

Operating Instructions

for the operator and authorised end user

System Manager KKM8



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Operation

Power connection regulations

Warranty conditions

Function

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.

⚠ Improper installation may result in danger to life and limb.

Warranty conditions

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

Important text passages

! Important notes are denoted by an exclamation mark.

⚠ This attention symbol is used to point out dangers in this manual.

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

Declaration of conformity



This device corresponds to the requirements of the relevant guidelines and standards, if the corresponding regulations and the manufacturer's instructions are complied with.

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 modulating 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

Operation

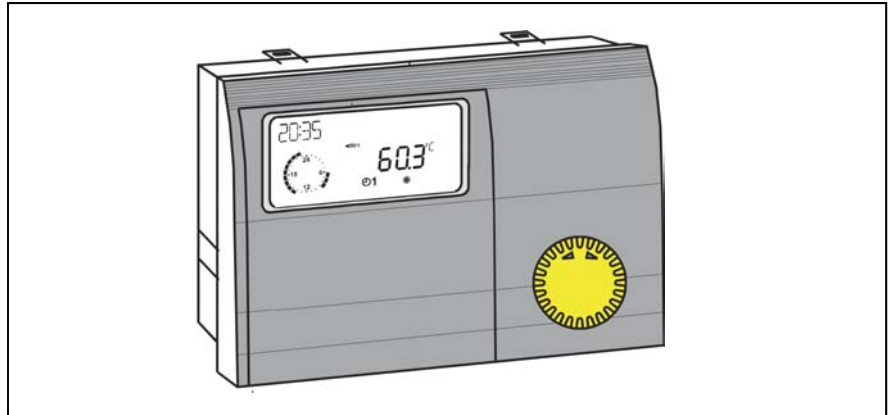
Operating mode selection Effect of the operating mode

For initial start-up, please read the chapter "Installation and Start-up"

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)
- ⌚ **Automatic mode 1**
(Heating according to timer program 1; DHW according to DHW program)
- ⌚ **Automatic mode 2**
(Heating according to timer program 2; DHW according to DHW program)
- ☀ **Day mode**
(24 h heating with comfort temperature 1; HW according to HW program)
- 🌙 **Night mode**
(24 h heating with reduced temperature; HW according to program)
- ☀ **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 32 ; 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.

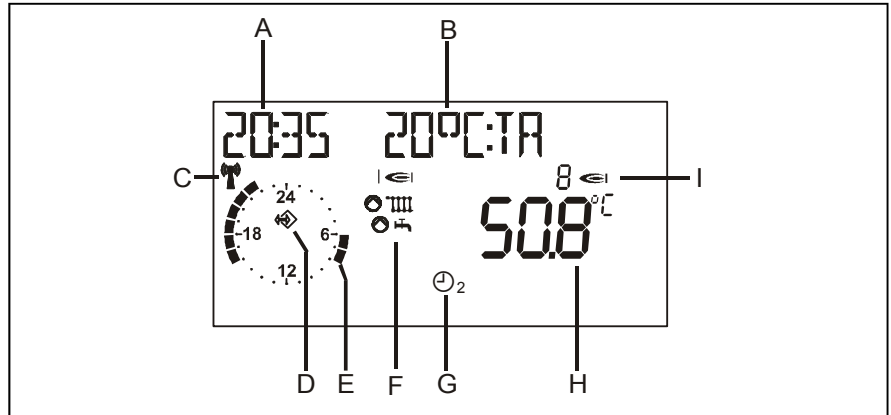
Operation

Display in normal operation

Display in normal operation

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 heating circuits for which a separate operating mode has been selected via the "MODE" set value (here: ⌚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)



! Due to the tolerances of sensors, deviations of +/- 2K (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

Operation

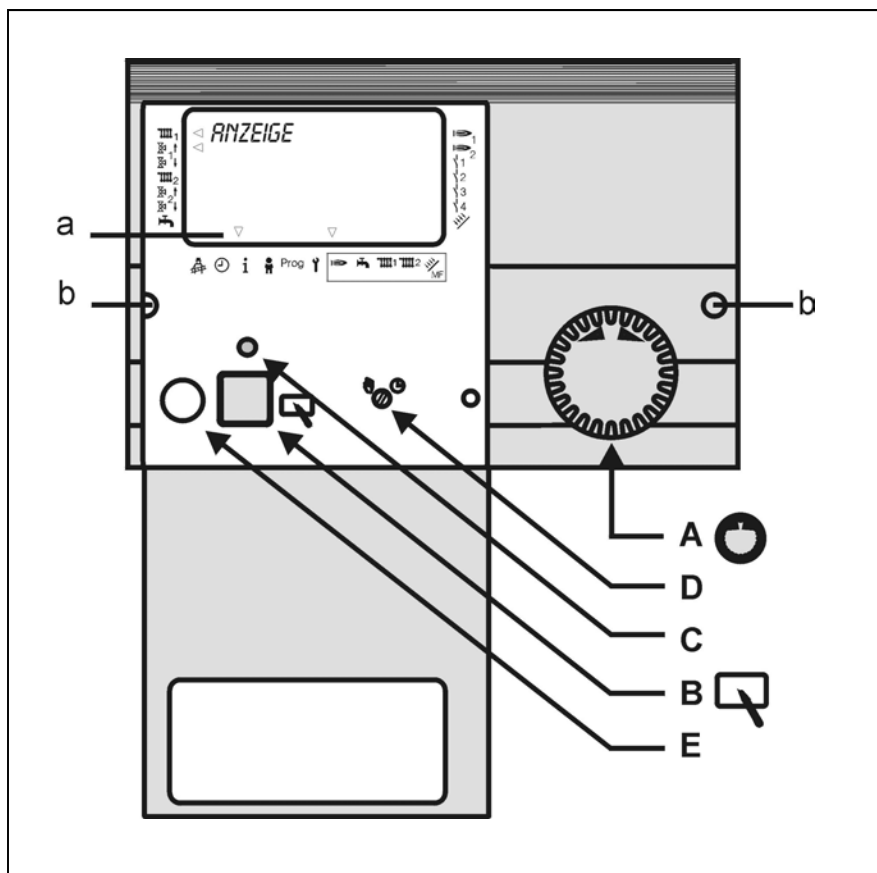
Changing the settings

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 adjusted / controlled (display: "EMERG-MODE").

Limitation (switch-of with 5K hysteresis):

- Burner => MAX T HS (Expert)
- Heating pumps => MAX FLOW-T (expert)
- Cylinder charging pump => DHW-TEMP I (user)

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

E => PC connection via optical adapter

Areas

- Service
- Date / Time / Holiday
- Display
- Users
- Prog** Time programs
- Expert

Operating level

- Installation
- Hot water
- 1 Heat circuit I
- 2 Heat circuit II
- MF Solar/MF

Operation

Operating level

Operating level

Operation is divided into different areas:

General - Display - Users - Time Programs - Expert

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 INSTALLATION is displayed once only. Once the values grouped here have been set the controller is operable.

	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
		HEAT-PROG I  1
		etc...
	Expert	INSTALLATION
		HOT WATER
		HEAT CIRCUIT I
		HEAT CIRCUIT II
		SOLAR/MF
	Expert FA	INSTALLATION

Changing the settings

Changing the settings

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.

Users

Summary of settings that can be made by the operator.

Time programs

Summary of time programs for heating circuits, the hot water circuit and possibly the circulation pump

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
- HEAT 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.

Operation



Overview of display values and settings

Overview of display values and settings

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 )

- ! 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.

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)
 Hinged cover OPEN → search for level to the left with  , open with 	

- ! 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.

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

Operation

Overview of display values and settings

- ! 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.

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

Service

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

(Select operating level using ☺ and 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

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 10s) 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 ↩	

Operation

Overview of display values and settings

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; 0-10V I	Room temperature heating circuit 2 or measured value of the light sensor or voltage value 0-10V input



Operation


Overview of display values and settings

SOFTWARE NO XXX-XX

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

CASCADE MANU (only with code no.)


(only for cascades => Service mode)
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.



BURN TIME and BURN START

 => Display of current value


 => Return

 hold down until "RESET" display goes off => 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 (or activate "TÜV" - Technical Control Board - functions via BUS)
all pumps OFF; all mixers CLOSE
The temperature can be observed in the display.

SERVICE

Input of values for the yearly maintenance message

Delete active maintenance display:




Open control panel cover, press prog. button 2x , set display value to "00" using  and confirm with .

Delete programmed yearly message:

At the level General/Service set the value SERVICE => DAY or SERVICE => OPERAT-HRS to dashes.


RESET...





The three value groups can be reset to the factory setting using the Reset function.

Select function using  to "01" using  and confirm with .

Other entries

(General -> Service level)

Select value using  => value is displayed

SOFTWARE NO XXX-XX	Software number with index
CASCADE MANU (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 

Operation

Overview of display values and settings

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.

T-OUTSIDE

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

T-EXT DES

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

T-COLL 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-BOIL 1 (and T-BOIL 2 – 8 where cascades apply)

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

BUFFER-T/M/L

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

Modulation (only in the case of HS via BUS connection)

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

INSTALLATION

(HS => heat generator) use ☺ to select parameters

T-OUTSIDE	Outside temperature
T-EXT DES	External set value specification (0-10V)
T-COLL DES	HS / Header set value (cascade)
T-COLLECTOR	HS / Header temperature (cascade)
T-BOIL	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 L	Buffer storage tank solar zone
STORAGE 3	Temperature of storage tank 3 (e.g. solar pool-heating)
MODULATION 1-8	Modulation degree of HS (BUS)
RETURN	Exit level using ☹

Operation

Overview of display values and settings

! 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

Hot water	
T-DHW RATED	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 RATED **)	Hot water temperature setting
T-DHW **)	Current hot water temperature
T-FLOW RATED	Current flow temperature setting
FLOW TEMP	Current flow temperature
N-OPT-TIME	Previous time required to heat up with heat-up optimisation activated
RETURN	Exit level using 


Solar integration

See the description for multifunction 1-4 under Expert.

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

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 RETURN-TEMP under installation or as T-COLLECTOR under Solar/MF




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-COLLECTOR 1	Temperature collector 1
T-DHW	Upper hot water temperature
T-DHW L	Hot water temperature infeed
RETURN	Exit level using 

Operation

Overview of display values and settings

User Area

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

DAY

=> Week day (Mon, Tue, Wed,)

OUTSIDE TEMP

=> Outside temperature

T-FLOW 1

=> Flow temperature heating circuit 1

T-FLOW 2

=> Flow temperature heating circuit 2

HW-T

=> Hot water temperature (upper)

T-HS

=> Heat generator temperature

T-ROOM 1

=> Room temperature heating circuit 1=> *)

T-ROOM 2

=> Room temperature heating circuit 2=> *)

T-COLLECTOR 1

=> Collector 1 temperature => **)

*) only if remote control is connected




**) only if corresponding configuration applies


SELEC-PROG

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

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	- - - -	
SELEC-PROG	Heat circuit 1, HC 2	01	
RETURN	Exit level using 		

*) IV = Internal Values:

Space for entering the parameters stored in the system!

Operation

Overview of display values and settings

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 once (e.g. for showering outside hot water times).

Charging starts when the temperature drops below set temperature "DHW-TEMP 1" by the switching hysteresis. After charging, the value is automatically set to "00".

DHW-TEMP 1-3 (Hot water temperature setting)

Required hot water temperature setting
DHW-TEMP 1

=> used in first enable time,

DHW-TEMP 2


=> used in second enable time ,

DHW-TEMP 3

=> 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

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

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 hysteresis.

! This function may be affected by alternative energy sources that are connected via bus (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

Operation

Overview of display values and settings

MODE

---- => The controller programming switch applies in this case.
When setting an operating mode the mode only applies to the assigned heating circuit. When the "☺ = Stand-by/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.

ECONO TEMP

Required room temperature setting during night reduction

REDUCED TEMP

Required room temperature setting during holidays

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	
ECONO TEMP*)	5°C - 40°C	10°C	
REDUCED TEMP	5°C - 40°C	15°C	
T-LIMIT DAY	----, (-5)°C - 40°C	19°C	
T-LIMIT N	----, (-5)°C - 40°C	10°C	
HEAT SLOPE	0,00 - 3,00	1,20	
ADAPTION	00, 01 (OFF/ON)	00 = OFF	
ROOMS-INFL	00 - 20	10	
ADAP ROOM-T	(-5,0)K - (5,0)K	0,0K	
OPTIMIZAT	00, 01, 02	00	
M-OPT-TIME	0:00 - 3:00 [h]	2:00 [h]	
ECONO OPTI	0:00 - 2:00 [h]	0:00 [h]	
PC-ENABLE	0000 - 9999	0000	
RETURN	Exit level using ☼		

*) depending on function selector
Heating circuit POOL-TEMP,
DHW-TEMP, T-FLOW-DAY or
T-FLOW-NIGHT

Operation

Overview of display values and settings

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, 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 by 1K (= 1°C).

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 "Circulation pump control")

HEAT SLOPE

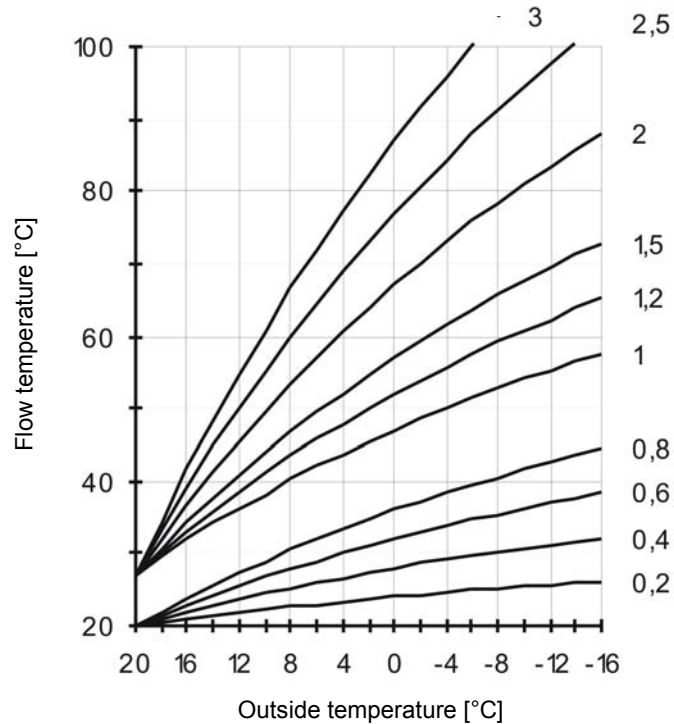
The gradient of the heat slope indicates by how many degrees the flow temperature changes if the outside temperature rises or drops by 1 K.

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

Operation

Overview of display values and settings

ADAPTION (heat slope adaption)

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

Function for automatic heat 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.

ROOMS-INFL (Room sensor influence)

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

The heat generator temperature is increased by the set value when the temperature drops below the required room temperature by 1K.

=> High values lead to fast control and large heat generator temperature fluctuations.

- - - -

=> pure weather-dependent control

0 => pure weather-dependent control *)

20 => pure room temperature control

*) Special function with ROOMS-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 "Circulation pump control").

ADAP ROOM-T (room sensor adaptation)

For room control (e.g. with FBR), the measurement can be corrected by means of this setting should the room sensor not measure correctly.

Overview of display values and settings

OPTIMIZAT (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 "OPTIMIZAT = 01 or 02"

The start of heating is brought forward by no more than this time.

ECONO OPTI (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.

Operation

Overview of display values and settings

Timer Program Area

All the time programs can be set in this area.

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

Selecting a timer program

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

of the right until clock
=> "USER => INSTALLATION",

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

Select timer program
=> e.g. "HEAT-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 faded out.

List of available time programs

With maximum controller configuration

Select timer program using

select timer program for display or adjustment

CIRCL TIME	Switching program for circulation pump
HOTW-PROG	Enabling program for hot water charging pump
HEAT-PROG 1 1	1. heating program for first controller heating circuit
HEAT-PROG 2 1	2nd heating program for first controller heating circuit
HEAT-PROG 1 2	1. heating program for second controller heating circuit
HEAT-PROG 2 2	2nd heating program for second controller heating circuit
RETURN	Exit level using

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 right)
=> "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

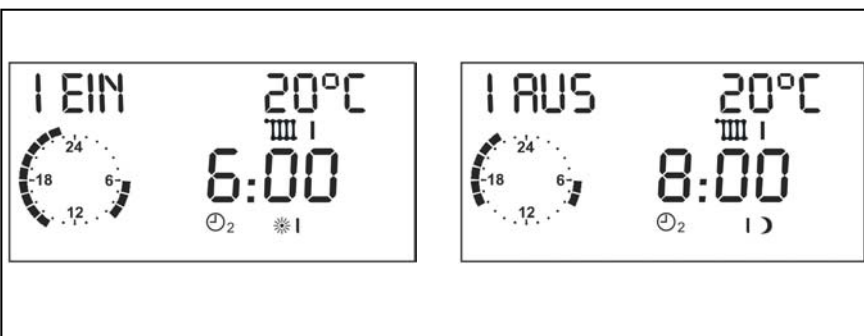
=> „I OFF 20°C" First switch-off time - set value I = 20°C

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.

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

II = Heating program 2,

I = 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

Operation


Overview of display values and settings

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 So.: 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 So.: 07:00 to 23:00

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

Operation


Overview of display values and settings

Hot water

Factory setting:

Mo. to Fr.: 05:00 to 21:00

Sa. and So.: 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 So.: 06:00 to 22:00

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


Operation

Overview of display values and settings

Expert area












 Hinged cover OPEN → search for level on right with , open with 

These settings can only be changed if the code no. is entered (see page 10).

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

CODE-NO

Entering the code number (see page 6) 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 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 TERM (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“.

EBUS SUPPLY (supply for eBUS)

Switching the eBUS supply on / off in relation to connected devices (power supply balance).

INSTALLATION			
Designation	Value range	Default	IV
CODE-NO	0000 - 9999	Entry	
->CODE-NO	Adjustment	0000	
BUS ID 1	(00), 01 - 15	01	
BUS ID 2	(00), 01-15	02	
AF SUPPLY	00,01 (OFF/ON)	01 = ON	
BUS TERM	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-COLL	30°C - 110°C	85°C	
MIN HS1-T or MIN T-COLL	10°C - 80°C	40°C	
MAX T-HS2	30°C - 110°C	85°C	
MIN T-HS2	10°C - 80°C	40°C	
V-CURVE	00 - 11	00	
CURVE 11-U1	0,00V - 10,00V	4,00V	
CURVE 11-U2	0,00V - 10,00V	0,10V	
CURVE 11-T1	00°C - 120°C	20°C	
CURVE 11-T2	00°C - 120°C	90°C	
CURVE 11-UA	0,00V - 10,00V	5,00V	
WARM-UP-T	10°C - 85°C	35°C	
MIN-DEIMI	00, 01, 02	00	
HYSTERESIS	2K - 20K	5K	
HYST TIME	00min - 30min	00min	

Table of voltage curves that can be chosen

No.	U1	U2	T1	T2	UA
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

Operation

Overview of display values and settings

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 HS1/2-T (Max. temperature HS)
Protects the HS from overheating / prevents triggering the LIMITER.

! Caution: Also works with hot water preparation.

MIN HS1/2-T (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-BOIL + HYSTERESIS (Standard 5K) (see MIN-DELIMI as well).

MAX/MIN T-COLL (only for cascades)
See MAX/MIN HS1/2-T.

0-10 V Function

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

If the 0-10V 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 0-10V 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 UA, a special voltage curve can be defined.
U = Voltage, T = Temperature,
UA = 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.
UA => Starting with this voltage,
HS = OFF
(Must lie outside of the valid voltage values)

WARM-UP-T (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-BOIL + HYSTERESIS (Standard 5K)

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-BOIL. **at heating requirements** (Pump release).

02 = Permanent minimum delimiter (24) The HS holds 24h
at least the set minimum temperature MIN T-BOIL. **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 (=5K) 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 5K. This prevents the boiler from heating to unnecessary high temperatures.

Operation

Overview of display values and settings

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

OUTPUT/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 or 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. 1 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, 15kW 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.

Installation (only for cascades via BUS)			
Designation	Value range	Default	IV
FOUND MODULS	Display only		
OUTPUT/STAGE	00 - 1000 KW	00 KW	
NEW CONFIG	00,01 (OFF/ON)		
MIN MOD CASC	00 - 100	00	
HW-BOILER	00 - 08	00	
CONTR DEVIAT	[K]	Display	
DES OUTPUT	0-100 [%]	Display	
SWITCH VAL	(-99) - 0 - (99)	Display	
BLOCK TIME	Remaining [min]	Display	
MAX T-MODUL	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%	
MOD LEVEL HW	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	

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.

CONTR DEVIAT (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.

Overview of display values and settings

SWITCH VAL (-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 1K the boiler is also switched off.

BLOCKINGTIME (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 5K

! The temperature selected for MAX T-MODUL 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.

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.

MOD LEVEL HW (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).

Operation

Overview of display values and settings

SEQ CHANGE (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.

DELAY BURN (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.

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 COOLFCT (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 5K.

Installation (only for cascades or two-stage operation)			
Designation	Value range	Default	IV
SEQ CHANGE	10 - 800 hours	200 hours	
DELAY BURN	00min - 30min	00min	
HYST BURNER2	2K - 20K	2K	
Cooling function			
HS COOLFCT	00-01	00	
T-HS COOL	50°C - 95°C	80°C	

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

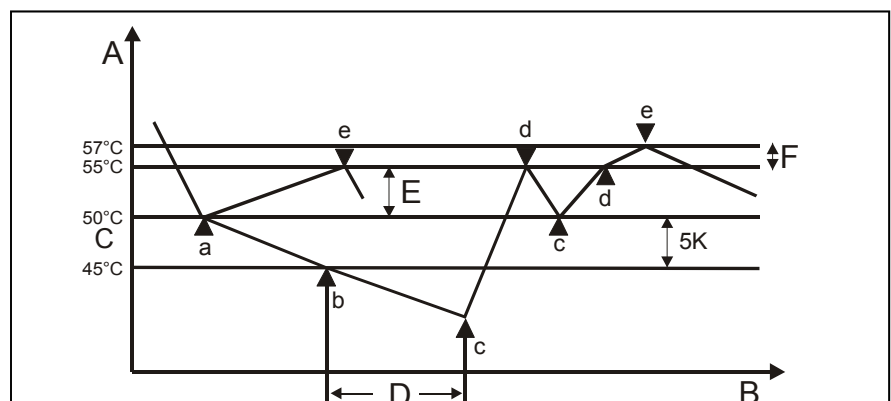
- after start of 1st Burner stage and undercutting the set temperature by 5K (= Start the CLOCKINHIBIT)
- and progress of the CLOCKINHIBIT (= Release 2nd burner stage)

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 DELAY BURN (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)



Operation

Overview of display values and settings

HEATSOURCE 1 (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 = 0-10V

only for HEATSOURCE 1 =

01, 02 or 03

Burner relays are controlled in parallel

Cooler KF [F8] must be connected

HEATSOURCE 2 (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)

Installation (configuring the installation)

Designation	Value range	Default	IV
HEATSOURCE 1	00 - 06	06	
HS1 BUS	00 - 04	01	
HEATSOURCE 2	00 - 05	00	
STORAGE HS2	00 - 03	00	
BUFFER	00, 01, 02	00	

STORAGE HS2 (heat accumulator for HS2)

(Only where HEATSOURCE 2 = Solid fuel)

Warm-up relief applies superordinated:

ON: T-HS2 > MIN T-HS2

OFF: T-HS2 < [MIN T-HS2 – 5K]

T-HS2 = Solid fuel burner temperature

00 = Heating vis-à-vis collector (no storage tank) => F8

ON: T-HS2 > [F8 + HYST BURNER2 + 5K]

OFF: T-HS2 < [F8 + HYST BURNER2]

01 = Heating vis-à-vis buffer storage tank => F1, F3

ON: HS2-T > [F3 + HYST BURNER2 + 5K]

OFF: HS2-T < [F1 + HYST BURNER2]

02 = Heating vis-à-vis HW tank => F6

ON: HS2-T > [F6 + HYST BURNER2 + 5K]

OFF: HS2-T < [F6 + HYST BURNER2]

03 = Heating vis-à-vis STORAGE III (pool) => F15

ON: HS2-T > [F15 + HYST BURNER2 + 5K]

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 + 5K). Switching off occurs when the temperature drops 5K 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 5K. 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 + 5K 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)

Operation

Overview of display values and settings

! 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.

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








! 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 i = Standby / OFF.

Screed program

SCREED (activation of screed drying process)

The screed program can be used for function heating in accordance with DIN 4725 – 4 and for heating freshly laid screed ready for flooring.

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" + .

! 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	---	---	---	---	---	---	---
=>																												

Operation

Overview of display values and settings

CP LOCK (Charge pump lock)

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

PARALLEL (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 heat generator has reached the temperature of hot water set temperature + heat generator superheating [DHW-TEMP + HS-T DHW]. If the heat generator temperature drops below the enable temperature by the switching hysteresis [HYST DHW], 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 heat generator temperature exceeds the maximum flow temperature of the direct heating circuit by 8K, the heating circuit pump for this circuit is switched off (overheating protection). The heating circuit pump has already been switched on again when the heat generator temperature drops below the temperature [maximum flow temperature + 5K].

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

HS-T DHW

(Heat generator superheating during hot water preparation)
Heat generator set temperature during hot water preparation = Hot water set temperature + HS-T DHW

! The heat generator 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 charging 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)

00 min => 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 00 min => The charge pump runs down by the set time when storage tank charging is complete. The after-run can only be cancelled by means of 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 HG)

Heat generator set temperature during hot water preparation = Storage tank actual temperature + HS-T DHW
With this function the exhaust gas losses occurring during hot water preparation can be reduced with modulating heat generator using the adapted heat generator set temperature.

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 RATED - HYST DHW
OFF: T-DHW L > T-DHW RATED

Operation

Overview of display values and settings

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

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-NIGHT] 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 [ROOMS-INFL].

The set value for the water temperature can be entered in the user area of the associated heating circuit level [POOL-TEMP 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 [POOL-TEMP/RATED POOL-T].

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	
MAX FLOW-T	20°C - 110°C	80°C	
MIN FLOW-T	10°C - 110°C	10°C	
FROST PROT	---; (-15)°C - (5)°C	0°C	
OUT-TEMP-DEL	0:00 - 24:00	0:00	
SLOPE OFFSET	0K - 50K	5K	
B-HEAT SINK	00, 01 (OFF/ON)	01 = ON	
RETURN	Exit level using 		

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 [DHW-TEMP 1/2/3]. The heating program for 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 heat generator controller's 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 heat generator return flow sensor. The mixer motor controls to the heating circuit set value for 24 hours [MIN-FLOW-T].

Installation tip: Mixer motor OPEN => heat generator 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 heat generator (heat generator 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 1K hysteresis)

The setting affects the weather-controlled deactivation. Additionally, the thermostat-controlled deactivation takes effect if room regulation is activated (ROOMS-INFL > 0).

- Room temperature > room set value + 1K

00 => Standard circulation pump control

Heating time:

- Outside temperature > room set value +1K

Reduction time:

ROOMS-INFL = 0:

- The switch-off occurs during the transition to reduction operation.
- Restart: Room temperature < room set value The pump runs continuously after switching on.

ROOMS-INFL = "---":

- Flow temperature setting < 20°C.

Operation

Overview of display values and settings

01 => Pump switching in accordance with heating limits

Heating time:

- Outside temperature < daytime set heating limit +1K

Reduction time:

- Outside temperature < set night-time heating limit +1K

02 => Pump switching in accordance with heating program

Heating time:

- Pump is ON; Heat circuit is enabled

Reduction time:

- Pump is OFF; Heat circuit is blocked

03 => Continuous operation

The runs continuously for 24 hrs.! The heating circuit is permanently enabled.

MIXER OPEN (mixer dynamics when opening)

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 CLOSED (Mixer dynamics when closing)

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.

MAX T-FLOW (maximum flow temperature)

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



The heating circuit pump of the **direct** heating circuit is only switched off if the temperature of the heat generator exceeds the maximum flow temperature by 8K. The heating circuit pump is switched on again when the temperature of the heat generator drops below the temperature [maximum flow temperature + 5K].

MIN T-FLOW (minimum flow temperature)

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

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!

OUT-TEMP-DEL (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 heat generator temperature that is required for a mixer circuit is calculated by adding the calculated temperature setting for the heating circuit flow to the heating slope 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.

Operation

Overview of display values and settings

Auxiliary relay functions

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

- MF-1: Mixer HC1 OPEN
(MF1 FUNCTION = 00)
MF-2: Mixer HC1 CLOSED
(MF2 FUNCTION = 00)
MF-3: Header pump
(MF3 FUNCTION = 01)
MF-4: Circulation (time)
(MF4 FUNCTION = 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.

MF1 FUNCTION (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

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

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.

Overview of display values and settings

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 L = Temperature of buffer storage in the infeed area [F1]

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

Start-up relief:

ON: $T-MF1 > T-MF1 SETP$
OFF: $T-MF1 < [T-MF1 SETP - 5K]$

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 L (F1)] by the hysteresis [MF 1 HYST + 5K]. Switching off occurs when the temperature drops 5K 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 5K. The pump is enabled again when the temperature of the solid fuel boiler exceeds the set limit temperature [T-MF1 SETP].

Blocking HS1:

ON: $T-MF1 > HS \text{ set temperature} + 5K$ and solid-fuel boiler pump = ON
OFF: $T-MF1 \leq HS \text{ set temperature}$ or solid-fuel boiler pump = OFF

23 = Solar integration (to MF4 because of PT1000 sensor)
T-COLLECTOR [T-MF4] = Temperature of the solar collector
T-DHW L [F12] = Temperature of hot water storage tank in infeed area

ON: $T-COLLECTOR > [T-DHW L + MF4 HYST + 5K]$
OFF: $T-COLLECTOR < [T-DHW L + MF4 HYST]$

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 + 5K). Switching off occurs when the temperature drops 5K below the switch-on temperature.

Safety / system protection:

OFF: $T-DHW > T-MF4 SETP$
ON: $T-DHW < [T-MF4 SETP - 5K]$

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 5K.

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

The valve to the return flow temperature increase via the buffer storage is opened if the temperature buffer storage low [T-BUFFER L] exceeds the return flow temperature of the installation [sensor 1 or 1-4] by the Hysteresis (MF 1 HYST + 5K). 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 = 0-10V input => On evaluation see parameter V_SLOPE in the expert/installation level.

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

Operation

General function description

Heat circuit control

Weather-dependent control

The heat generator 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 5K. 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 heat generator

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

The function stops when the outside temperature increases to 1K 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 heat generator

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, 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 by 1K (= 1°C).

T-LIMIT DAY => applies during heating times

T-LIMIT N => applies during reduction times

Operation

General function description

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 - 5K.

Installation and Start-up

Installation

Assembly / Dismantling

Sketch showing basic mode of operation:

- A Controller, side view, cutaway view
- B Control panel plate
- C Mounting clamp
- D Unlocking holes (see Chapter Changing set values)
- E Sharp-pointed tool

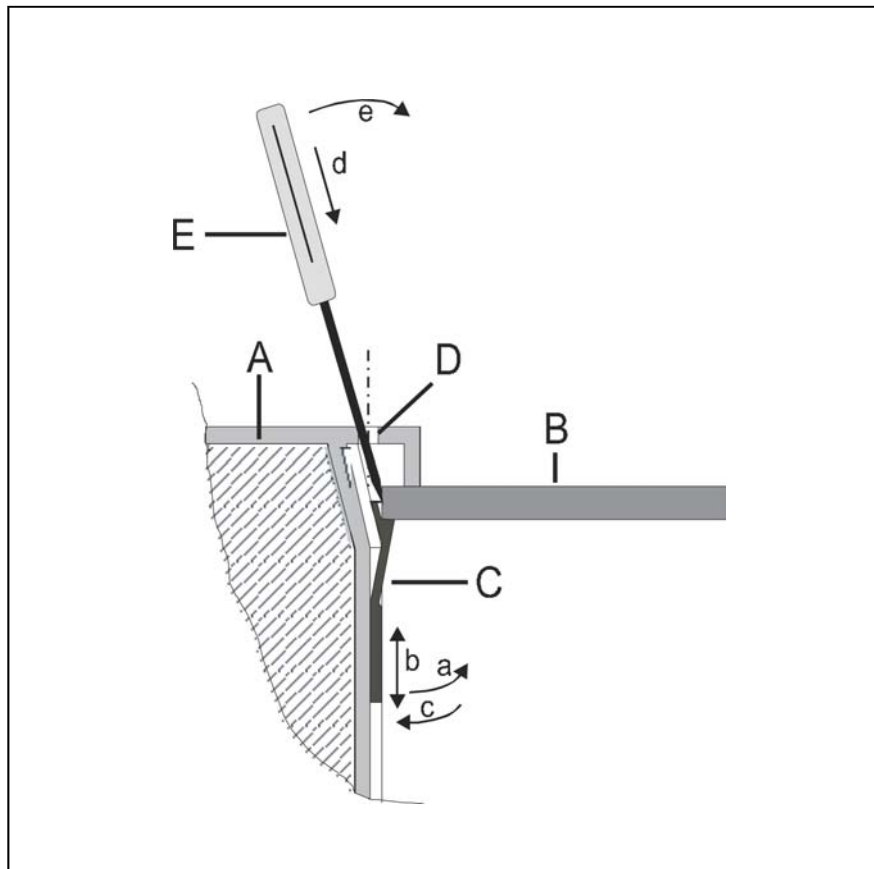
Installing the controller:

1. Set the mounting clamp to the wall thickness of the control panel (at the left and right-hand side of the unit):
 - a) Pull the mounting clamp at the low away from the controller wall (toothing).
 - b) In this condition, slide the mounting clamp down or up until the distance from the edge of the unit corresponds to the thickness of the control panel wall.
Detent position 1 \approx 0.5-1.0 mm wall thickness
Detent position 5 \approx 5.0 mm wall thickness
 - c) Press the mounting clamp against the controller wall at the low.
2. Press the controller into the control panel recess and check that it is firmly secure. If the controller wobbles: Remove the controller and move the mounting clamps up.

Removing the controller:

- ⚠ Disconnect the unit from the power supply before removing it.
- d) Insert a sharp-pointed tool at an angle with respect to the exterior wall into one of the unlocking holes (the tool must be slid between mounting clamp and control panel wall).
- e) Lever the tool with respect to the unit exterior wall. This causes the mounting clamp to release the control panel wall.

Raise the unit slightly at the corresponding side and repeat the procedure on the other side of the unit. The unit can now be removed.



Connecting instructions

- ⚠ The controller is designed for an operating current of 230 V AC at 50 Hz. The burner contact is potential-free and must always be connected in series with the mechanical boiler thermostat (if present).

- ⚠ **Attention:** Bus lines and sensor lines must be laid separately, away from mains cables!

- ! After connecting or modifying the connections of sensors and remote controls the controller must be briefly switched off (mains switch/fuse). The function of the controller is reconfigured in accordance with the connected sensors the next time the controller is switched on.

Note for installation in connection with digital room device

When installing a digital room device, the heating circuit-specific set values are adjusted at the room device. These values are automatically faded out inside the controller.

- ! If during operation the digital room device is separated from the BUS for a longer time period (>5min), the heating controller will continue to work with its own set values.

In order to avoid damages in case of errors - for deviations from relevant set values (such as maximum flow temperature for floor heaters) - we suggest the following procedure:

1. Installing the new heating controller
2. Set all values for heating controller
3. Install one digital room device
4. Set all values for digital room device

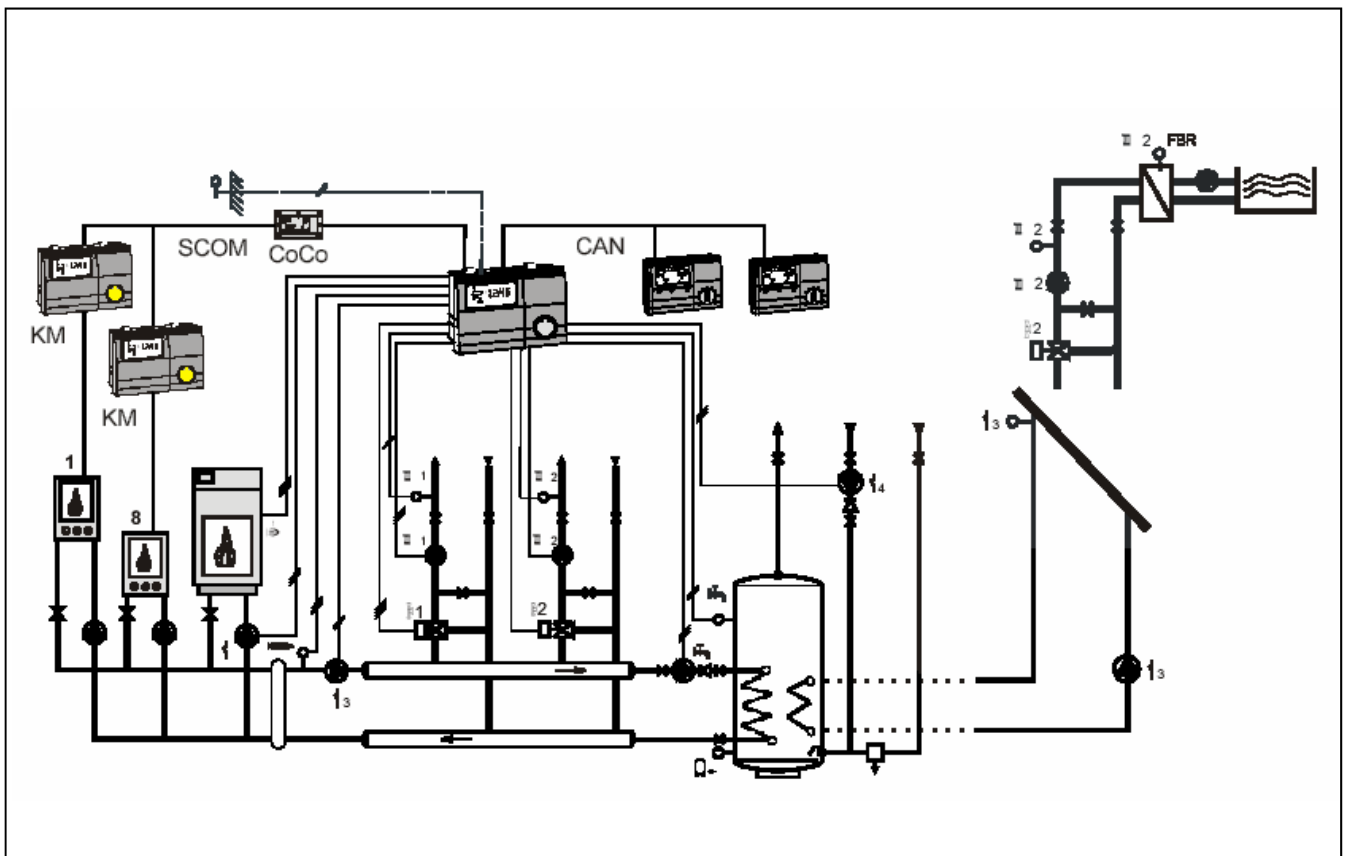
Operation

Installation and Start-up

System diagram

Maximum configuration:

HS regulation (2-stage)
Hot water generation
2 mixed heating circuits, remote-
controlled via BUS or
1 mixed heating circuit & Fixed value/
Pool regulation
Return increase/Solar/Solid fuel
Circulation pump

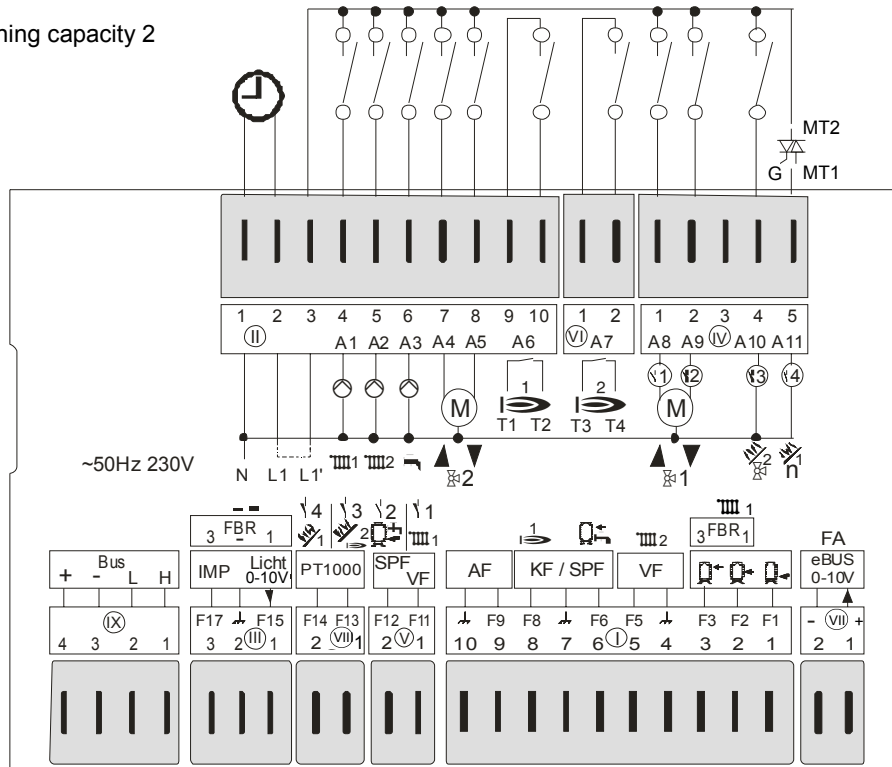


Operation

Installation and Start-up

Electrical connection

230V~; Relay switching capacity 2 (2)A, 250V~



Terminal assignment

VII (1+2): eBUS (FA) or 0-10V output
 I (1,2,3+M): F1/F2/F3 = buffer storage tank low/middle/top
 I (2+3+M): FBR2 (FBR1) for heating circuit 1
 I (2+M): F2 = Room sensor for heating circuit 1
 I (4+5): F5 = Flow sensor heating circuit 2
 I (6+7): F6 = Storage tank sensor
 I (7+8): F8 = Boiler sensor/header sensor
 I (9+10): F9 = Outdoor sensor
 V (1+M): F11 = Flow sensor heating circuit 1 / Multifunction relay sensor 1
 V (2+M): F12 = Hot-water tank low / Multifunction relay sensor 2

VIII (1+M): F13 = PT1000 => HS2/ collector 2 / Multifunction relay sensor 3
 VIII (2+M): F14 = PT1000 => Collector 1 / Multifunction relay sensor 4
 III (1-3): FBR2 (FBR1) for heating circuit 2
 III (1+2): F15 = 0-10V input/light sensor / Room sensor for heating circuit 2
 III (2+3): F17 = Pulse counter for output measurement
 IX (1+2): Data line CAN bus
 IX (3+4): Power supply CAN bus

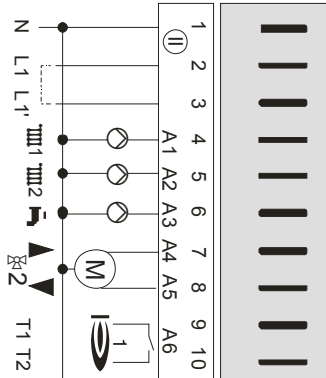
Mains

II (1): Neutral conductor, mains
 II (2): Power supply, unit
 II (3): Power supply, relay
 II (4): A1 = Pump heating circuit 1
 II (5): A1 = Pump heating circuit 2
 II (6): A3 = Cylinder charging pump
 II (7): A4 = Mixer motor heating circuit 2 on
 II (8): A5 = Mixer motor heating circuit 2 to
 II (9+10): A6 = Burner stage 1/HS 1
 VI (1+2): A7 = Burner stage 2/HS 2/Solid fuel
 IV (1): A8 = Mixer motor heating circuit 1 on/ Multifunction relay 1
 IV (2): A9 = Mixer motor heating circuit 1 to/ Multifunction relay 2
 IV (3): A10 = Collector pump 2/Switching valve to solar tank 2/Multifunction relay 3
 IV (4): A11 = Collector pump 1 (speed controlled) multifunction relay 4

Installation and Start-up

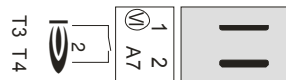
Power terminal assignments

Plug 2 [II]



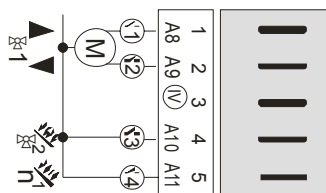
- N: Neutral conductor, mains
- L1: Power supply, unit
- L1': Power supply to relay
- 1: heating circuit pump HC 1
- 2: heating circuit pump HC 2
- Storage tank charging pump
- Mixer open, heating circuit 2
- Mixer closed, heating circuit 2
- Burner stage 1
- Burner stage 1

Plug 6 [VI]



- Burner stage 2/HS2
- Burner stage 2/HS2

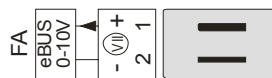
Plug 4 [IV]



- Mixer heating circuit 1 open / Multifunction relay 1
- Mixer heating circuit 1 close / Multifunction relay 2
- Collector pump 2/Switching valve / Multifunction relay 3
- Collector pump 1(rpm)/Multifunction relay 4

Sensor terminal assignments

Plug 7 [VII]



- Pin 1: eBUS (FA) or 0-10V output
- Pin 2: (Ground BUS / 0-10V)

Plug 1 [I]

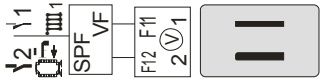


- Pin 1: Buffer storage tank low sensor
- Pin 2: Buffer stor. tank middle sensor / FBR heat. circ. 1 (room sensor)
- Pin 3: Buffer stor. tank top, sensor / FBR heating circuit 1 (set value)
- Pin 4: Flow sensor, heating circuit 2 (ground)
- Pin 5: Flow sensor, heating circuit 2
- Pin 6: Waste water sensor
- Pin 7: Waste water and boiler sensor (ground)
- Pin 8: Boiler sensor
- Pin 9: Outdoor sensor
- Pin 10: Outdoor sensor (ground)

Operation

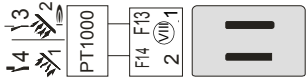
Installation and Start-up

Plug 5 [V]



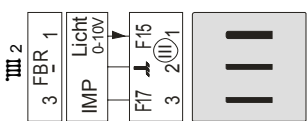
Pin 1: Flow sensor heating circuit 1 / sensor multifunction 1
Pin 2: Service water low sensor / sensor multifunction 2

Plug 8 [VIII] => **PT 1000 sensor**



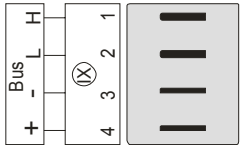
Pin 1: Sensor HS2 / Solar 2 / Multifunction relay 3
Pin 2: Sensor Solar 1 / Sensor multifunction relay 4

Plug 3 [III]



Pin 1: FBR heating circuit 2 (room sensor) / 0-10V IN / Light
Pin 2: FBR heating circuit 2 (ground)
Pin 3: FBR heating circuit 2 (set value) / Pulse counter for output measurement

Plug 9 [IX]



CAN Bus Pin 1 = H (Data)
CAN Bus Pin 2 = L (Data)
CAN Bus Pin 3 = - (ground, Gnd)
CAN Bus Pin 4 = + (12V supply)

Operation

Installation and Start-up

Remote controls

The operator module BM 8

(Only for controller models with CAN-Bus connection)

Electrical connection: Connector IX; 1-4
The E6 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



Remote control FBR 2

Electrical connection: Connector I; 1-3 and 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)

🕒 Automatic mode (according to timer program 1 in controller)

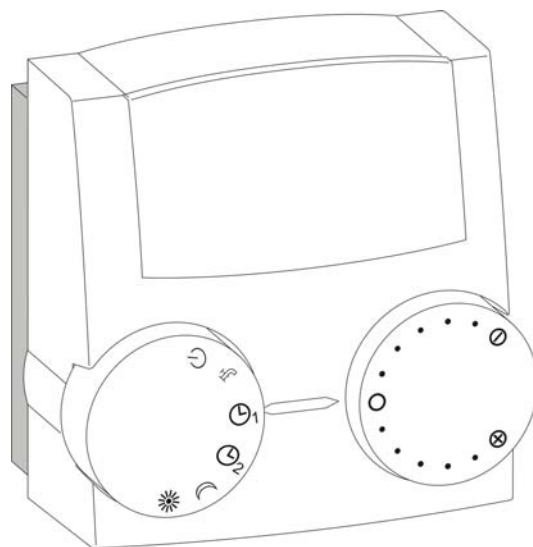
🕒 Automatic mode (according to timer program 2 in controller)

🌙 24-hour night operation (reduction temperature)

☀️ 24-hour daytime operation (comfort temperature)

🔥 Summer mode (heating OFF, hot water only)

! The heating program switch at the controller must be set to 🕒.



Operation

Installation and Start-up

Installation location

- In reference / main living room of the heating circuit (on an inside wall of the room).
- Not in the vicinity of radiators or other heat dissipating units.
- Any, if the room sensor influence is switched off.

Installation

- Remove cap from underside of pedestal.
- Secure the base at the installation location.
- Connect the electrical connection cables.
- Press the cap back on.

DCF receiver

Electrical connection: Connector

VII; 1,2

The controller has an optional connection to a DCF receiver.

If the DCF receiver is connected, the controller time is brought up to date daily at 03.02 and additionally 5 minutes after switching on the voltage.

If the time does not correct itself after the specified period, select a different location for the DCF (e.g. a different wall) and restart the controller (switch voltage-free once).

PC

All system-specific parameters can be set and interrogated using the Comfort-Soft parameterisation software. The parameters can be saved, displayed graphically and evaluated on the PC at predefined intervals. To 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.

Sensor resistances FBR

Temperature	FBR1 terminals 1-2 switch in position ☉	FBR2 terminals 1-2 Room sensor
+10 °C	680 Ω	9.950 Ω
+15 °C	700 Ω	7.855 Ω
+20 °C	720 Ω	6.245 Ω
+25 °C	740 Ω	5.000 Ω
+30 °C	760 Ω	4.028 Ω

Operation

Installation and Start-up

5KOhm NTC: AF, KF, SPF, VF
1KOhm PTC: AFS, KFS, SPFS, VFAS

The controller can be operated with 5KOhm NTC (standard) or 1KOhm PTC sensors. The sensor type is selected in the start-up level during start-up.

The start-up level is displayed when the operating cover is opened after the supply voltage has been switched on (**once only**). It can be reactivated again by briefly switching the supply voltage off.

The sensor switchover affects all sensors.

Exceptions:

- Attaching an analogue remote control is detected automatically. This means that the previous and new versions can be connected to the controller [connector I; 1-3 and connector III; 1-3].
- The controller has a facility for connecting a room sensor to terminals [connector I; 1+2 and connector III; 1+2] and performing room temperature-dependent control. In this case only a 5KOhm NTC sensor can be used, irrespective of the sensor type that has been selected.

Temperature	5KOhm NTC	1KOhm PTC	PT1000
-60 °C	698961 Ω	470 Ω	-
-50 °C	333908 Ω	520 Ω	-
-40 °C	167835 Ω	573 Ω	-
-30 °C	88340 Ω	630 Ω	-
-20 °C	48487 Ω	690 Ω	922 Ω
-10 °C	27648 Ω	755 Ω	961 Ω
0 °C	16325 Ω	823 Ω	1000 Ω
10 °C	9952 Ω	895 Ω	1039 Ω
20 °C	6247 Ω	971 Ω	1078 Ω
25 °C	5000 Ω	1010 Ω	-
30 °C	4028 Ω	1050 Ω	1118 Ω
40 °C	2662 Ω	1134 Ω	1155 Ω
50 °C	1801 Ω	1221 Ω	1194 Ω
60 °C	1244 Ω	1312 Ω	1232 Ω
70 °C	876 Ω	1406 Ω	1270 Ω
80 °C	628 Ω	1505 Ω	1309 Ω
90 °C	458 Ω	1607 Ω	1347 Ω
100 °C	339 Ω	1713 Ω	1385 Ω
110 °C	255 Ω	1823 Ω	1422 Ω
120 °C	194 Ω	1936 Ω	1460 Ω

Operation

Installation and Start-up

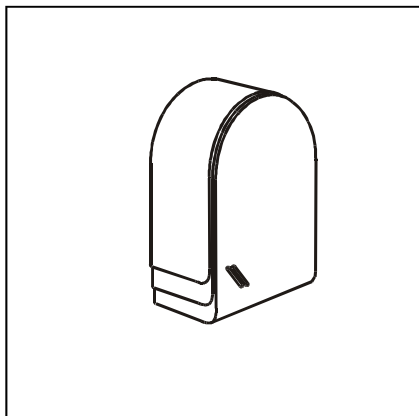
Outside sensor AF (AFS)

Installation location

- Wherever possible, on a northerly or north-easterly wall behind a heated room
- Approx. 2.5 m above ground
- Not above windows or ventilation shafts


Installation

- Detach the cover.
- Attach the sensor with the supplied screw.



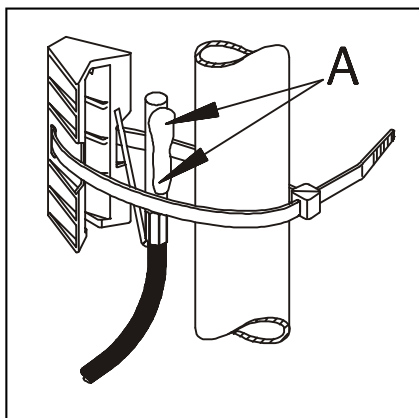
Flow sensor VF (VFAS)

Installation location

- In the case of boiler control, in place of the boiler sensor KF as close as possible behind the boiler on the heating flow pipe
- In the case of mixer operation  approx. 0.5 m behind the circulation pump

Installation

- Thoroughly clean the flow pipe.
- Apply heat conductive paste (A)!!
- Secure sensor with stretch band.



Storage tank sensor SPF (SPFS)

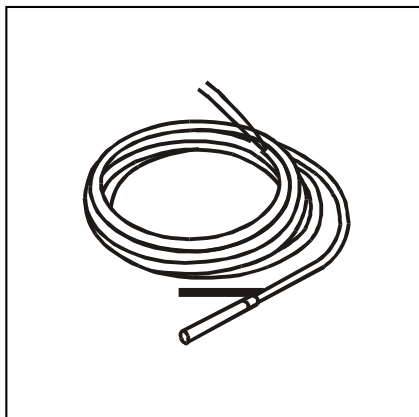
Installation location

- In the immersed pipe of the hot-water cylinder tank (generally on the front face of the tank)

Installation

- Slide the sensor as far as possible into the immersed pipe.

! The immersed sleeve must be dry.



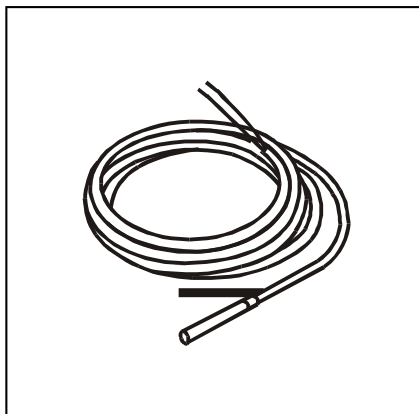
Boiler sensor KF (KFS)

Installation location:

- Immersion sleeve for thermometer, temperature controller and boiler sensor in heating boiler

Installation:

- Slide the sensor as far as possible into the immersed pipe.



Operation

Installation and Start-up

Commissioning

Commissioning procedure

1. Please read this guide carefully before commissioning
2. Fit controller, make electrical connections and switch on heat generator and supply voltage
3. Wait until standard display appears on controller
4. Open hinged operating cover

When the hinged operating flap is opened for the first time after switching on, the "INSTALLATION" is shown on the display.

5. Start INSTALLATION
6. Set value
7. Save value and next value
8. Close hinged operating flap (end of INSTALLATION)
9. Move program switch to required operating mode, e.g. automatic 1 (see page 4)

Commissioning level

All the values in this level must be entered in sequence without interruption

Open level, adjust value, save value and activate next value

GERMAN	Set language
TIME	Set current time: 1. Minute => => 2. Hour
YEAR	Set current date
MONTH	Set current date
DAY	Set current date

Installation (selecting basic controller functions)

This set value can be used to pre/set the other values of the start-up level. The following basic functions may be pre-selected (also see system description

- 01 = E8.4034 => Cascade controller for modulating HS
 02 = E8.4834 => Cascade controller for switching HS
 03 = E8.3611 => 0-10V Controller
 04 = E8.0634 => Standard controller with 2-stage HS
 05 = 2HS controller => 2 HS cascade switched via relay
 06 = E8.6644 => (no function in V1)

Installation level

Designation	Value range	Default	IV
INSTALLATION	----, 01 - 06	01	
HEATSOURCE 1	00 - 06	06	
HS1 BUS	00 - 04	01	
HEATSOURCE 2	00 - 05	00	
STORAGE HS2	00 - 03	00	
BUFFER	00, 01, 02	00	
HC FUNCTION 1	00, 01, 03	00	
HC FUNCTION 2	00 - 04	00	
CAP/MODULE	00 - 1000 kW	00 kW	

Operation

Installation and Start-up

HEATSOURCE 1

(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 = 0-10V
only for HEATSOURCE 1 = 01, 02 or 03

Burner relays are controlled in parallel
Cooler KF [F8] must be connected

HEATSOURCE 2 (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 HEATSOURCE 2 = Solid fuel)

Warm-up relief applies superordinated:

- ON: $T\text{-HS2} > \text{MIN } T\text{-HS2}$
 - OFF: $T\text{-HS2} < [\text{MIN } T\text{-HS2} - 5\text{K}]$
- $T\text{-HS2}$ = Solid fuel burner temperature

00 = Heating vis-à-vis collector (no storage tank) => F8

- ON: $T\text{-HS2} > [\text{F8} + \text{HYST BURNER2} + 5\text{K}]$
- OFF: $T\text{-HS2} < [\text{F8} + \text{HYST BURNER2}]$

01 = Heating vis-à-vis buffer storage tank => F1, F3

- ON: $\text{HS2-T} > [\text{F3} + \text{HYST BURNER2} + 5\text{K}]$
- OFF: $\text{HS2-T} < [\text{F1} + \text{HYST BURNER2}]$

02 = Heating vis-à-vis HW tank => F6

- ON: $\text{HS2-T} > [\text{F6} + \text{HYST BURNER2} + 5\text{K}]$
- OFF: $\text{HS2-T} < [\text{F6} + \text{HYST BURNER2}]$

03 = Heating vis-à-vis STORAGE III (pool) => F15

- ON: $\text{HS2-T} > [\text{F15} + \text{HYST BURNER2} + 5\text{K}]$
- OFF: $\text{HS2-T} < [\text{F15} + \text{HYST BURNER2}]$

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

Blocking HS1

- ON: $T\text{-HS2} > \text{HS set temperature} + 5\text{K}$ and pump HS2 = ON
- OFF: $T\text{-HS2} \leq \text{HS set temperature}$ 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)

HC FUNCTION (heating circuit function selection)

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

Installation and Start-up

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 NIGHT] 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 [ROOMS-INFL].

The set value for the water temperature can be entered in the user area of the associated heating circuit level [POOL-TEMP 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 [POOL-TEMP/RATED POOL-T].

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 [DHW-TEMP 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 (only for heating circuit II)

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).

CAP/MODULE (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 or not active

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

HS1 01 => 01

HS1 02 => 01

HS2 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. 1 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, 15kW 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.

Operation

Installation and Start-up

Auxiliary relay functions

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

- MF-1: Mixer HC1 OPEN
(MF1 FUNCTION = 00)
- MF-2: Mixer HC1 CLOSED
(MF2 FUNCTION = 00)
- MF-3: Header pump
(MF3 FUNCTION = 01)
- MF-4: Circulation (time)
(MF4 FUNCTION = 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.

MF1 FUNCTION (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.

Solar/MF			
Designation	Value range	Default	IV
MF(1-4) FUNCTION	00 - 26	00,00,01,02	
MF(1-4) SET TEMP	30°C - 90°C	30°C	
MF(1-4) HYST	2K - 10K	5K	
F15 FUNCTION	00 - 02	00	

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 L = Temperature of buffer storage in the infeed area [F1]

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

Start-up relief:

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

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 L (F1)] by the hysteresis [MF 1 HYST + 5K]. Switching off occurs when the temperature drops 5K below the switch-on temperature.

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Switching off also occurs when the temperature of the solid fuel boiler drops below the set limit temperature [T-MF1 SETP] by 5K. 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 + 5K 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-COLLECTOR [T-MF4] = Temperature of the solar collector
T-DHW L [F12] = Temperature of hot water storage tank in infeed area

ON: T-COLLECTOR > [T-DHW L + MF4 HYST + 5K]
OFF: T-COLLECTOR < [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 + 5K). Switching off occurs when the temperature drops 5K below the switch-on temperature.

Safety / system protection:

OFF: T-DHW > T-MF4 SETP
ON: T-DHW < [T-MF4 SETP - 5K]

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 5K.

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 L [F1] > T-MF1 + MF 1 HYST + 5K
OFF: T-BUFFER L < 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 L] exceeds the return flow temperature of the installation [sensor 1 or 1-4] by the Hysteresis (MF 1 HYST + 5K). 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 = 0-10V input => On evaluation see parameter V_SLOPE in the expert/installation level.

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

BUS ID (heating circuit number):

The heating circuits are sequentially numbered starting with "01". heating circuit numbers must not be assigned twice. Please only use "00" for replacement controllers.

5K SENSORS / 1K SENSORS

(code no. required for input)

00 = 5kOhm NTC sensor

01 = 1kOhm PTC sensor

Here the type of connected sensor can be set (does not apply to FBR, room sensor and solar sensor PT 1000 [connector VIII]).

Heating circuit / Sensors			
Designation	Value range	Default	IV
BUS ID 1	00 - 15	01	
BUS ID 2	00 - 15	02	
5K SENSORS	00 = 5K, 01 = 1K	01	

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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 Heat generator (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 heat generator

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 ID (heating circuit number or heat generator number).

Error messages


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 language, time and sensor values).

The additional button () must be pressed when the controller is switched on (mains on) until "EEPROM" appears in the display.

Error no.	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.
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
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 (Storage tank 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

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Troubleshooting

General

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

Sensors

The 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 motors, pumps)

The 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 => Display of the outside temperature and the heat generator temperature (see "Display / System")
Control unit => Room temperature displayed and current room set temperature 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 8V 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 => Automatic
Check pump switching => Type of pump switching

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 + 1K

Burner does not switch of at correct time

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

Burner will not switch on

Check set temperature of heat generator => The set temperature must be above the current heat generator temperature.

Check operating mode => Standard ☺ (test ☼)

Check BOB-VALUE

The current temperature of the heat generator's solid fuel is greater than the HS1 set temperature.

Technical data	
Supply voltage to IEC 38	230 V AC \pm 10%
Power consumption	max. 8 VA
Switching capacity of the relays	250 V 2 (2) A
Maximum current on terminal L1'	10 A
Enclosure to EN 60529	IP 40
Safety class II to EN 60730	Totally insulated
Switch panel installation in acc. with DIN IEC 61554	Recess 138x92
Power reserve of the timer	> 10 hours
Permitted room temperature during operation	0 to 50 °C
Permitted room temperature during storage	- 20 to 60 °C
Sensor resistances	NTC 5 k Ω (AF,KF,SPF,VF)
- Tolerance in ohms	+/- 1% at 25°C
- Temperature tolerance	+/- 0,2K at 25°C
- Tolerance in ohms	PTC 1010 Ω (AFS,KFS,SPFS,VFAS)
- Temperature tolerance	+/- 1% at 25°C
- Tolerance in ohms	+/- 1,3K at 25°C
Tolerance in ohms	PT1000 sensor with 1 k Ω
	+/- 0,2% bei 0°C

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

Notes

[illegible]