 hours

At the beginning of the lowering period, the current room temperature is measured. During the next four hours, this temperature is used as the set point for the room regulator. The heating curve is calculated from the values determined during this time by the regulator for the flow pipe nominal temperature and the external temperature.

! If the adaptation is interrupted, e.g. by a start-up discharge or the hot water demand from an external heating circuit, then the warning triangle will appear in the display until the function is carried out successfully the next day or is ended, e.g. by adjusting the operating mode switch.

! During the adaptation, the water heating and the heating optimisation of the regulator are blocked.

ROOM INFL (Room sensor influence)

Only active if an FBR analogue room device is connected (room sensor + operating mode selection).

The boiler temperature is increased by the set value when the temperature drops below the required room temperature by 1 K.
=> High values lead to fast control and large boiler temperature fluctuations.

- - - - => pure weather-dependent control
0 => pure weather-dependent control *)
20 => pure room temperature control

*) Special function with ROOM INFL = 0

For one-off heating requirements during the night reduction the heating pump continues to run until the next heating period is reached (see chapter entitled "Circulation pump control").

T-ROOM ADJ (room sensor adaptation)

In the case of room control (e.g. with FBR) the measurement can be corrected using this setting if the room sensor is not measuring correctly.

OPT HEAT UP (Heating optimisation)

Activation of function for automatically bringing forward the start of heating.

Example: Heating program 6:00 hrs - 22:30 hrs

OFF: Building starts to be heated at 6:00 hrs.

ON: Depending on weather and room temperature, heating starts soon enough so that building just reaches the set room temperature at 6:00 hrs.

00 => start of heating not brought forward
01 => brought forward depending on weather
02 => brought forward depending on room temperature *)

*) Only active if an FBR analogue room device is connected (room sensor + operating mode selection).

! Warm-up optimisation occurs only if the reduced time of the heating circuit is at least 6 hours.

MAX OPT-TIME (Maximum bring-forward)

Only active with "OPT HEAT UP = 01 or 02"
The start of heating is brought forward by no more than this time.

OPT REDUCED (Reduction optimisation)

Automatic reduction of burner disabling to end of set heating time.

The burner is not restarted before the end of the heating period during the set time period (last heating time only) if it not already in operation.

This function prevents short-term heating of the heat generator to the end of the heating period.

PC-ENABLE

Code number for enabling access to heating circuit data from a PC
"0000" => access is blocked.

RETURN

Exit heating circuit level => Return to "User" area.

Timer Program Area

All the time programs can be set in this area.

List of available time programs	
With maximum controller configuration Select timer program using ◯ ↵ select timer program for display or adjustment	
CIRCL TIME	Prg for circulation pump
HOTW-PROG	Prg for hot water charging pump
HTG-PROG 1 1	1st heating program for first controller heating circuit
HTG-PROG 2 1	2nd heating program for first controller heating circuit
HTG-PROG 1 2	1st heating program for second controller heating circuit
HTG-PROG 2 2	2nd heating program for second controller heating circuit
RETURN	Exit level using ↵

Hinged cover OPEN ➔ search for level to the right with ◯, open with ↵

Selecting a timer program

Open hinged cover => "Display => System",

◯ to the right until clock
=> "USER => INSTALLATION",

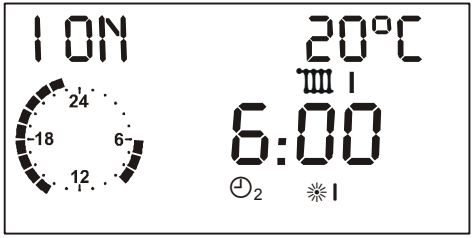
◯ to the right until clock => "TIME PROGRAM
=> CIRCL TIME"

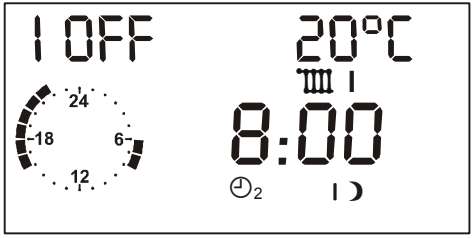
◯ Select timer program
=> e.g. "HTG-PROG 2 1"
= Heating program 2 for controller heating circuit 1

↵ Confirm/open timer program
=> "MONDAY"

When connecting a digital room controller with heating program input, the corresponding heating program in this controller is automatically superceeded.

Timer Program Area





Symbols:

I ON = First switch-on time (I OFF = first switch-off time)

20 °C = Set room temperature for displayed heating time

Clock = Approximate program display [full hours]

1 = Program for heating circuit 1

$\odot_2$ = Heating program 2, $\odot_1$ = Heating program 1

I = Start time 1, I = Stop time 1, II = Start time 2, II = Stop time 2, III = Start time 3, III = Stop time 3

Timer/heating program adjustment

Select weekday (Mo-Su) or block
(MO-FR => Monday-Friday, SA-SU => Saturday-Sunday, MO-SU => Monday-Sunday)

Open weekday/block (see left)
=> "I ON 20 °C" First switch-on time – set value I = 20 °C
Set first switch-on time => for example 6:00 hrs
Confirm first switch-on time

=> „I OFF 20 °C" First switch-off time – set value I = 20 °C
Set first switch-off time => for example 8:00 hrs
Confirm first switch-off time

=> „II ON 20 °C" Second switch-on time – set value II = 20 °C

Switch-on and switch-off times 2 and 3 are entered in the same way - please enter all values!

Select another weekday/block for entry or exit heating program 2 with "RETURN" and set another program.

! The heating times are not saved until all the times for a weekday/block have been entered.

"- - - -" for a switch-on/switch-off time => The relevant heating timer is deactivated.

Heat circuit 1

Heating program 1 => factory setting:

Mo. to Fr.: 06:00 to 22:00
Sa. and Su.: 07:00 to 23:00

✎	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Heating program 2 => factory setting:

Mo. to Fr.: 06:00 to 08:00, 16:00 to 22:00
Sa. and Su.: 07:00 to 23:00

✎	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Heat circuit 2

Heating program 1 => factory setting:

Mo. to Fr.: 06:00 to 22:00
Sa. and Su.: 07:00 to 23:00

✎	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Heating program 2 => factory setting:

Mo. to Fr.: 06:00 to 08:00, 16:00 to 22:00
Sa. and Su.: 07:00 to 23:00

✎	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Hot water

Factory setting:
Mo. to Fr.: 05:00 to 21:00
Sa. and Su.: 06:00 to 22:00

	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Circulation

Factory setting:
Mo. to Fr.: 05:00 to 21:00
Sa. and Su.: 06:00 to 22:00

	Heating time 1		Heating time 2		Heating time 3	
Mo.						
Tu.						
We.						
Th.						
Fr.						
Sa.						
Su.						

Expert Area

These settings can only be changed if the code no. is entered (see page 16).

⚠ If these values are set incorrectly, they may cause malfunctions or damage to the system.

INSTALLATION			
Designation	**Value range**	**Default**	**IV**
CODE-NO	0000 - 9999	Entry	
->CODE-NO	Adjustment	0000	
BUS-ID HS	----, 01 - 08	----	
BUS ID 1	(00), 01 - 15	01	
BUS ID 2	(00), 01 - 15	02	
AF SUPPLY	00.01 (Off/On)	01 = ON	
BUS TERMIN	00, 01	01	
EBUS SUPPLY	00.01 (Off/On)	01 = ON	
TIME MASTER	00, 01 (OFF/ON)	00 = OFF	
MAX T-HS1 or MAX T-HEADER	30 °C - 110 °C	85 °C	
MIN T-HS1 or MIN T-HEADER	10 °C - 80 °C	40 °C	
MAX T-HS2	30 °C - 110 °C	85 °C	
MIN T-HS2	10 °C - 80 °C	40 °C	
See following pages for continuation			

CODE-NO

Entering the code number (see page 16) allows all of the expert settings to be modified => including the code number itself (first parameter)

(◌ on right => CODE-NO 0000 ☟=>◌ 1st digit ☟=>◌ 2nd digit ☟=> ◌ 3rd digit ☟=> ◌ 4th digit ☟=>◌)

BUS-ID HS (- - - -)

(not an option in all models)

The controller will be used as cascade with setting "01 - 08". The heating circuits are then not available anymore.

BUS ID 1/2 (Heat circuit number)

The heating circuits are sequentially numbered starting with "01". heating circuit numbers must not be assigned twice. For replacement controllers however, please enter exactly the same heating circuit numbers as the replaced controller.

AF SUPPLY (Outdoor sensor power supply)

Switching off the power supply to the outdoor sensor. Switching off allows up to 5 controllers to be operated with a single outdoor sensor. The power supply must only be switched on if there is one controller per sensor = "01".

BUS TERMIN (Bus terminating resistor)

The bus terminating resistor must be available once in the bus system (HS controller or cascade controller).
When installing with a CoCo, set 1 to „00“.
00 = OFF => The resistor is not set
01 = ON => The resistor is set

EBUS SUPPLY (supply for eBUS)

Switching the eBUS supply on/off in relation to connected devices (power supply balance) => see part 3: Description of functions – eBUS burner controls.

TIME MASTER

(Only without or TIME MASTER in system)

00 no time master => each heating circuit has its own time
01 controller is time master => all controllers and remote controls take over the time settings of this controller.

! No more than 1 TIME MASTER is permitted in the system!

MAX T-HS1/2 (Max. temperature HS)

Protects the HS from overheating/prevents triggering the LIMITER.

! Caution: Also works with hot water preparation.

MIN T-HS1/2 (min temperature HS)

Decreased condensation build-up in HS with low heat requirements. Switching the HS off is always done earlier when achieving the HS minimum temperature MIN T-HS + HYSTERESIS (Standard 5 K)

(see MIN DELIMI as well).

MAX/MIN T-HEADER (only for cascades)

See MAX/MIN T HS1/2.

Installation			
Designation	**Value range**	**Default**	**IV**
V-CURVE	00 - 11	00	
CURVE 11-U1	0,00 V - 10,00 V	4,00 V	
CURVE 11-U2	0,00 V - 10,00 V	0,10 V	
CURVE 11-T1	00 °C - 120 °C	20 °C	
CURVE 11-T2	00 °C - 120 °C	90 °C	
CURVE 11-UO	0,00 V - 10,00 V	5,00 V	
See following pages for continuation			

Table of voltage curves that can be chosen

No.	U1	U2	T1	T2	UO
0	2,0	10,0	0	90	2,0
1	2.5	0.3	38	80	5,0
2	2.5	0.3	38	75	5,0
3	2.5	0.3	38	45	5,0
4	4.0	0.1	20	85	5,0
5	4.0	0.1	20	75	5,0
6	4.0	0.1	20	55	5,0
7	4.0	0.1	30	87	5,0
8	4.0	0.1	38	87	5,0
9	4.0	0.1	38	73	5,0
10	4.0	0.1	38	53	5,0
11	4.0	0.1	20	90	5,0

0 - 10 V Function

If the controller assigns the HS with the set temperature through a voltage input, the 0 - 10 V output on the controller can be adjusted using the following parameters on the voltage input of the HS.

If the 0 - 10 V input of the controller is used for a temperature requirement, the evaluation of the current signal is defined using the same parameters.

V-CURVE (only for 0 - 10 V input/output)

One of the defined voltage curves or free-definition curve 11 can be selected here for configuring the voltage input and the voltage output.

CURVE 11-xx

Using parameters U1, U2, T1, T2 and UO, a special voltage curve can be defined.

U = Voltage, T = Temperature, UO = HS OFF
U1, T1 => Point 1 on the voltage curve
U2, T2 => Point 2 on the voltage curve
The line between these limit points defines the voltage curve.
UO => Starting with this voltage, HS = OFF
(Must lie outside of the valid voltage values)

Installation			
Designation	**Value range**	**Default**	**IV**
T-WARM UP	10 °C - 85 °C	35 °C	
MIN-DELIMI	00, 01, 02	00	
HYSTERESIS	2 K - 20 K	5 K	
HYST TIME	00 min - 30 min	00 min	
See following pages for continuation			

T-WARM UP (Warm-up relief)

(Not in cascade operation)

Reduces operation in condensation zone. The circulation pumps are switched off and the mixers are shut until the boiler has reached the start-up temperature.

MIN DELIMI (minimum delimiter HS)

(Not in cascade operation)

Decreased condensation build-up in HS with low heat requirements. Switching the HS off is always done earlier when achieving the HS minimum temperature MIN T-HS + HYSTERESIS (Standard 5 K)

00 = Minimum delimiter for heat CURVE
The HS switches on if the requested temperature has been exceeded by the using components.

01 = Minimum delimiter with heat requirement
The HS holds at least the set minimum temperature MIN T-HS. at heating requirements (Pump release).

02 = Permanent minimum delimiter (24 h) The HS holds 24 h at least the set minimum temperature MIN T-HS. at heating requirements (Pump release).

HYSTERESIS (Dyn. switching hysteresis stage 1)

with HYST TIME (Hysteresis time)

Function for optimising boiler operation with differing boiler loads.

The effective switching hysteresis is reduced linearly after the burner is switched on from the set HYSTERESIS to the minimum hysteresis (= 5 K) during the hysteresis time "HYST TIME".

Low heat consumption
In this case the higher HYSTERESIS setting takes effect. Short run-times and frequent burner operation are prevented.

High heat consumption
During longer periods of burner operation (high heating load) the hysteresis is automatically reduced to 5 K. This prevents the boiler from heating to unnecessary high temperatures.

Installation (only for cascades via BUS)			
Designation	**Value range**	**Default**	**IV**
DETECTED HSS	Display only		
CAP/STAGE	00 - 9950 kW	00 kW	
NEW CONFIG	00.01 (Off/On)		
MIN MOD CASC	00 - 100	00	
HW-BOILER	00 - 08	00	
CONTROL DEV	[K]	Display	
DES OUTPUT	0 - 100 [%]	Display	
SWITCH VALUE	(-99) - 0 - (99)	Display	
BLOCK TIME	Remaining [min]	Display	
MAX T-HS	50 °C - 110 °C	90 °C	
DYN UPWARD	20 - 500 K	100 K	
DYN DOWNWARD	20 - 500 K	100 K	
RESET TIME	5 - 500	50	
MODULAT MAX	0 % - 100 %	80 %	
MODULAT MIN	0 % - 100 %	30 %	
MIN MOD HS	0 % - 100 %	0 %	
MODULAT DHW	40 % - 100 %	80 %	
SEQUENCE 1	-	1 2 3 4 5 6 7 8	
SEQUENCE 2	-	8 7 6 5 4 3 2 1	
SEQU CHANGE	01 - 06	01	
See following pages for continuation			

DETECTED HSS (number of heat generators)

Display of heat generators automatically reported via BUS with bus id (boiler no.)

CAP/STAGE (boiler output for each stage)

Display of the HS number and the stage => Selection with Prog button => Input/Adjustment of HS output

- - - - = Stage/Boiler not available
0 = Stage/Boiler not active

In the case of boilers of the same power, a boiler release is sufficient; e.g.:

HS 1 01 => 01
HS 1 02 => 01
HS 2 01 => 01 etc.
(depending on the number of boilers)

Automatic assignment:

After restarting or after a new configuration, the controller searches the bus systems for a heat generator. Within this time period (approx. 2 min) no manual output entries are allowed [Display „SCAN“]. In the case that a heat generator answers with output information, this output is automatically entered into the list. In the case that a heat generator answers without output information, 15 kW is entered into the list. This value can then be adjusted manually.

If a boiler, which had been configured previously, is no longer found after a restart, or after updating the parameter CONFIG NEW, an error message is put out. Pressing CONFIG OK after entering the performance data, the boiler is deleted from the configuration and the error message is deleted.

NEW CONFIG (new BUS configuration)

If the BUS configuration was modified (e.g. additional heat generators connected), the automatic search for heat generators on the BUS may be activated here.

MIN MOD CASC (min. modulation cascade)

Every time the cascade controller calculates a total degree of modulation greater than null and less than MIN MOD CASC, the total degree of modulation is set to the value MIN MOD CASC. Simultaneously, the clock inhibition is set to 10 seconds.

HW-BOILER (number of stages for HW operation)

00 = HW preparation via header

01 - 08 = Number of heat generators in the cascade which are coupled out of the cascade hydraulically for hot water preparation.

! It is essential that the HW-BOILER are at the beginning of the BUS ID sequence => 01 - xx.

CONTROL DEV (header control variance)

Display of the header control variance
(set temperature - actual temperature).

DES OUTPUT (required system output [in %])

Display of currently required total output % (0 - 100)

=> Calculated set value from control system = System load in per cent. The value is calculated, floating, and does not take any skips caused by the switching operation into account.

SWITCH VALUE (-99 - +99)

Internal control value => only for switching cascade!

If this value reaches "0", the next heat generator is also connected (only after the delay time has elapsed). If the switching value reaches "-0", the last heat generator is switched off.
If the desired temperature is exceeded by 1 K the boiler is also switched off.

BLOCK TIME (currently remaining value)

Display of current delay time. Only if "delay = 0“ is it possible to operate the next heat generator.

MAX HS-T (maximum temperature of the heat generator)

Protects individual heat generators in the cascade from overheating/prevents triggering LIMITER (limiter value).

This parameter is used to set a temperature at which the different boilers switch themselves off, or - in the case of modulating heat generators - modulate themselves down.

The boilers are switched on again if they drop below this temperature by 5 K

! The temperature selected for MAX T-HS must be higher than the maximum header temperature.

DYN UPWARD (dyn. heat generator connection [K])

Small value = fast connection
Large value = slow connection

⚠ Values set too low can lead to overheating or short-term connection of a heat generator.

Calculation: If the cumulative system deviation in Kelvin reaches the set value A, this results in connection of all heat generator stages.

DYN DOWNWARD (dynamic heat generator deactivation [K])

Small value = fast deactivation
Large value = slow deactivation

⚠ Values set to high can lead to overheating and triggering the STB

Calculation: If the cumulative system deviation in Kelvin reaches the set value A, this results in deactivation of all heat generators.

RESET TIME (resetting time for I-Controller)

⚠ Control value: Changing this value can cause the control system to overshoot. The recommended default settings should be retained.

! Small values cause a fast regulatory behavior and could cause to a oscillation of the boiler temperature.

MODULAT MAX

If this modulation degree is exceeded the next heat generator in sequence is connected after the delay time elapses.

MODULAT MIN

If values drop below this modulation degree the last heat generator of the current sequence is switched off.

MIN MOD HS

Connection of the next heat generator will only occur, if the resulting modulation degree for the different heat generators then exceeds the value set here.
=> For optimum operation with maximum number of burners: MODULAT MAX = 0 and MIN MOD HS set to minimum modulation degree for heat exchanger stages.

MODULAT DHW (only for HW-boiler)

Entry of the set modulation degree for the heat generators in hot water operation (see HW-boiler).

SEQUENCE 1 (boiler sequence 1)

Entry of the sequence in which the boilers are set into operation in sequence 1. => Selection of start no. => Prog. button => Entry of the boiler number

SEQUENCE 2 (boiler sequence 2)

Entry of the sequence in which the boilers are set into operation in sequence 2. => Selection of start no. => Prog. button => Entry of the boiler number

! With respect to two-stage heat generators, the second stage is always switched after the first stage.

SEQU CHANGE (sequence change mode)

01 = Only boiler sequence 1
02 = Only boiler sequence 2
03 = Change between sequence 1 and 2 according to operating hours of the first heat generator of the active sequence
04 = 1/3 <-> 2/3 Switching for boilers with a different nominal power: When the second boiler is activated, the first is put out of operation until activated again.
05 = Rotating boiler sequence; the first boiler of the sequence is placed in last position of the current sequence after the sequence switching time has elapsed.
06 = New boiler sequence by means of automatic sorting according to operating hours in the event of sequence change (sequence change according to operating hours of the first heat generator of the active sequence).

Installation (only for cascades or two-stage operation)			
Designation	**Value range**	**Default**	**IV**
SEQ SW TIME	10 - 800 hours	200 hours	
BLOCK-TIME	00 min - 30 min	00 min	
HYST BURNER2	2 K - 20 K	2 K	
Cooling function			
HS COOL-FCT	00 - 01	00	
T-HS COOL	30 °C - 120 °C	95 °C	
See following pages for continuation			

SEQ SW TIME(time to sequence change)

For operation with at least 2 heat generators there is the option to swap the boiler sequence after the operating hours specified here of the first heat generator of the active sequence.

BLOCK-TIME (delay time for next stage)

Min. delay time after switching on or with switching HS, also when switching a layer off until switching the next layer on.

! 00 = 10 sec.; Please consider the internal block-times of the connected burner controllers to make the correct settings.

HYST BURNER2 (for solid fuel/2. burner)

(only for 2-stage burners or solid fuel integration)
Solid fuel integration: Hysteresis for the charging pump
2nd Burner 2 and burner stage 2: see next page =>
Switching pattern for 2-stage burners

HS COOL-FCT (cooling function for boiler)

with T-HS COOL (starting temperature for cooling)

! Applies to all boilers connected to the controller!

If the cooling function for the boiler is activated (HS-COOLFCT = 01), then the heating circuits commence operation with T-FLOW MAX as soon as the set starting temperature T-HS COOL is exceeded by one of the boilers. the cooling function terminates when the temperature drops below the starting temperature T-HS COOL by 5 K.

Switching pattern for 2-stage burners

! This switching patterns is also effective for operating two switching heat generators via the burner relays A6 and A7.

Switch on the 1st Burner stage when temperature drops below set temperature of the heat generator.

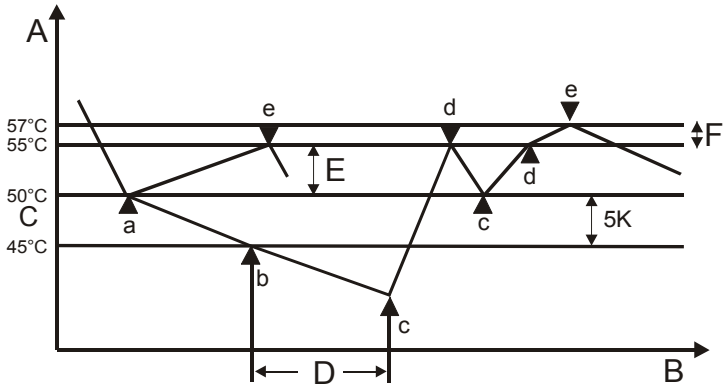
Switch off the 1st burner stage when the temperature setting is exceeded by the HYSTERESIS.

Switch on the 2nd burner stage
- after start of 1st Burner stage and
- undercutting the set temperature by 5 K
  (= Start the BLOCK-TIME)
- and progress of the BLOCK-TIME
  (= Release 2nd burner stage)

Switch off 2nd burner stage when the temperature setting is exceeded by the HYSTERESIS.

Switch 2nd Burner stage when temperature drops below set temperature of the heat generator.

Switch off the 1st burner stage when 2nd stage enabled after set temperatures are exceeded by [HYSTERESIS + HYST BURNER2]



A Boiler temperature
B Time
C Boiler temperature setting
D BLOCK-TIME (blocking time 2. burner stage)
E HYSTERESIS (dynamic switching hysteresis)
F HYST BURNER2 (Hysteresis for shut-off)

a Stage 1 on
b Start of blocking time 2. Burner stage
c Stage 2 on (stage 2 enable)
d Stage 2 off
e Stage 1 off (cancel stage 2 enable)

Installation (configuring the installation)			
Designation	**Value range**	**Default**	**IV**
HS 1 TYPE	00 - 06	03	
HS1 BUS	00 - 05	00	
HS 2 TYPE	00 - 05	00	
STORAGE HS2	00 - 03	00	
BUFFER	00, 01, 02	00	
See following pages for continuation			

HS 1 TYPE (primary heat generator type)

00 = No primary heat generator
01 = Single stage HS switching
02 = Single stage modulating
03 = 2-stage HS switching (second stage via A7)
04 = Two individual HS switching (second HS via A7)
05 = Multi-stage switching (cascade via BUS)
06 = Multi-stage modulating (cascade via BUS)

HS1 BUS (connection for HS)

00 = Relay => Standard (switching HS)
01 = CAN-BUS => Standard (cascade switching)
02 = eBUS => HS without temperature controller
=> Preset modulation depth
=> Standard (cascade modulating)
03 = eBUS => HS with temperature controller
=> Preset desired temperature
[not suitable for cascade]
04 = 0 - 10 V Preset Boiler set temperature
only for HS 1 TYPE = 01, 02 or 03
Burner relays are controlled in parallel
Cooler KF [F8] must be connected
05 = 0 - 10 V Preset Modulation degree
only for HS 1 TYPE = 02

HS 2 TYPE (secondary heat generator type HS => A7)

(For HS1 with 2-stage burner – not active)

00 = No secondary heat generator
01 = Solid fuel boiler => function see “STORAGE HS2”
02 = (no function in V1)
03 = (no function in V1)
04 = Collector pump
05 = Pump for HS1 (e.g. additional HS for cascades)

STORAGE HS2 (heat accumulator for HS2)

(Only where HS 2 TYPE = Solid fuel)
Warm-up relief applies superordinated:
ON: T-HS2 > MIN T-HS2
OFF: T-HS2 < [MIN T-HS2 - 5 K]
T-HS2 = Solid fuel burner temperature
00 = Heating vis-à-vis collector (no storage tank) => F8
ON: T-HS2 > [F8 + HYST BURNER2 + 5 K]
OFF: T-HS2 < [F8 + HYST BURNER2]
01 = Heating vis-à-vis buffer storage tank => F1, F3
ON: HS2-T > [F3 + HYST BURNER2 + 5 K]
OFF: HS2-T < [F1 + HYST BURNER2]

02 = Heating vis-à-vis HW tank => F6
ON: HS2-T > [F6 + HYST BURNER2 + 5 K]
OFF: HS2-T < [F6 + HYST BURNER2]
03 = Heating vis-à-vis STORAGE III (pool) => F15
ON: HS2-T > [F15 + HYST BURNER2 + 5 K]
OFF: HS2-T < [F15 + HYST BURNER2]
Switching pattern

Switching the pump on is done if the temperature of the solid fuel boiler exceeds the temperature of the Reference sensor by the hysteresis (HYST BURNER2 + 5 K). Switching off occurs when the temperature drops 5 K below the switch-on temperature.

Start-up relief

Switching off occurs when the temperature of the solid fuel boiler drops below the set limit temperature (MIN T-HS2) by 5 K. The pump is enabled again when the temperature of the solid fuel boiler exceeds the set limit temperature (MIN T-HS2).

Blocking HS1

ON: T-HS2 > HS set temperature + 5 K and pump HS2 = ON
OFF: T-HS2 <= HS set temperature or pump WE2 = OFF

No HS1 blocking for

HS1 type = "Multi-stage switching“
HS1 type = "Multi-stage modulating“

STORAGE HS2 = "Heating against HW storage (F6)“
STORAGE HS2 = "Heating against STORAGE III (F15)“

! If activated, the cooling function will also affect the solid-fuel boiler function.

BUFFER (heater buffer storage type)

! After activation (>0) it is not possible to connect a FBR for heating circuit 1.

00 = no buffer storage for heating operation
01 = Buffer storage for heating operation (F1 - F3)
(Sensor switching- in V1 no other function)
02 = Combination storage tank for heating and HW operation
(Sensor switching- in V1 no other function)

Installation		
Designation	**Value range**	**Default**
SCREED	00, 01 (OFF/ON)	00 = OFF
SCREED PROGR	See explanation!	
RETURN	Exit level using ⏎	

! Start day is not included:
The screed program starts with the "Day 1" temperature setting and switches to "Day 1" at 00:00 hrs and then to the next day at 00:00 hrs and so on. The current day is marked with an "x" in the "SCREED PROGR" program.

! After the function has been cancelled/terminated the controller continues heating using the set operating mode. If no heating is required, set the operating mode to ⏻ = Standby / OFF.

Screed program

SCREED (activation of screed drying process)

The screed program can be used for function heating in accordance and for heating freshly laid screed ready for flooring.

! Screed drying can only be carried out for mixer circuits.

After starting, the program runs through the set flow temperatures. The integrated mixer circuits control to the set flow temperature. The boiler provides this temperature irrespective of the operating mode that has been selected. This is marked in the standard display by the entry "SCREED" and a display of the current flow temperature.

The freely adjustable program runs for a maximum of 28 days. The flow temperatures can be set to a value of between 10 °C and 60 °C for each day. The entry "----" stops the program (also during operation for the following day).

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
VT	25	25	25	55	55	55	55	25	40	55	55	55	55	55	55	55	55	55	55	40	25	---	---	---	---	---	---	---
=>																												

SCREED PROGR (Program setting)

=> Screed program; ◯ Select day; => Activate adjustment date; ◯ Set flow temperature;
=> Save setting; ◯ Select next day or exit screed program using "RETURN" + .

Hot water			
Designation	**Value range**	**Default**	**IV**
DHW RELIEF	00, 01 (OFF/ON)	01 = ON	
PARALLEL DHW	00, 01, 02, 03	01	
T-HS DHW	00 K - 50 K	20 K	
HYST DHW	5 K - 30 K	5 K	
DHW FOLLOWUP	00 min - 30 min	00 min	
THERM INPUT	00, 01 (OFF/ON)	00 = OFF	
WALL HUNG	00, 01 (OFF/ON)	00 = OFF	
LOAD THROUGH	00, 01 (OFF/ON)	00 = OFF	
RETURN	Exit level using ⮹		

DHW RELIEF (Charge pump blocking)

The charging pump is not switched until the boiler temperature exceeds the storage tank temperature by 5 K. It is switched off when the boiler temperature drops below the storage tank temperature. This prevents the storage tank from being cooled by the boiler when hot water preparation starts.

PARALLEL DHW (Pump parallel running)

00 => Hot water priority operation: The heating circuits are blocked during hot water preparation. The mixers close and the heating circuit pumps switch off.

01 => HW partial priority: The heating circuits are blocked during hot water preparation. The mixers close and the heating circuit pumps switch off. The mixer circuits are enabled again when the boiler has reached the temperature of hot water temperature setting + boiler superheating [T-DHW + T-HS DHW]. If the boiler temperature drops below the enable temperature by the switching hysteresis [HYST DHW] again, the mixer circuits are blocked again.

02 => Pump parallel running: Only the direct heating circuits are blocked during hot water preparation. The mixer circuits continue to be heated. The hot water preparation is extended by this function.

03 => Pump parallel running also for the direct heating circuit: During hot water preparation all heater circuits continue to be heated. The hot water preparation is extended by this function. When the boiler temperature exceeds the maximum flow temperature of the direct heating circuit by 8 K, the heating circuit pump for this circuit is switched off (overheating protection). The heating circuit pump is switched on again when the boiler temperature drops below the temperature [maximum flow temperature + 5 K].

T-HS DHW (increase during HW operation)

Boiler temperature setting with hot water preparation = hot water temperature setting + T-HS DHW

! The boiler must be run at a higher temperature during hot water preparation so that the hot water temperature in the storage tank can be reached via the heat exchanger.

HYST DHW (hot water hysteresis)

Hot water preparation is started when the temperature of the hot water storage tank drops below the temperature setting by the hysteresis [HYST DHW]. The hot water preparation stops when the storage tank reaches the temperature setting (the temperature setting is set to 65 °C during hot water short time heating operation).

DHW FOLLOWUP (pump run-down time)

00min => Standard function: The charging pump continues to run for 5 minutes after the burner has switched off.
If heat is requested by a heating circuit the run-down is cancelled.
The charge pump blocking kicks in and can also cause the run-down function to be cancelled.

greater than 00min => The charge pump runs down by the set time when storage tank charging is complete. The after-run can only be cancelled by the activated charge pump blocking.

THERM INPUT (storage tank with thermostat)

00 => Hot water preparation via storage tank sensor

01 => Hot water preparation via thermostat:
The hot water preparation is started by a short circuit at the storage tank sensor connecting terminals. It stops when the short circuit is removed.

WALL HUNG (for modulating HS)

Boiler temperature setting with hot water preparation = hot water actual temperature + T-HS DHW

With this function the exhaust gas losses occurring during hot water preparation can be reduced with modulating heat generator using the adapted boiler temperature setting.

LOAD THROUGH (only with F12 = T-DHW-LOWER)

The charge through function can be activated by connecting a hot water storage tank, lower, sensor.

T-DHW = Temperature of hot water tank in removal area (plug I, pin 6 + 7)

Storage tank charging:
ON: T-DHW < T-DHW DES - HYST DHW
OFF: T-DHW L > T-DHW DES

The charging process of the storage tank only terminates when the lower storage tank set temperature has been reached.

The parameters in this level change in accordance with the heating circuit function that has been selected
[HC FUNCTION]

Heating circuit I/II			
Designation	**Value range**	**Default**	**IV**
HC FUNCTION	00 - 04	00	
PUMP MODE	00 - 03	00	
MIXER OPEN (not for HW circuit)	5 - 25	18	
MIXER CLOSE (not for HW circuit)	5 - 25	12	
See following pages for continuation			

HC FUNCTION (heating circuit function selection)

If this parameter is modified the controller is restarted. "RESET" briefly appears in the display.

00 => Standard heating circuit

01 => Control to fixed flow temperatures

During the heating periods (see heating program) the heating circuit is operated with a fixed preset flow temperature
[T-FLOW-DAY], and during reduced mode operation with a fixed preset flow temperature [T-FLOW REDUC] accordingly.

02 => Swimming pool control (only for heating circuit II)
This function can be used to heat a swimming pool. The mixer controls the flow temperature for the swimming pool heat exchanger. The swimming pool water temperature sensor is connected to the room sensor connection for the heating circuit (see FBR).
[Plug III; 1 + 2]
The flow temperature control operates like normal room control [ROOM INFL].
The set value for the water temperature can be entered in the user area of the associated heating circuit level [T-POOL 1/2/3]. The heating program operates. No heating takes place during the reduction period (frost protection only).
The water temperature and the current set value are displayed in the display level [T-POOL/T-POOL DES].

03 => Hot water circuit
This function can be used to operate additional hot water circuits. The heating circuit flow sensor is located in the hot water storage tank.
The hot water temperature set value can be entered in the user area of the associated heating circuit level [T-DHW 1/2/3]. The heating program for the heating circuit acts as an enable program for the storage tank. The storage tank set value is set to 10 °C during the reduction period.
The boiler controller hot water priority function can be used (partial priority acts like priority).

04 => Return flow temperature increase via mixer motor
The heating circuit flow sensor is used as a boiler return flow sensor. The mixer motor controls to the heating circuit set value for 24 hours [MIN T-FLOW].
Installation tip: Mixer motor OPEN => boiler flow is fed into the return (=> return flow temperature increase)
Mixer motor CLOSED => heating circuit return is passed through. When the mixer motor is open it must be ensured that there is circulation through the boiler (boiler pump).

PUMP MODE (pump operating mode)

The circulation pumps are switched off if heating is not required. The mixer motors are closed at the same time => "The heating circuit is switched off".

(Switch on with 1 K hysteresis)

This adjustment concerns the weather dependent shutdown. If room temperature regulation is enabled (ROOM INFL > 0) the "thermostat function" takes effect in addition.

- Room temperature > room set value + 1 K

00 => Standard circulation pump control
Heating time:
- Outside temperature > room set value + 1 K

Reduction period:
ROOM INFL = 0
- The switch-off occurs during the transition to reduction operation.
- Switch on with: Room temperature < room set value
  The pump runs continuously after switching on.

ROOM INFL ="--":
- Flow temperature setting < 20 °C.

01 => Pump switching in accordance with heating limits
Heating time
OFF: Outside temperature > set heating limit day +1 K
ON: Outside temperature < set heating limit day

Reduction period
OFF: Outside temperature > set heating limit night +1 K
ON: Outside temperature < set heating limit night

02 => Pump switching in accordance with heating program
Heating time:
- Pump is ON; Heat circuit is enabled

Reduction period:
- Pump is OFF; Heat circuit is blocked

03 => Continuous operation
The runs continuously for 24 hrs.! The heating circuit is permanently enabled.

MIXER OPEN (open mixer dynamic)

Speed setting at which the mixer motor opens when a control difference occurs. The control difference at which the mixer motor opens without interruption is entered in Kelvin.

! Small values cause the mixer motor to adjust quickly and can lead to oscillation.

MIXER CLOSE (close mixer dynamic)

Speed setting at which the mixer motor closes when a control difference occurs. The control difference at which the mixer motor closes without interruption is entered in Kelvin.

! Small values cause the mixer motor to adjust quickly and can lead to oscillation.

Heat circuit I/II			
Designation	**Value range**	**Default**	**IV**
MAX T-FLOW	20 °C - 110 °C	80 °C	
MIN T-FLOW	10 °C - 110 °C	10 °C	
T-FROST PROT	----; (-15) °C - (5) °C	0 °C	
T-OUT DELAY	0:00 - 24:00	0:00	
SLOPE OFFSET	0 K - 50 K	5 K	
B-HEAT SINK	00, 01 (OFF/ON)	01 = ON	
RETURN	Exit level using ⮹		

MAX T-FLOW (max. flow temperature)

The measured temperature setting for the heating circuit flow is limited to the maximum flow temperature setting (overheating protection).

⚠ The pump of the direct heating circuit is not switched off until the boiler temperature exceeds the set maximum flow temperature by 8 K. The heating circuit pump has already been switched on again when the boiler temperature drops below the temperature [maximum flow temperature + 5 K].

MIN T-FLOW (min. flow temperature)

The measured temperature setting of the heating circuit flow is increased to the minimum flow temperature setting (e.g. with air heating).

T-FROST PROT (frost protection temperature)

If the outside temperature drops below the programmed value, the system switches to frost protection mode (pumps are switched on).
"----" Frost protection mode is deactivated!

T-OUT DELAY (outside temperature delay)

The selected outside temperature delay must be matched to the type of construction of the building. In the case of heavy structures (thick walls), a long delay must be selected since a change in outside temperature affects the room temperature later accordingly. With light structures (walls have no storage effect) the delay should be set (0 hrs.).

SLOPE OFFSET (heating slope distance)

The boiler temperature that is required for a mixer circuit is calculated by adding the calculated temperature setting for the heating circuit flow to the heating curve distance. The heating curve distance compensates for sensor tolerances and heat loss up to the mixer.

B-HEAT SINK (circuit enable)

00 => OFF

01 => The heating circuit can be used by higher-order functions (e.g. cooling function of a heat generator to protect from overheating; heat removal during service mode) as a heat sink/consumer. The heating circuit is heated at the maximum flow temperature setting for the duration of the function.

Solar/MF			
Designation	**Value range**	**Default**	**IV**
FUNC RELAY (1-4)	00 - 26	00,00,01,02	
T-MF(1-4) SETP	30 °C - 90 °C	30 °C	
MF(1-4) HYST	2 K - 10 K	5 K	
F15 FUNCTION	00 - 03	00	
RETURN	Exit level using		

Auxiliary relay functions

The multifunction relays = MF relay is assigned one basic function respectively

MF-1: Mixer HC1 OPEN (FUNC RELAY 1 = 00)
MF-2: Mixer HC1 CLOSED (FUNC RELAY 2= 00)
MF-3: Header pump (FUNC RELAY 3 = 01)
MF-4: Circulation (time) (FUNC RELAY 4 = 02)

If this basic function of a MF relay is not required (configuration of the installation in Installation level), any one of the functions described below may be selected for any unused relay.

The MF-relay 1 - 4 (A8-A11) is always assigned with a sensor 1 - 4 (F11-F14) (applies for functions starting from „20“ only).
If a further sensor is required for a function, this sensor must be connected as F17 (connector III, Pin 2 + 3).
The functions that may be selected for the MF relays 1 - 4 are described using MF relay 1 as an example.

FUNC RELAY 1 (function selection relay MF1)

T-MF1 SETP (switching temperature relay MF1)

MF 1 HYST (hysteresis relay MF1)

00 = No MF function

01 = Header pump

ON: When heat is requested by a consumer
OFF: Without consumer heat request
If at least one consumer in the system requests heat the pump is switched on. The after-run function runs after the burner has been switched on.

02 = Circulation (time)

Switching the relay according to the time program for the circulation pump

03 = Booster pump

ON: When heat is requested by an internal consumer
OFF: When no heat is requested by an internal consumer. Follow-up pump action occurs.

05 = Pump HS1

The relay may be used to control boiler pump for heat generator 1.
(Relay switches with burner relay 1; run-down =5 min)

06 = Pump HS2

When using the controller to control two heat generators the relay may be used to control the pump for HS 2.
(Relay switches with burner relay 2; run-down =5 min)

20 = Temperature-controlled circulation pump

T-CIRCL = Return flow temperature of circulation line
ON: T-CIRCL < T-MF1 SETP
OFF: T-CIRCL > [T-MF1 SETP + MF 1 HYST]

The circulation pump is switched on when the return flow temperature drops below the temperature setting limit (T-MF1 SETP). The pump is switched off again when the return flow temperature exceeds the set limit temperature by the Hysteresis (MF 1 HYST).
The set circulation program and the "Circulation with hot water" setting have an overriding function
=> Switching on only takes place during enable periods.

21 = Pulsed circulation pump

ON: With short circuit at assigned sensor input
OFF: After 5 minutes
If a short-cut occurs at the multifunction sensor input the circulation pump is switched on for 5 minutes. Switching on takes place on the edge (once only).
The set circulation program and the "Circulation with hot water" setting have an overriding function
=> Switching on only takes place during enable periods.

22 = Solid fuel boiler integration

(e.g. in connection with 2-stage HS)
T-MF1 or 1 - 4 = Temperature of the solid fuel boiler
T-BUFFER B = Temperature of buffer storage in the infeed area [F1]

ON: T-MF1 > [T-BUFFER B (F1) +MF 1 HYST + 5 K]
OFF: T-MF1 < [T-BUFFER B (F1) + MF 1 HYST]

Start-up relief:
ON: T-MF1 > T-MF1 SETP
OFF: T-MF1 < [T-MF1 SETP - 5 K]

The pump is switched on when the temperature of the solid fuel boiler exceeds the temperature of the buffer storage in the infeed area [T-BUFFER B (F1)] by the hysteresis [MF 1 HYST+ 5 K]. Switching off occurs when the temperature drops 5 K below the switch-on temperature. Switching off also occurs when the temperature of the solid fuel boiler drops below the set limit temperature [T-MF1 SETP] by 5 K. The pump is enabled again when the temperature of the solid fuel boiler exceeds the set limit temperature [T-MF1 SETP].

Blocking HS1:

ON: T-MF1 > HS set temperature + 5 K and solid-fuel boiler pump = ON
OFF: T-MF1 <= HS set temperature or solid-fuel boiler pump = OFF

23 = Solar integration (to MF4 because of PT1000 sensor)

T-SOL PANEL [T-MF4] = Temperature of the solar collector
T-DHW L [F12]= Temperature of hot water storage tank in infeed area
ON: T-SOL PANEL > [T-DHW L + MF4 HYST + 5 K]
OFF: T-SOL PANEL < [T-DHW L + MF4 HYST]

The pump is switched on when the temperature of the solar collector exceeds the temperature of the storage tank in the infeed area (T-DHW L) by the Hysteresis (MF4 HYST + 5 K). Switching off occurs when the temperature drops 5 K below the switch-on temperature.

Safety/system protection:
OFF: T-DHW B > T-MF4 SETP
ON: T-DHW B < [T-MF4 SETP - 5 K]

Switching off occurs when storage tank temperature exceeds the set limit temperature (T-MF4 SETP). The pump is enabled again when the storage tank temperature drops below the limit temperature by 5 K.

24 = Return flow temperature increase HS1

T-RETURN 1 = Return flow temperature from the installation [= T-MF1 or 1 - 4].
ON: T-RETURN 1 < T-MF1 SETP
OFF: T-RETURN 1 > [T-MF1 SETP + MF 1 HYST]

The return flow temperature increase pump is switched on if the return flow temperature drops below the temperature setting limit (T-MF1 SETP). It is switched off again when the return flow temperature exceeds the temperature setting limit by the Hysteresis (MF 1 HYST).

25 = Return flow temperature increase HS2

T-RETURN 2 = Return temperature of system
ON: T-RETURN 2 < T-MF1 SETP
OFF: T-RETURN 2 > [T-MF1 SETP +MF 1 HYST]

The return flow temperature increase pump is switched on if the return flow temperature drops below the temperature setting limit (T-MF1 SETP). It is switched off again when the return flow temperature exceeds the temperature setting limit by the Hysteresis (MF 1 HYST).

26 = Return flow temperature increase HS via buffer storage

ON: T-BUFFER B [F1] > T-MF1 + MF 1 HYST + 5 K
OFF: T-BUFFER B < T-MF1 + MF 1 HYST

The valve to the return flow temperature increase via the buffer storage is opened if the temperature buffer storage low [T-BUFFER B] exceeds the return flow temperature of the installation [sensor 1 or 1 - 4] by the Hysteresis (MF 1 HYST + 5 K). It is switched off again when the temperature buffer storage low drops below the return flow temperature.

F15 FUNCTION (sensor function F15)
00 = Room sensor for heating circuit 2. If a further sensor at the pulse input [IMP] is detected at this position an FBR is evaluated.

01 = 0 - 10 V input => For Preset Collector set temperature. On evaluation see parameter V-CURVE in the expert/installation level.

02 = light sensor (for plausibility testing with solar – no function in version V1).

03 = 0 - 10 V input preset for modulation. On evaluation see parameter V-CURVE in the expert/installation level.

! The internal determination of the burner requirement is deactivated when this function is used.

! It is exclusively the target set via the 0 - 10 V output that applies. Any changes, such as those relating to external heating circuits, hot water preparation or the frost protection function are ignored. The operating mode switch also has no effect on the burner requirement, only on the internal and external determination of requirement and distribution.

Part 3: General function description

Heat circuit control

Weather-dependent control

The boiler or flow temperature is determined via the set heat slope to suit the measured outside temperature in such a way that the set value for the room is approximately set if the heating system is configured correctly.

=> Exact setting of the heat slope is extremely important for weather-dependent control.

The circulation pump is controlled weather-dependently. The circulation pump is switched on if there is a heating demand and in Frost-protection mode.

Room sensor influence

The current room temperature can be included in computation of the required flow temperature via a present room temperature sensor.

The influence factor (parameter list) can be set between 0 (fully weather-dependent regulation) and 20 (room temperature regulation with minimal outdoor temperature influence). Position "----" deactivates room temperature control. Positions "----" and "0" indicate differences for demand-dependent circulation pump control.

Hot water generation

The programmed hot water temperature is stabilised by switching the hot-water cylinder charging pump and the burner. Storage tank charging starts when the storage tank temperature drops below the temperature setting by 5 K. Storage tank charging stops when the temperature setting is reached.

OwB => operation without burner

For operation with solar energy for instance. In this operating mode the burner is only enabled when values drop below the set tolerance limit.

Frost protection function

The frost protection circuit prevents the heating system from freezing by automatically switching heating operation on.

Outdoor sensor frost protection

If the measured outside temperature drops below the set frost protection temperature the room temperature setting is set to 5 °C for the relevant heating circuit. The heating circuit is enabled:

- the pumps are switched on
- the heat request is sent to the boiler

"----" => outdoor sensor frost protection deactivated

The function stops when the outside temperature increases to 1 K above the frost protection temperature setting.

Boiler frost protection

Boiler frost protection is activated when the boiler temperature drops below 5 °C. The boiler is switched on until the boiler temperature exceeds the "MINIMUM BOILER TEMPERATURE".

Flow or storage tank sensor frost protection

The sensor frost protection is activated when the flow or storage tank temperature drops below 7 °C. Only the relevant pump is switched on.

The sensor frost protection is deactivated when the flow or storage tank temperature increases to above 9 °C.

Frost protection via room sensor

If the room temperature drops below 5 °C the frost protection function is activated.

The room temperature setting for the relevant heating circuit is set to 5 °C. The heating circuit is enabled:

- the pumps are switched on
- the heat request is sent to the boiler

eBUS burner controls

The controller supports the operation of burner controls via the implemented eBUS. The unit is connected by means of the connector VII (FA eBUS).

Heat request: Controller => Burner / FA

05h07h [in data byte 7 = Process water desired value the burner must not interpret bit 7] additionally

Data/Status: Burner/FA => Controller

05h03h

Requirements for operation:

The burner control unit (FA) must transmit a valid eBUS message.
The eBUS supply must be activated if the burner does not also supply the BUS => Expert/System (tap without information => Test function with and without eBUS supply)

EEPROM check

Every 10 minutes, a check is conducted automatically in order to establish whether the settings of the controller lie within the specified limits. If a value is found to be out-of-range, it is substituted by the related default value. The range transgression is indicated by the blinking ⚠ and the error number 81.

In this case, the user should check the important settings of the controller. The warning symbol is cleared after the unit is restarted (RESET).

Circulation pump control

Switched according to heating requirement

Demand-dependent circulation pump control (automatic summertime switchover) switches the circulation pumps off if there is no heating demand. The mixers are closed at the same time.

Conditions for switch-off:

Room temperature-dependent control

The room temperature exceeds the set desired temperature.

Weather-dependent control

Outside temperature exceeds room temperature set value or flow temperature set value drops below 20 °C.

! If the room temperature factor is "0", the pump continues to run during the reduced operation period after a one-off heating demand.

Switched according to heating limits

If the outside temperature that is measured and calculated by the controller exceeds the heating limit specified here by 1 K (= 1 °C), heating is disabled, the pumps switch off and the mixers are closed. The heating is enabled again when the outside temperature drops below the set heating limit.

T-LIMIT DAY => applies during heating times
T-LIMIT N => applies during reduction times

Delayed pump switch-off

In the case of switch-off of the circulation pumps, the circulation pumps are not switched off until 5 minutes later if one of the burners was on during the last 5 minutes before the switch-off instant.

Pump blocking protection

The controller effectively prevents blocking of the pumps if they are not switched on for long periods. The integrated protection function switches on all pumps which have not been in operation during the past 24 hours for 5 seconds at 12:00 hours every day.

Mixer motor blocking protection

If the mixer motor has not moved for 24 hours it is fully opened at approximately 03:00 hrs. (once only). The heating circuit pump is switched off during this time. The maximum flow temperature is monitored. Cancelled at maximum flow temperature - 5 K.

Remote controls

Operation-control module Merlin BM, BM 8, Lago FB

(Only for controller models with CAN-Bus connection)

Electrical connection: Connector IX; 1 - 4
The controller permits connection of an operation-control module BM for each heating circuit via a bus line. The operation-control module allows various operation-control functions and monitoring functions for the system values to be relocated to the main controlled zone – i.e. the living room. This achieves maximum comfort and convenience. Please refer to the technical description of the BM for a precise description of the overall scope of functions.

- Display of the system parameters
- Entry of the heating circuit parameters
- Room temperature control
- Automatic adaptation of the heat slope (not Lago FB)

Remote control FBR2

Connection for HC1: Connector I; (2 + collective ground + 3)
Connection for HC2: Connector III; (1 - 3)

- Rotating switch for modifying room temperature setting

- Adjusting range: (± 5 K)
- Room control via the integrated room sensor
- Rotating switch for selecting operating mode
  - ⏻ Standby/OFF (frost protection only)
  - ◷1 Automatic mode (according to timer program 1 in controller)
  - ◷2 Automatic mode (according to timer program 2 in controller)
  - ☽ 24-hour night operation (reduction temperature)
  - ☼ 24-hour daytime operation (comfort temperature)
  - Summer mode (heating OFF, hot water only)

Depending on the version, your FBR supports a portion of the following operating modes.

! The operating mode at the controller must be set to ◷.

The controller can also be operated with an FBR1.

DCF receiver

Electrical connection: Connector VII; Terminal 1, 2
The controller can evaluate a eBUS DCF receiver on the eBUS FA-Terminals.

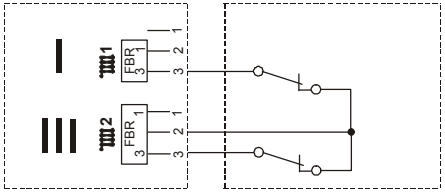
If the DCF receiver is connected, the controller time is updated as soon as the DCF transmits a valid time on the BUS.

If the time has not been corrected after max. 10 min, select a different place of installation for the DCF (e.g. another wall - not in proximity to TV devices, monitors or dimmers).

PC

All system-specific parameters can be set and interrogated using the C*omfort*S*oft* parameterisation software. The parameters can be saved, displayed graphically and evaluated on the PC at predefined intervals. T connect to a PC you need the optical adapter or CoCo PC active, which also supports the sending of error messages by SMS and the remote interrogation of controller data.

Telephone switch



The heating system can be switched to Heating mode ❋ with a telephone switch. The connection terminals of the controller for the remote control FBR (see connection diagram) are used for installation. As soon as a short circuit between terminal 3 of the FBR and ground (FBR terminal 2) is detected, the assigned heating circuit is switched to heating mode. Additionally the hot water preparation is activated (only for controllers with hot water preparation). When the short-circuit is eliminated, the controller once again heats on the basis of the set heating program.

⚠ If the heating circuit is controlled remotely by an operating module, the telephone switch must be connected at the operating module.

System bus

The heating system

This controller can be expanded in a modular fashion using additional modules that are connected via the integrated bus. In its maximum configuration, the system can be used to control the following heating system components

1 - 8 Boiler (modulating or switching)

1 - 15 Mixed weather-dependent heating circuits

0 - 15 Room controller (digital or analogue)

1 Solar system (2 collectors, 2 storage tanks)

1 Solid fuel boiler

The various components are simply coupled to the system bus. The modules log on to the system automatically and search for their communication partners via the defined bus IDs (heating circuit number or boiler number).

Error messages

Error	Error description
Communication error	
E 90	Adr. 0 and 1 on bus. Bus IDs 0 and 1 may not be used simultaneously.
E 91	Bus ID used. The set bus ID is already in use by another device. More than 1 Time Master in the system
E 200	Communication error HS1
E 201	Communication error HS2
E 202	Communication error HS3
E 203	Communication error HS4
E 204	Communication error HS5
E 205	Communication error HS6
E 206	Communication error HS7
E 207	Communication error HS8
Internal error	
E 81	EEPROM error. The invalid value has been replaced with the default value ⚠ Check parameter values!

Sensor defective (break/short circuit)	
E 69	F5: Flow sensor HC2
E 70	F11: Flow sensor HC1, sensor Multifunction1
E 71	F1: Buffer storage tank low sensor
E 72	F3: Buffer storage tank top sensor
E 75	F9: Outdoor sensor
E 76	F6: Storage tank sensor

Sensor defective (break/short circuit)	
E 78	F8: Boiler sensor/Collector sensor (cascade)
E 80	Room sensor HC1, F2: F2 Buffer storage tank low sensor
E 83	Room sensor HC2, F15: Pool sensor (T-Storage 3)
E 135	F12: HW Storage tank low sensor, Multifunction 2
E 136	F13 (PT1000): HS2, Collector2, Multifunction 3
E 137	F14 (PT1000): Collector 1, Multifunction 4

If a fault or error occurs in the heating system, you will see a blinking warning triangle (⚠) and the related error number on the controller display. Please refer to the table below for the significance of the displayed error code.
The system must be restarted after a fault has been remedied => RESET.

RESET: Brief device shut-off (mains switch). Controller restarts, reconfigures itself and continues to operate with the values that have already been set.

RESET+ ☜: Overwrite all settings with default values (except time).
The additional button (☜) must be pressed when the controller is switched on (mains on) until "EEPROM" appears in the display.

Troubleshooting

General

If your system malfunctions you should first check that the controller and the control components are correctly wired.

Sensors:
All sensors can be checked in the "General/Service/Sensor test" level. All the sensors that are connected must appear in this level with plausible measurements.

Actuators (Mixer motor, pumps => only with code no.):
All actuators can be checked in the "General/Service/Relay test" level. All relays can be individually switched using this level. This makes it easy to check whether these components have been correctly connected (e.g. mixer motor direction of rotation).

BUS connection:
In control devices with connection to
Mixer motor => Communication symbol appears in standard display ("" or "" depending on version)
Boiler controller => Outside temperature and boiler temperature display (see "Display/Installation")
In boiler controller with connection to
Control unit => Room temperature displayed and current room temperature setting blanked out "----"
(see "Display/Heating circuit")

In mixer motor expansion controllers with connection to
Boiler controller => Outside temperature and boiler temperature display (see "Display/Installation")
Control unit => Room temperature displayed and current room temperature setting blanked out "----"
(see "Display/Heating circuit")

In case of communication problems

Check connecting cables: Bus lines and sensor lines must be laid separately, away from mains cables! Poles switches?

Check bus feed: There must be at least 8 V DC between the "+" and "-" terminals of the BUS connector (connector IX, terminals 3 + 4). If you measure a lower voltage, an external power supply must be installed.

Pumps do not switch off

Check manual/automatic switch => Check automatic pump switching
=> pump switching mode

Pumps do not switch on

Check operating mode => Standard (test)
Check time and heating program => Heating time
Check pump switching mode:
Default => Outside temperature > Room set temperature?
Heating limits => Outside temperature > Valid heating limit?
Room control => Room temperature > Temperature setting + 1 K

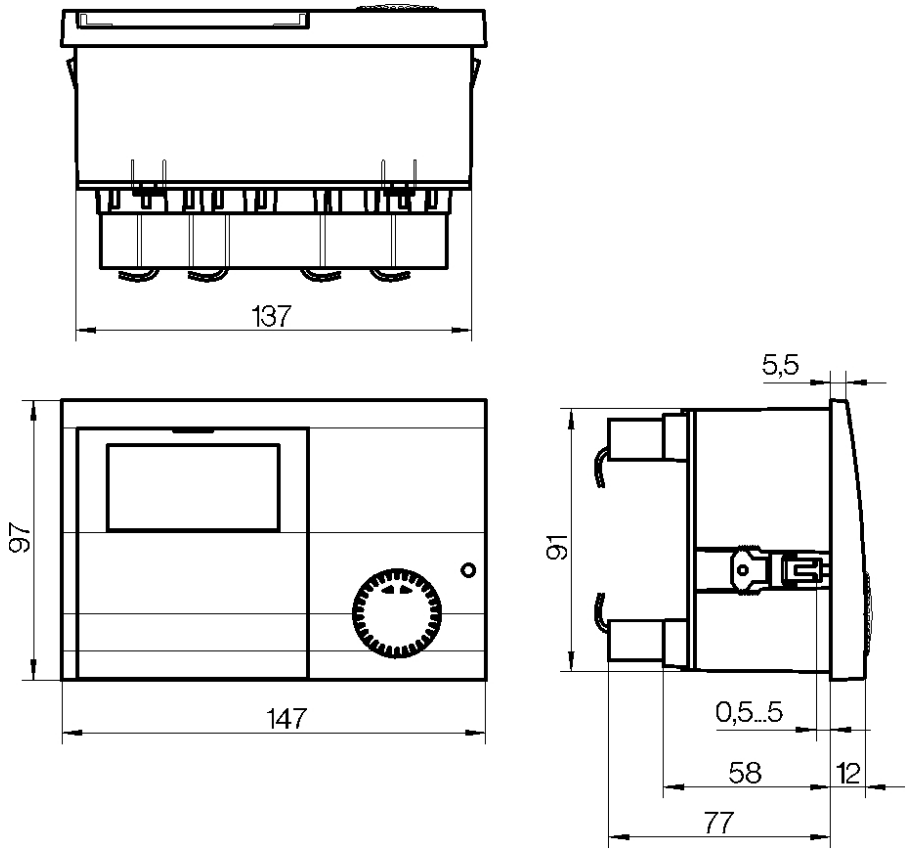
Burner does not switch of at correct time

Check minimum boiler temperature and type of minimum delimiter => Protect from corrosion

Burner will not switch on

Check boiler temperature setting => The temperature setting must be greater than the boiler temperature.
Check operating mode => Standard ◴ (test ✳)
With solar: Check burner blocking (BOB)

Dimensions



Technical Data

Supply voltage in acc. with EN 60038	AC 230 V ± 10 %
Power consumption	Max. 8 W
Switching capacity of the relays	AC 250 V 2 (2) A
Maximum current on terminal L1'	10A
Enclosure to EN 60529	IP40
Safety class II to EN 60730-1	Totally insulated
Switch panel installation in acc. with DIN IEC 61554	Recess 138x92
Power reserve of the timer	at least 10 hours
Permitted room temperature during operation	0 to 50 °C
Permitted room temperature during storage	- 20 to 60 °C
Permissible humidity non condensing	% 95 r.H.
Sensor resistances	NTC 5 kΩ (AF, KF, SPF, VF)
Tolerance of the resistor	+/- 1 % at 25 °C
Temperature tolerance	+/- 0.2 K at 25 °C
	PTC 1010 Ω (AFS, KFS, SPFS, VFAS)
Tolerance of the resistor	+/- 1 % at 25 °C
Temperature tolerance	+/- 1,3 K at 25 °C
	PT1000 sensor with 1 kΩ
Tolerance of the resistor	+/- 0,2 % at 0 °C

Glossary

Flow and return flow temperature

The flow temperature is the temperature to which the heat source heats the water that transfers the heat to the consumer (e.g. radiator). The return flow temperature is the temperature of the water that flow back from the consumer to the heat source.

Desired and actual temperature

The desired temperature (or setpoint temperature) describes the desired temperature for a room or for hot water.
The actual temperature denotes the actual temperature that prevails. The heating controller has the task to adjust the actual temperature to the desired temperature.

Setback temperature

The setback temperature is the desired temperature to which the heating system heats outside heating times (e.g. at night). It should be set so that the rooms do not cool down too much while saving energy.

Heat source

Heat source is generally the designation for the heating boiler. It may also be a buffer storage tank however.

Mixed heating circuit/Mixer circuit

In the mixed heating circuit a three-way valve is used to add cooled water from the return flow to the hot flow water. The flow temperature is thus reduced. This is important for Underfloor heating systems, for example, because they must only be operated with low flow temperatures.

Heating time

In the heating programs you can define up to three heating times per day, one for the morning, one for lunchtime, and one for the evening for example. During a heating time, the temperature is controlled to the desired room temperature. Between heating times the temperature is controlled to the setback temperature.

Header pump

A header pump is used to pump the hot water in a system with one or several heat sources. It is switched on as soon as a consumer in the system requests heat.

Legionella

Legionella are bacteria that live in water. The hot water storage tank is heated to 65 °C every 20th heating period or at least once a week as protection against these bacteria.

If you have any technical questions, please contact your local branch office/agent.
The addresses are available on the Internet or from Elster GmbH.
We reserve the right to make technical modifications in the interests of progress.

Malfunctions due to improper operation or settings are not covered by the warranty.

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