

Operating-control module BME



Operating and Installation Instructions

Please follow the safety information and read through these Instructions carefully before placing the system into operation.

General

- ⚠ This attention symbol is used in these Instructions to point out risks and dangers to the life and limb of persons and/or damage to property.

Power connection regulations

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

- ⚠ If the system is not installed professionally, this will involve a risk to life and limb.

Warranty conditions

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

Declaration of conformity



BME

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

Descriptions of operating procedures

Certain operating sequences are explained using examples. The statuses of the controller are illustrated or described as boxes. The following status can be accessed by operating the operating controls as shown or by performing the operation described.

Key symbols:

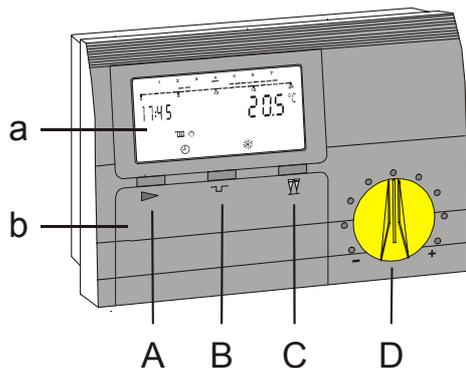
- Operate mode-selector switch
- Press ECO key
- Press Party key
- Press Programming key
- Press Plus key
- Press Minus key

Notes

- ! Important information is highlighted with an exclamation mark.

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Operation



- a Display
- b Hinged control panel cover
- A Mode-selector switch
- B ECO switch
(interrupting the heating time)
- C Party switch
(prolonging the heating time)
- D Rotary knob for desired value entry

Mode-selector switch

The operating mode of the heating circuit assigned to the operation-control module can be changed simply by operating the mode-selector switch ▶.

! This takes effect after 5 seconds.

The current operating mode is displayed as a symbol. The mode-selector switch of the operation-control module is operable only if the connected boiler controller or the connected mixer module is in Automatic mode ☹. If these units are in other operating modes, the operation-control module accepts the corresponding switch setting.

☹ Frost-protection mode

The controller is switched off. If the actual temperature drops below the frost-protection temperature, the controller operates continuously in Frost-protection mode.

☹ Automatic mode

Automatic change of the desired room temperatures at the programmed switching times.

☀ Heating mode

The controller constantly stabilises the system to the desired room temperature 1.

☾ Reduced mode

The controller operates constantly in Economy mode and stabilises the system to the set economy temperature.

☺ Summer mode

(Hot-water operation)
The controller switches the burner on only for hot-water generation. The heating system is switched off continuously (Frost-protection mode).

⚙ Service mode

All pumps and burners are switched on.

Heating time changes  / 

The heating time change is terminated by pressing the mode-selector switch .

ECO key 

In Heating mode:

Each time key  is pressed, the heating circuit switches to Reduced mode for 1 further hour.

In Reduced mode (ECO):

Each time key  is pressed, Reduced mode is prolonged by one hour.

Pressing the Party key  shortens the set interruption by 1 hour.

Display: 

Party key 

In Reduced mode (ECO):

Each time key  is pressed, the heating circuit switches to Heating mode with the desired room temperature of the last heating time for one further hour.

In Heating mode:

Each time key  is pressed, the heating period is prolonged by 1 hour.

When the ECO key  is pressed, this shortens the set heating time extension by one hour.

Display: 

Correcting the desired room temperature

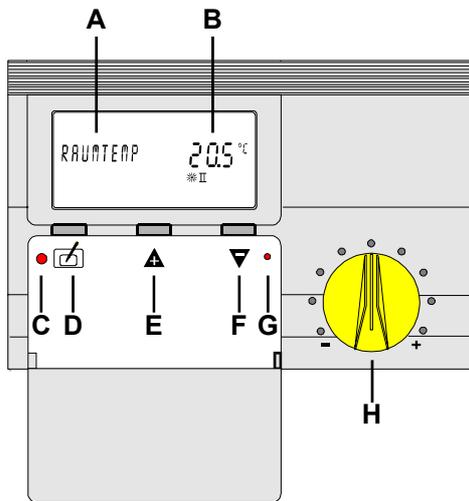
The rotary knob can be used to adjust the programmed desired room temperatures by $\pm 5^{\circ}\text{C}$. The set reduced temperature is not influenced. The corrected desired value is displayed at level "announce" (update every 10 s).

Parameter entry

Opening the hinged control panel cover causes the operation-control module to switch automatically to Information and Programming mode. The operating controls are assigned a new significance (which can be seen from the printed designations which will now appear beneath the keys).

All entries can be made on the basis of the same principle

1. Open the hinged cover on the front of the controller; the controller switches to INFO mode. The three keys are then assigned the function printed on the inside of the hinged cover.
2. Choose the required parameter of the current level or another level with keys ▲ or ▼.
3. Press the Programming key .
4. If you press key  and have selected a lower operating level -> continue at Point 2!
5. If you press key  and have selected a setting, the controller changes to Programming mode (the red lamp/programming indicator



- A** Designation of the entry or of the operating level (resp. the number of the entry)
- B** Entry
- C** Programming indicator (red lamp)
- D** Programming key
- E** ▲ key: Next setting / increment setting
- F** ▼ key: Previous setting / decrement setting
- G** RESET switch
- H** Desired room temperature correction

lights).

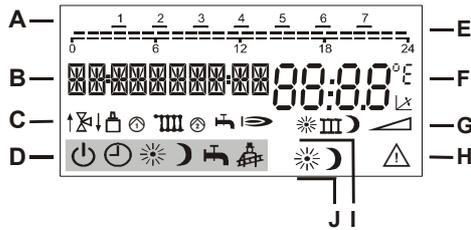
6. The parameter value can be changed with keys ▲ or ▼.
7. Press key  again; this saves the new value.
8. If you close the hinged cover before pressing key , this quits Programming mode. The controller switches to the standard display

(boiler temperature and time). The changed value is not saved.

! You can branch up to the next operating level by pressing key  and selecting the "RETURN" function.

Display

Operation-control module BM features a liquid-crystal display (LCD) used for displaying all relevant data. The illustration below shows all symbols of the display. The display in relation to various functions is discussed in even greater detail below.



- A Weekday (1 = Monday)
- B Time, name/number of the settings

C Function display:

- ⚠ here not relevant
- 🔌 Bus connection to boiler
- ⊙ III Heating circuit pump
- ⊙ II Charging pump
- ➡ Burner

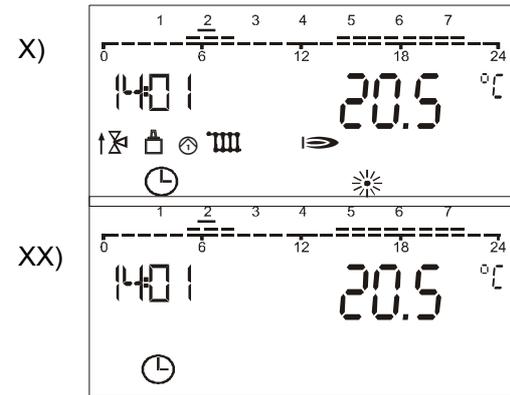
- D Current setting of the mode-selector switch
- E Heating program display (times)
- F Settings and measured values (e.g. temperatures)
- G Desired value symbol
- H Warning fault display
- I Designation of the heating program switching times in Entry mode
I to III = Heating time 1 to 3
☀ = Switch-on time
☾ = Switch-off time
- J Current heating circuit status after mode-selector switch, heating program and Party or ECO key

X) Standard (status on)

- Weekday
- Current heating program
- Time
- Actual room temperature
- Function display (components)
- Mode-selector switch status
- Heating circuit status after heating program

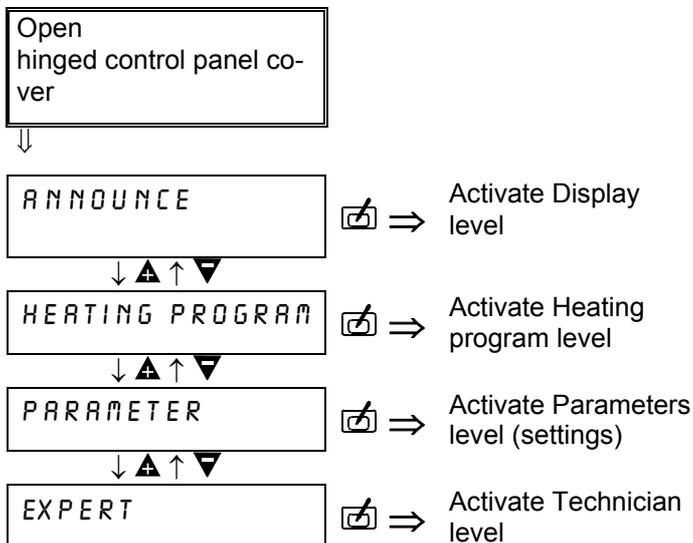
XX) Reduced (status off)

- Weekday
- Current heating program
- Time
- Actual room temperature
- Mode-selector switch status



Operating levels

After you open the hinged control panel cover (Info mode), you can choose four different operating levels with the +/- keys. You can activate the selected level by pressing the Programming key.

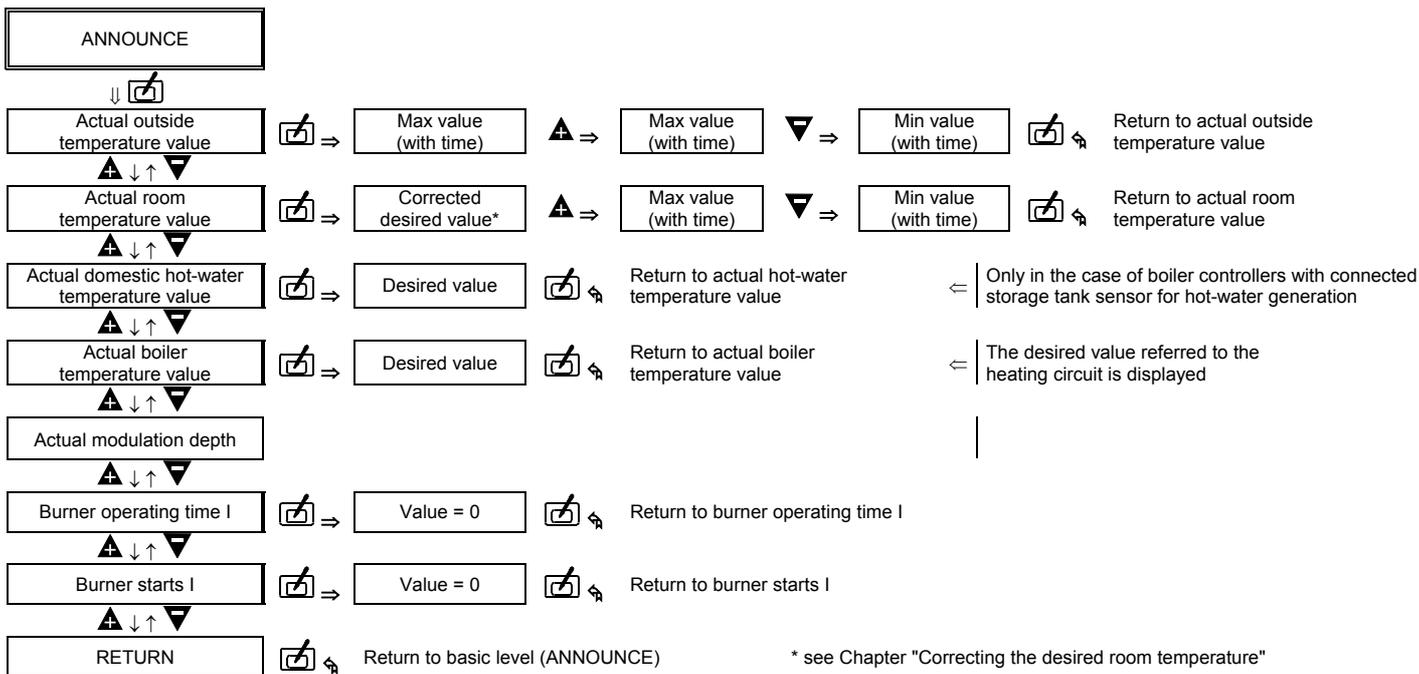


Display level

The user of the system can display various parameters at this level. He thus obtains a picture of the status of the heating system.

1. Open the hinged control panel cover! You will see "ANNOUNCE" on the display.
2. Press key .
3. Choose the display you require with keys +/-.
4. Using key , display the desired value or activate the function as shown in the table (Reset, Max/Min value).
5. Press key  again -> Return to Display level.

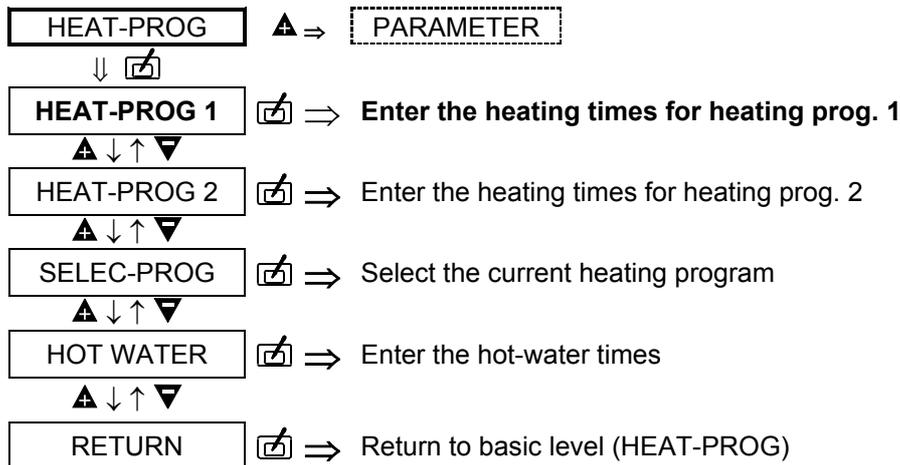
! If a parameter of the Display level is not present on the system (e.g. sensor not connected), this is indicated either by dashes on the display (----) or the parameter is masked.



Heating program level

The BM allows entry of two heating programs between which the user can constantly select.

! If switching time entry in blocks (Mo-Fr, Sa-Su, Mo-Su) is activated, the current switching times of the first day of the block are displayed. The display does not show the switching times of the entire block. If you activate a switching time with the Programming key  (red lamp lights) and then save the value by pressing the Programming key  again. All switching values in the block are overwritten by the switching values of the first day in the block!



Entering the heating programs

- 1) Open the hinged cover
- 2) Press key  -> HEAT-PROG
- 3) Press key  -> HEAT-PROG 1
- 4) **Heating program:**
Select a heating program with keys   (heating program I, II or hot water).
- 5) Press key .
- 6) **Weekday/Period:**
Select the weekday or the period for which the switching times are to be defined, using keys  .
- 7) Press key .
- 8) **Switching time:**
Select the switching time to be changed using keys  .
- 9) Press key  (red lamp lights).
- 10) Adjust the switching time with keys  .
- 11) Save with key .
- 12) RETURN (higher level):
Choose "RETURN" with keys  . Press key .

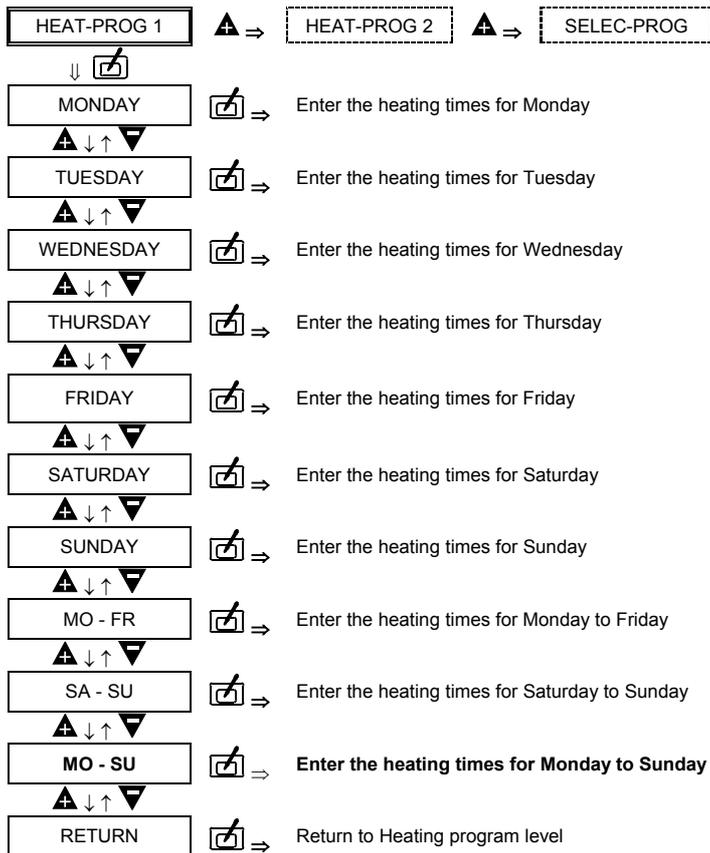
Recommended procedure

- 1) Enter all heating times for the period Monday-Sunday (overwrite all switching times of the week!).
- 2) Enter different switching times for the corresponding days.

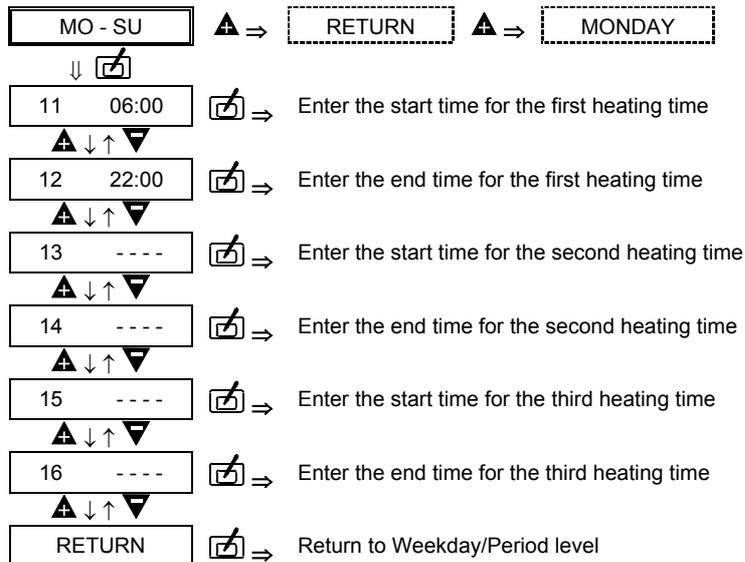
Selecting a heating program

- 1) Open the hinged front cover
 - 2) Press key ▲. -> HEAT-PROG
 - 3) Press key [OK]. -> HEAT-PROG 1
 - 4) Press key ▲ twice.
-> SELEC-PROG
 - 5) Press key [OK].
 - 6) Press key ▼ = Heating prog. 1.
Press key ▲ = Heating prog. 2
 - 7) Press key [OK]. -> Save
- The selected heating program is operable in Automatic mode.

Weekday / Period level



Switching times level



Heating circuit 1 -> Heating program 1

No.	Heating time 1		Heating time 2		Heating time 3	
	11	12	13	14	15	16
Mo	06:00	22:00	-	-	-	-
Pers						
Tu	06:00	22:00	-	-	-	-
Pers						
We	06:00	22:00	-	-	-	-
Pers						
Th	06:00	22:00	-	-	-	-
Pers						
Fr	06:00	22:00	-	-	-	-
Pers						
Sa	07:00	23:00	-	-	-	-
Pers						
Su	07:00	23:00	-	-	-	-
Pers						

Heating circuit 1 -> Heating program 2

No.	Heating time 1		Heating time 2		Heating time 3	
	21	22	23	24	25	26
Mo	06:00	08:00	16:00	22:00	-	-
Pers						
Tu	06:00	08:00	16:00	22:00	-	-
Pers						
We	06:00	08:00	16:00	22:00	-	-
Pers						
Th	06:00	08:00	16:00	22:00	-	-
Pers						
Fr	06:00	08:00	16:00	22:00	-	-
Pers						
Sa	07:00	23:00	-	-	-	-
Pers						
Su	07:00	23:00	-	-	-	-
Pers						

Hot-water program

No.	Heating time 1		Heating time 2	
	01	02	03	04
Mo	05:00	21:00	-	-
Pers				
Tu	05:00	21:00	-	-
Pers				
We	05:00	21:00	-	-
Pers				
Th	05:00	21:00	-	-
Pers				
Fr	05:00	21:00	-	-
Pers				
Sa	06:00	22:00	-	-
Pers				
Su	06:00	22:00	-	-
Pers				

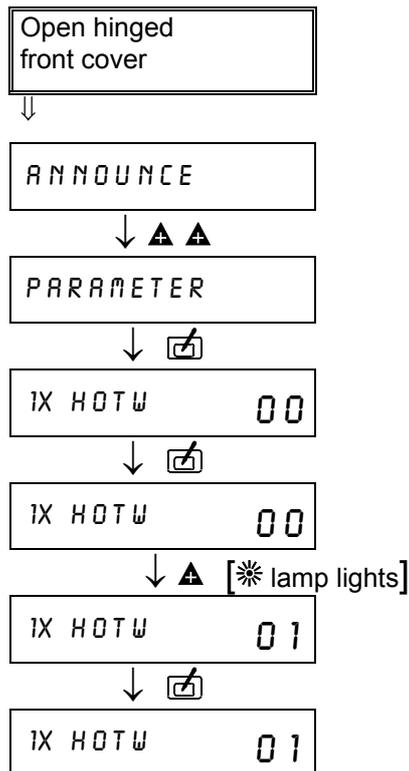
Condition as delivered and table for current values (please enter)!

Settings at Parameter level

Operating example: One-off hot water

Operating mode

- 1) Open hinged control panel cover
=> Info mode.
- 2) Choose basic function Parameters
Press key ▲ twice.
- 3) Enter level with key □.
- Display: Parameter name and current setting.
- 4) Select the required setting with keys ▲ ▼.
- Table: "Parameters of BM".
- 5) Press key □ (red lamp lights).
- 6) Change the setting with keys ▲ ▼.
- 7) Save the new setting with key □ (red lamp goes out).
Close the hinged control panel cover.



Parameters of operation-control module BM				
Parameter	Designation	Setting range	Default	System values
1X HOTW	One-off hot-water generation	0/1	0	
TIME	Time	00:00-24:00	10:00	
MONDAY	Weekday	1-7	1 (Mo)	
ROOMTEMP 1	Desired room temperature, heating time I	5°C - 40°C	20°C	
ROOMTEMP 2	Desired room temperature, heating time II	5°C - 40°C	20°C	
ROOMTEMP 3	Desired room temperature, heating time III	5°C - 40°C	20°C	
ECONO TEMP	Reduced temperature (night)	5°C - 40°C	10°C	
HOTW TEMP	Desired hot-water temperature (only KM/KM1)	10°C - 70°C	50°C	
S-HOLIDAY	Holiday start in days as of programming time	0-99	0	
L-HOLIDAY	Holiday duration in days	0-99	0	
HEATSLOPE	Heat slope	0.2-3	1.2	
ADAPTION	Automatic heat slope optimisation	0/1 (Off/On)	0	
ROOM INFL	Room sensor influence	0-20	0	
OPTIMIZAT	Room-dependent warm up optimisation	0/1 (Off/On)	0	
M-OPT-TIME	Maximum advance	0-3 hours	2 hours	
N-OPT-TIME	Last warm up time required		Display only	
ADAP ROOMT	Room sensor adaptation	(-5)K – (+5)K	0K	
O-TEMP-DEL	Outside temperature delay	0-3 hours	0 hours	
STATUS	Status of display (heat demand)	0/1 (Off/On)	0	
LANGUAGE	Language for parameter names	D F GB E I NL	D	

Flow resp. boiler temperature

In the case of temperatures, a distinction is made between the actual measured temperatures in the heating system and the pre-set or computed, desired temperatures necessary for heating. The flow temperature is the temperature of the water flowing to the radiators of a heating circuit. It is regulated by the mixers of the heating circuits, if present. The boiler temperature is measured directly in the boiler. The desired temperature of the boiler corresponds to the maximum computed flow temperature in the heating system plus the adjustable heat slope offset for mixer circuits.

Frost-protection control

Frost-protection control prevents the heating system freezing up by automatically activating Heating mode (switch-on temperature = see parameter list). In Frost-protection mode, the desired room temperature for all heating circuits is set to 5°C and the desired temperature for hot-water generation is set to 10°C.

Weather-dependent control

The boiler or flow temperature is determined by the **outside temperature**, the set heat slope and the set desired room temperature.

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 by means of an existing room temperature sensor.

The influence factor can be set between 0 (purely weather-dependent control) and 20 (room temperature control with slight outside temperature influence). In setting "--", room temperature control is deactivated. Settings "--" and "0" feature differences for demand-dependent circulation pump control.

Room sensor adaptation

The current display can be varied by ± 5 K in order to adapt the room temperature display to installation conditions or different thermometers. The corrected display value is included in the computation for all relevant functions.

Room temperature

This parameter can be used to program the desired room temperature required for each of the three heating times. The value entered is allowed for when computing the flow temperature of the heating circuit. The current temperature of the room is detected by the room sensor of the operation-control module and shown on the display. It can also be used to regulate the room temperature (via the room sensor influence).

Outside temperature delay

The selected outside temperature delay must be matched to the type of construction of the building. In the case of heavy types of construction (thick walls), a long delay (3 hours) must be selected since a change in outside temperature affects the room temperature later accordingly. In the case of lightweight type of construction (prefabricated dwellings), no delay should be set (0 hours).

Reduced temperature

The reduced or economy temperature is the temperature to which the heating circuit is controlled during times other than the heating times, e.g. during the nighttime or in ECO mode.

Hot-water generation

The programmed hot-water temperature is stabilised by switching the hot-water cylinder charging pump and the burner.

One-off hot water

Activating this function (parameter 02) means that the hot-water cylinder tank is heated precisely once (e.g. in order to shower during the reduced time).

Language

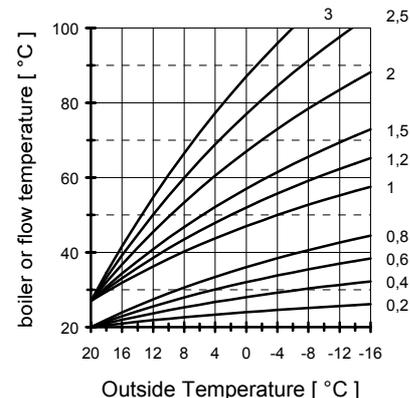
This menu item allows you to choose the language for the information displayed on the BM.

Heat slope

The heat slope indicates what flow temperatures occur at specific outside temperatures.

The heat slope is dependent on the design of the heating system. The gradient of the heat slope indicates by how many degrees the flow temperature changes if the outside temperature rises or drops by 1K.

Setting 0 = Pure room control



Heat slope diagram

Note on setting

- If the room temperature drops with dropping outside temperature, the gradient is set too low.
- If the room temperature increases with dropping outside temperature, the gradient is set too high.

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

! Correct setting of the heat slope is very important in the case of control systems without room sensor influence.

Heat slope optimisation

The heat slope is optimised automatically only if the outside temperature is below 8°C and the room temperature is below 18°C. Optimisation involves starting heating of the heating circuit 3 hours after the reduced time. The room temperature is regulated with the desired value 21°C. The optimum heat slope for the heating circuit is determined from the measured temperature characteristics and this heat slope is incorporated in the control function. If optimisation is not completed successfully, a retry is performed during the next reduced operation phase. In this case, the warning symbol blinks at Setting level for automatic heat slope optimisation. Hot-water generation is barred during optimisation.

Holiday

You can use the controller's Holiday program during the holiday period. The duration of the holiday and the holiday start are entered in days. The Holiday program is always activated at 12.00 hours and always ends at 24.00 hours of the last day of the holiday.

! If the holiday period is entered before 12.00 hours, the Holiday program starts on the day of entry (S-HOLIDAY=00; with S-HOLIDAY=05 in 5 days). If the holiday period is entered after 12.00 hours, the program starts on the next day at 12.00 hours. It thus also ends one day later.

The controller switches to Standby mode during the holiday. The Holiday symbol is shown on the display. Holiday mode is terminated by operating the Program switch.

Heating program

The operation-control module allows entry of two heating programs for each heating circuit.

Each heating program comprises of three heating times for each weekday. The heating times are defined by pairs of switching times, consisting of switch-on time and reduced operation time. This allows you to save two different heating profiles (Holiday/Working time, Early/Late shift). The current heating programs can be selected using parameter "SELEC-PROG".

Moreover, it is possible to program a time program for activating hot-water generation with two Enable times per day.

Warm-up optimisation

Warm-up optimisation determines the optimum time advance of start of heating. The computation can be carried out as a function of the outside temperature or as a function of the current room temperature at the instant of maximum time advance. Warm-up optimisation occurs only if the reduced time of the heating circuit is at least 6 hours. The Time advance function ensures that the heated rooms have reached their desired temperature at the switch-on instants of the heating times.

Maximum time advance

The maximum possible time advance of start of heating by the Optimisation function can be defined system-specifically by the user (parameter 13).

0 = No warm-up optimisation!

Circulation pump control

Demand-dependent circulation pump control switches the circulation pump 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

The outside temperature exceeds the desired room temperature.

The desired flow temperature is less than 20°C.

! In the case of room sensor influence "0", the pump operates continuously after one-off heating demand in the reduced time.

RESET function

If a fault or error occurs in the heating system, you will see a blinking warning triangle () and the related error number on the BM display. Please refer to the table below for the significance of the displayed error code. Frequently, an error can be remedied by performing a RESET on the unit. The RESET switch is located beneath the hinged operating panel (see Parameter entry). The RESET switch can be operated using a small screwdriver.

RESET: Corresponds to brief switch-off of the unit. The controller then continues to operate with the set values.

RESET +  : This overwrites all values with default values (exception: Language, Bus ID and Heating times).

RESET +  +  : This overwrites all values with default values.

The additional key ( ) must be pressed when switching over from RESET (Manual) mode to Automatic mode.

Error number*)	Error designation	Significance
Internal errors		
E 80	Room sensor defective	The room sensor of a heating circuit is defective (discontinuity/short circuit). In case of solar collector control, E80 may also indicate a defect of the storage tank sensor II.
E 81	EEPROM error	An error has occurred in the EEPROM.

*) If other error numbers are displayed, please refer to the instructions for the connected devices of the system (e.g. boiler module).

Technician level

Technician level contains the parameters which are protected by the code No. Code No. protection (parameter number 20) effectively prevents these parameters being adjusted inadvertently.

! It is not possible to set these parameters until after entering the code No.!

Code No. entry = Parameter 20

Code ex-works: see parameter list

△ Settings at Technician level should always be made with the appropriate care since this level stores safety-related parameters!

△ When programming the parameters at Technician level, please follow the manuals for the connected devices. The technical manuals contain information and explanatory information on the parameters.

Changing the parameters

- 1) Open the hinged control panel cover
- 2) Choose Technician level with ▲ ▲ ▲
- 3) Press key . →
- (20) Enter the code No.**
- 4) Press key  (red lamp lights).
- 5) Set the first digit with keys ▲ ▼.
- 6) Press key  (red lamp lights).
- 7) Set the second digit with keys ▲ ▼.
- 8) Press key  (red lamp lights).
- 9) Enter digits three and four accordingly (red lamp goes out).
- 10) Choose the required parameter with keys ▲ ▼ (see list).
- 11) Press key  (red lamp lights).
- 12) Set the value with keys ▲ ▼.
- 13) Save the value with key .
- 14) Close the hinged control panel cover.

! Parameters which cannot be set on the controller owing to the system are identified by dashes [----] on the display or the parameter is masked.

! The specified default values in the list below correspond to the condition of the unit as delivered. System-specific values can be entered in the last column of the table. This simplifies the task of recommissioning after a parameter RESET.

! If you press the Programming key  and choose a protected parameter before entering the code No., parameter 20 (code scan) is displayed automatically.

Code No.-protected parameters at Technician level				
No.	Parameter	Setting range	Defaults	System values
20	Entry of code No.	0000-9999	----	
21	Code No.	0000-9999	1234	
24	Frost-protection temperature	(-5)°C - (+5)°C	0°C	
33	Hot-water short-time heating	0/1 (Off/On)	0	
85	Software version BM		Display only	

Explanatory information

! Figures in the text correspond to parameter numbers (e.g. 24 = frost-protection temperature).

24 Frost-protection temperature

If the outside temperature drops below the programmed value, the system switches to Frost-protection mode.

25 Max. flow temperature

Limitation of the flow temperature of the heating circuit serves to protect the downstream components (e.g. in the case of underfloor heating systems

33 Hot-water short-time heating

Heating of the storage tank temperature up to 60°C with every 20th heat-up operation or at least once per week on Saturday at 1.00 hours.

85 Software version

Display of the unit's software version (please quote in the event of complaints or errors).

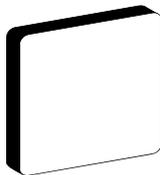
Telephone switch

The heating system can be switched to Heating mode \ast with a telephone switch. The connection terminals of the controller for the external room sensor RFB (see connection diagram) are used for installation. As soon as a short-circuit is detected at the corresponding connection terminals, the assigned heating circuit switches to Heating mode. In addition, hot-water preparation is activated. When the short-circuit is eliminated, the controller once again heats on the basis of the set heating program.

External room sensor RFB**Installation location:**

In the main controlled zone of the heating circuit (on an interior wall in the living room).

Not in the vicinity of radiators or other appliances emitting heat.

**Installation:**

Use a screwdriver to lever the cap off of the base; see illustration overleaf.

Attach the base at the installation location.

Make the electrical connections.

Press the cap back on.

Supply voltage

The controller receives its supply voltage of 12 V DC via the data line. The 4-core 2 X 0.8 mm² telephone line transfers the communication data and the supply voltage. The mounting base features screw-type terminals for connection to the data line and for the external room sensor or the telephone switch which can be connected as an alternative.

⚠ **Important:** Bus lines and sensor lines should be laid separately, away from mains cables!

! The controller must be switched off briefly (master switch / reset) after connection or after changing the connection of the sensors and remote controls. The function of the controller is reconfigured in accordance with the connected sensors the next time the controller is switched on.

Wiring:

1. BUS + (data line and Vcc 12V)
2. BUS - (data line and GND)
3. -free
4. free
5. and 6. external room sensor RFB or telephone switch

Sensor resistances

The sensor resistances must be measured with the BM disconnected.

Temperature	5°C	10°C	15°C	20°C	25°C	30°C	35°C
Resistance	12,700 Ω	9,950 Ω	7,855 Ω	6,245 Ω	5,000 Ω	4,030 Ω	3,265 Ω

Technical data

Supply voltage to IEC 38	12 V DC ± 15%
Power consumption	Max. 1 W
Enclosure to EN 60529	IP 40
Safety class to EN 60730	III
Power reserve of the timer	> 10 hours
Permitted ambient temperature during operation	0 to 50°C
Permitted ambient temperature for storage	-30 to 60°C
Room sensor	Test resistance with 5 kΩ ± 0.2% at 25°C

Malfunctions attributable to incorrect operation or setting are not covered by warranty.