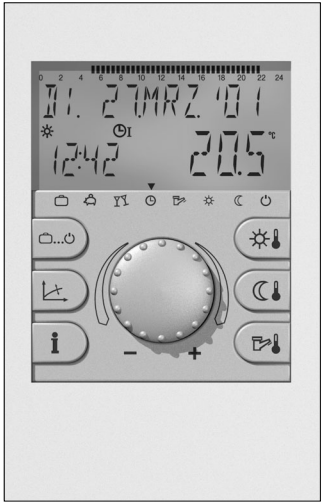
Control System THETA

Operating Instructions



Remote control unit RSC

for high efficiency condensing boilers
in connection with mixer expansion module ZMC 1

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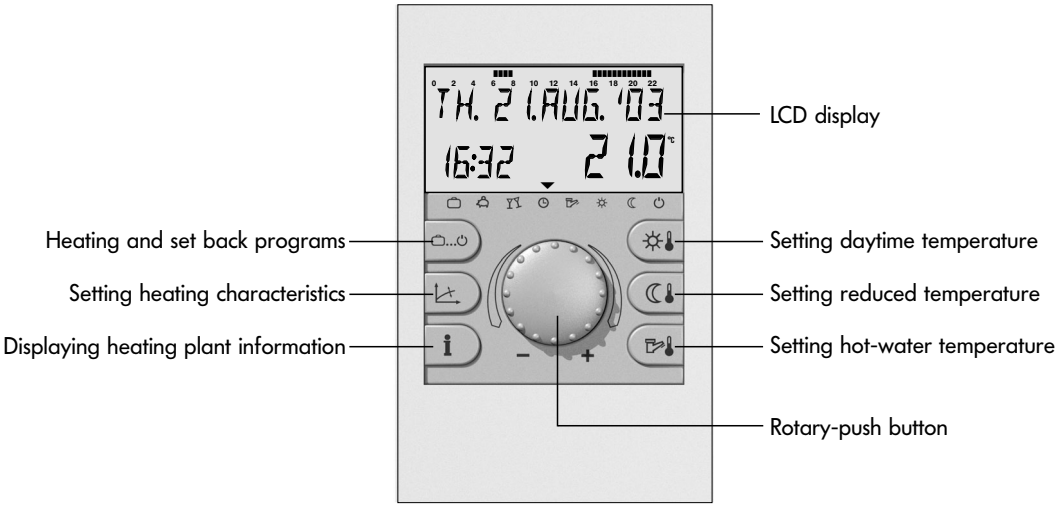
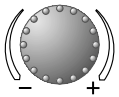
General operation

Operating instruments



Operation

Symbolism used in this manual:



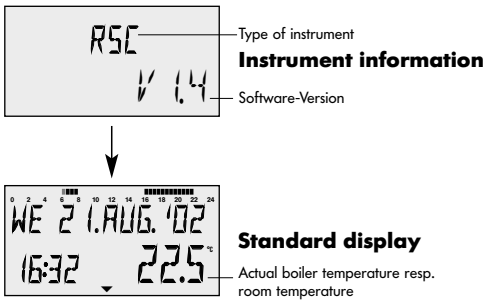
Turn: select parameters, change values

Press once: confirm, store

The center-positioned rotary-push button and the labeled keys guarantee a simple and easy operation. It is however recommended to read this manual attentively to be informed about the repeating steps.

- Each value in the display appears flashing and can be modified with the rotary-push button.
  A flashing display is appropriately marked in this manual.
  Turn to the right (+): Increase values
  Turn to the left (-): Decrease values
- Press once: Acceptance of the selected and indicated value, store.
- Keep pressed: Entry into the programming level (level selection),

The last operation step will be stored automatically after approx. 60 seconds if it was not stored by means of the rotary-push button.



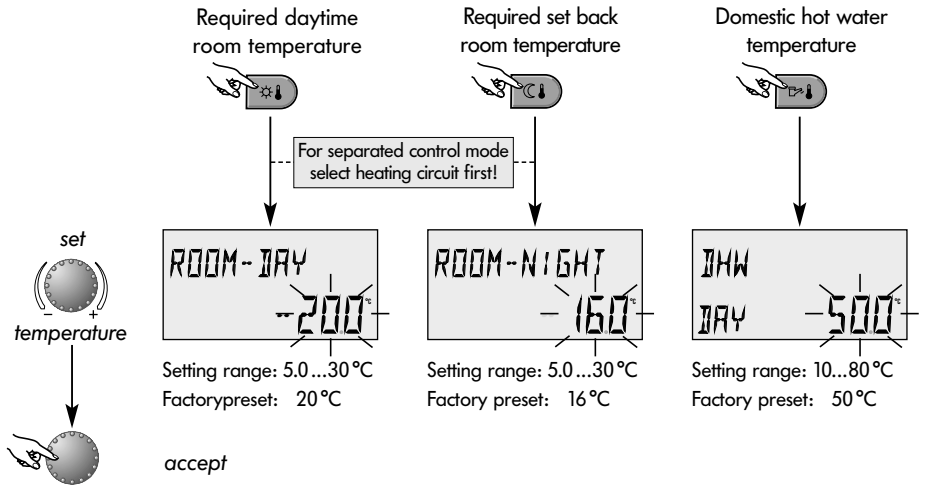
The LCD display

The control is equipped with a large display. All displays appear in plain text and are available in several languages (see page 22 - *SYSTEM/* parameter *LANGUAGE*). In case of starting up the plant or after power failure a segment test with an automatic error diagnosis is carried out, after that the type of instrument and software version will momentary appear.

The standard display

The standard display shows weekday, date, time and actual boiler temperature resp. actual room temperature (only after releasing the built-in room sensor). The upper time bar shows the heating periods and the corresponding operating times of the current weekday.

Temperature settings



This button is used to set the required daytime room temperature

This button is used to set the required set back room temperature

This button is used to set the required domestic hot water temperature

Adjustment (standard display mode only):

After pressing the button for the required temperature the current value appears flashing and can be adjusted directly with the rotary-push button.

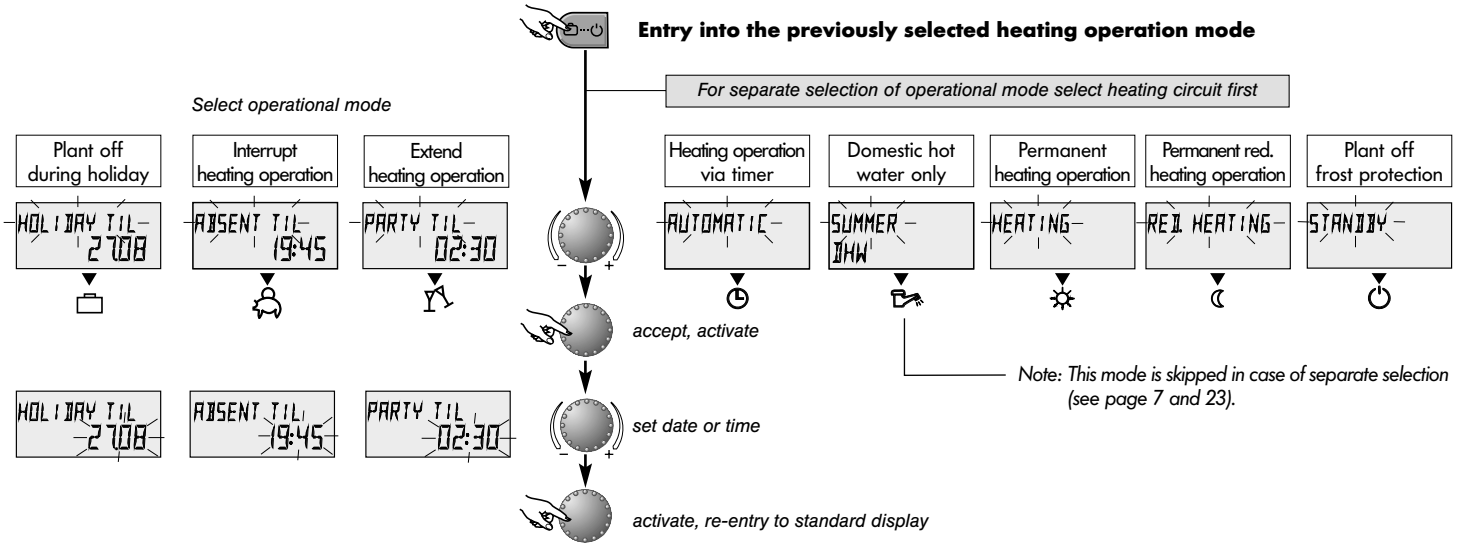
For separated control mode the correspondig heating circuit must be selected first before setting daytime or set back temperature.

Re-entry into the standard display is done by pressing the rotary-push button or the corresponding temperature button or automatically after approx. 60 seconds.

Operational mode selection for heating and hot water

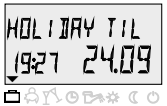
With this button the required operational mode is selected. It appears in plaintext on the display, simultanously an arrow at the lower edge of the display points to the appertaining program symbol. The selected operational mode is valid for all heating circuits.

Select: Pressing the button , the previously selected operational mode appears flashing. The other operational modes can be selected and activated with the rotary-push button according to the following scheme.



Functions of operational modes

Plant off during holiday



Setting range:

Actual date ... actual date + 250 days

Return to the previously selected operational mode at 0.00 o'clock of the set return date.

Hot water operation is set to frost protection temperature of 5 °C.

Earlier termination:

Press button , select required operational mode with rotary-push button and press again to activate.

Interrupt heating operation

Setting range

P1:

Heating operation is interrupted until next switching-on time of current operating times programm (see page 19-21 operating times programs).

0.5 ... 24 h:

Heating operation is interrupted until set time of return.

Earlier termination:

Press button , select required operational mode with rotary-push button and press again to activate.

Extend heating operation

Setting range:

P1:

Heating operation is continued until next switching-on time of current operating times programm (see page 19-21 operating times programs).

0.5 ... 24 h:

Heating operation is continued until end of party.

Earlier termination:

Press button , select required operational mode with rotary-push button and press again to activate.

Heating operation via timer

Operating times:

(see page 19-21 operating times programs).

Heating and domestic hot water operation automatically according to settings of temperature values (see page 5) and selected operating times program.

Programming individual operating times see page 14.

Domestic hot water only

Operating times:

(see page 19-21 operating times programs).

Only hot water operation according to settings of hot water temperature (see page 5) and selected operating times program.

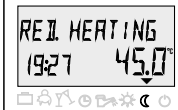
The heating operation is interrupted and frost protected.

Programming individual operating times see page 14.

Permanent heating operation

Permanent heating and reduced hot water operation round the clock according to the settings of daytime room temperature and domestic hot water temperature (see page 5).

Permanent red. heating operation

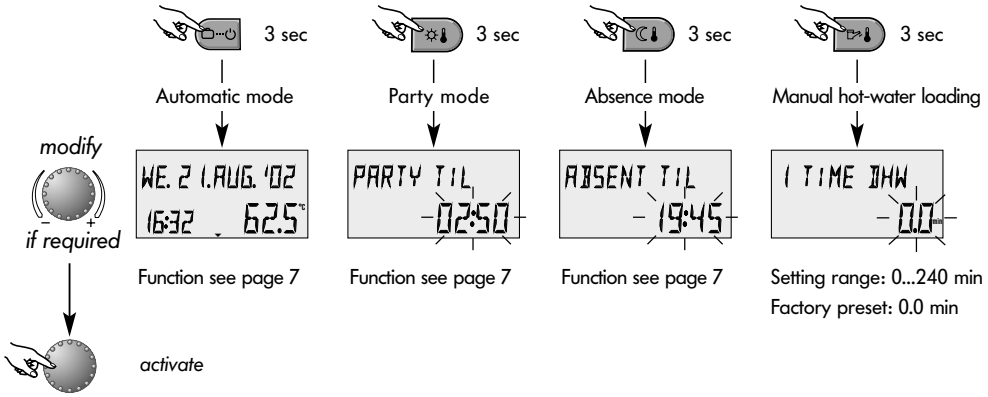


Permanent reduced heating and reduced hot water operation round the clock according to the settings of set back temperature (see page 5), reduced heating mode (see page 26) and hot water economic temperature (see page 25).

Plant off frost protection

Heating and hot water plant completly switched off except for frost protection mode.

Quick operational mode selection



Short-time operational modes

Frequently used operating modes such as *PARTY* or *ABSENT* or reloading the hot water tank during set back mode can be selected quickly according to the left scheme.

Direct automatic mode

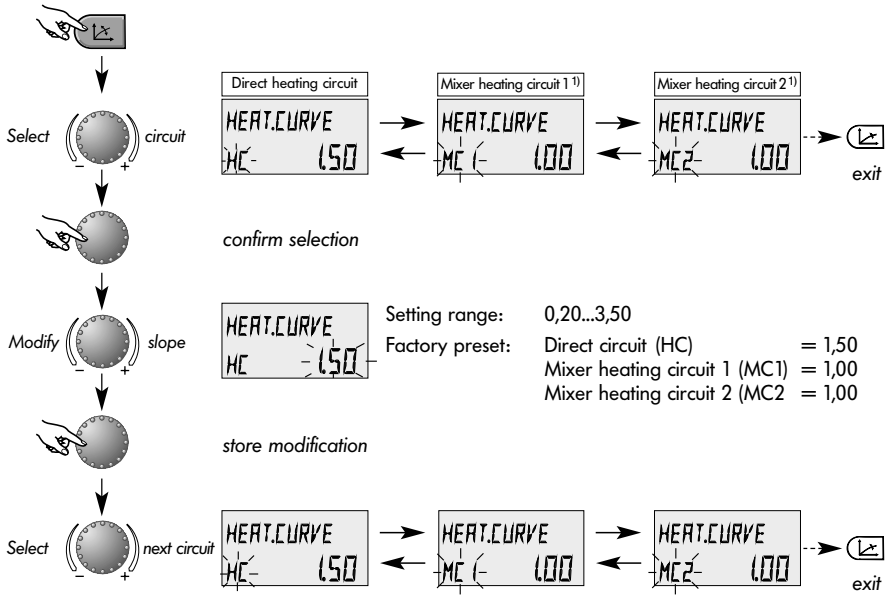
Pressing button ⊶ for approx. 3 seconds activates the automatic mode via timer inevitably. Functions and setting ranges see *Selection and function of operational mode* page 6-7.

Manual hot water loading

To activate manual hot water loading outside of operation times the button DHW has to be pressed for about 3 seconds. This turns on hot water preparation at any time for a period which may to be adjusted with the rotary-push button between 0 ...240 minutes. Pressing the rotary-push button activates loading. After this period the controller returns to the selected program.

At adjustment 0.0 the loading is independent of any time period. The tank will be loaded up once to the set DHW-temperature.

Setting the heating characteristics (heating curve)



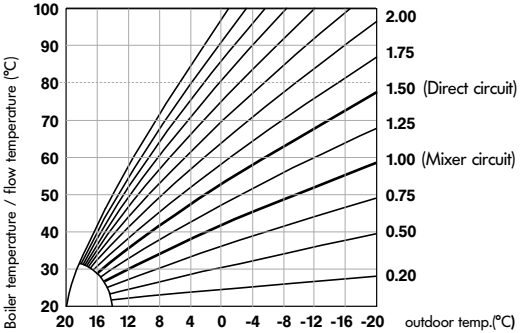
1) as far as available by numbers of expansion modules ZMC 1

This button regulates the heating characteristics of each heating circuit in relation to outdoor temperature.

The adjustment is dependent on the structural factors of the building and shows the relation between outdoor temperature and boiler resp. flow temperature (MC1, MC2).

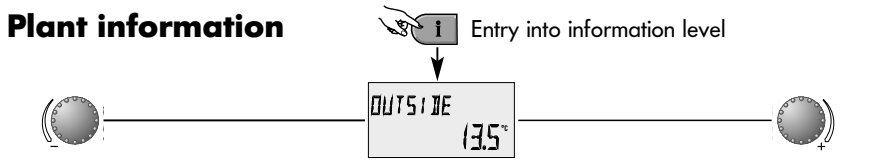
The slope determines the change of the boiler resp. flow temperature, if the outside temperature changes for 1 K.

Diagram of heating curves



Re-entry into the standard display is done be pressing the button again or automatically after approx. 60 seconds.

Plant information



Examples:

AUTO-PI DAY HC ON	Direct heating circuit [1]
AUTO-PI RED MC1 ON	Mixer heating circuit 1 [1]
ACTUATOR MC1 OPEN	Status of mixing valve 1 [1]
AUTO-PI ECO MC2 ON	Mixer heating circuit 2 [1]
ACTUATOR MC2 STOP	Status of mixing valve 2 [1]

Examples:

Outdoor temperature *minimum-maximum value between 0.00h and 24.00h*	OUT. MIN/MAX 8.0° 14.5°
Boiler temperature	HEAT.GENER. 64.5°
Return flow temperature (only with return flow sensor)	RETURN FLOW RS 32.0°
Flue gas temperature (only with flue gas sensor)	EXHAUST 58.0°
Hot water temperature (electronic DHW-sensor only)	DHW 50.5°

The info button displays general information such as plant temperatures, states of heating circuits and plant equipment.

Turning the rotary-push button clockwise
displays from all temperatures

- the actual values as well as the consumption figures.
- the nominal values pressing the rotary-push button.

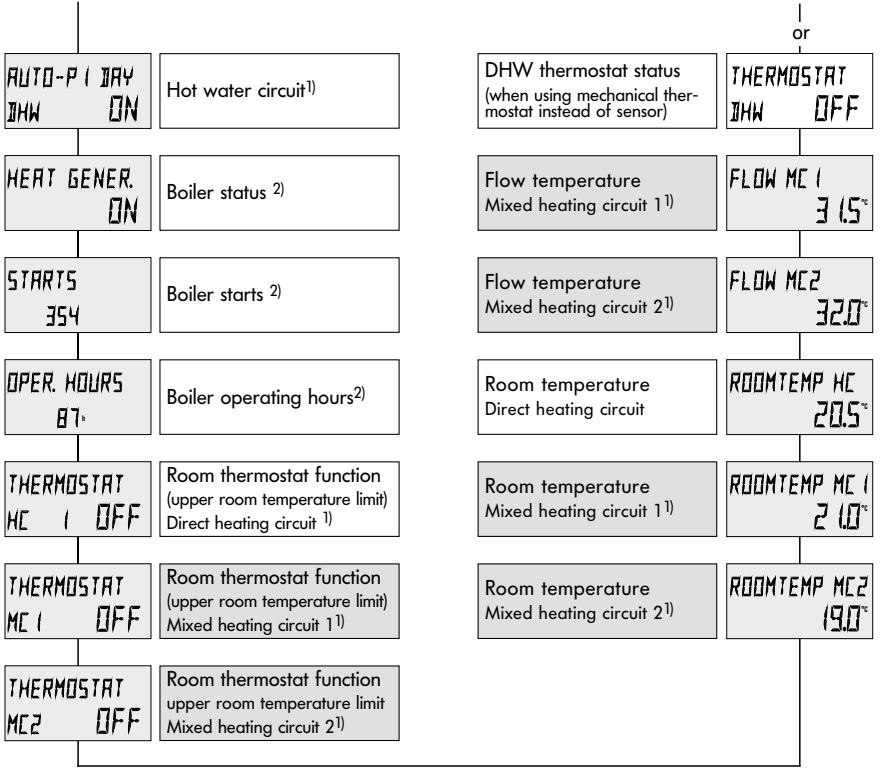
Turning the rotary-push button anti-clockwise

[1] displays heating-circuit information such as

- Type of operational mode (holiday, absent, party, auto, etc.)
- Operating times program P1 (P2, P3 when enabled)
- Mode of operation (daytime mode, reduced mode, ECO mode)
- Status of pumps (ON, OFF)
- Heating-circuit identification (HC, MC1, MC2, DHW)

[2] Boiler information such as

- Boiler status (ON, OFF)
- Number of operating hours (burner)
- Number of burner starts



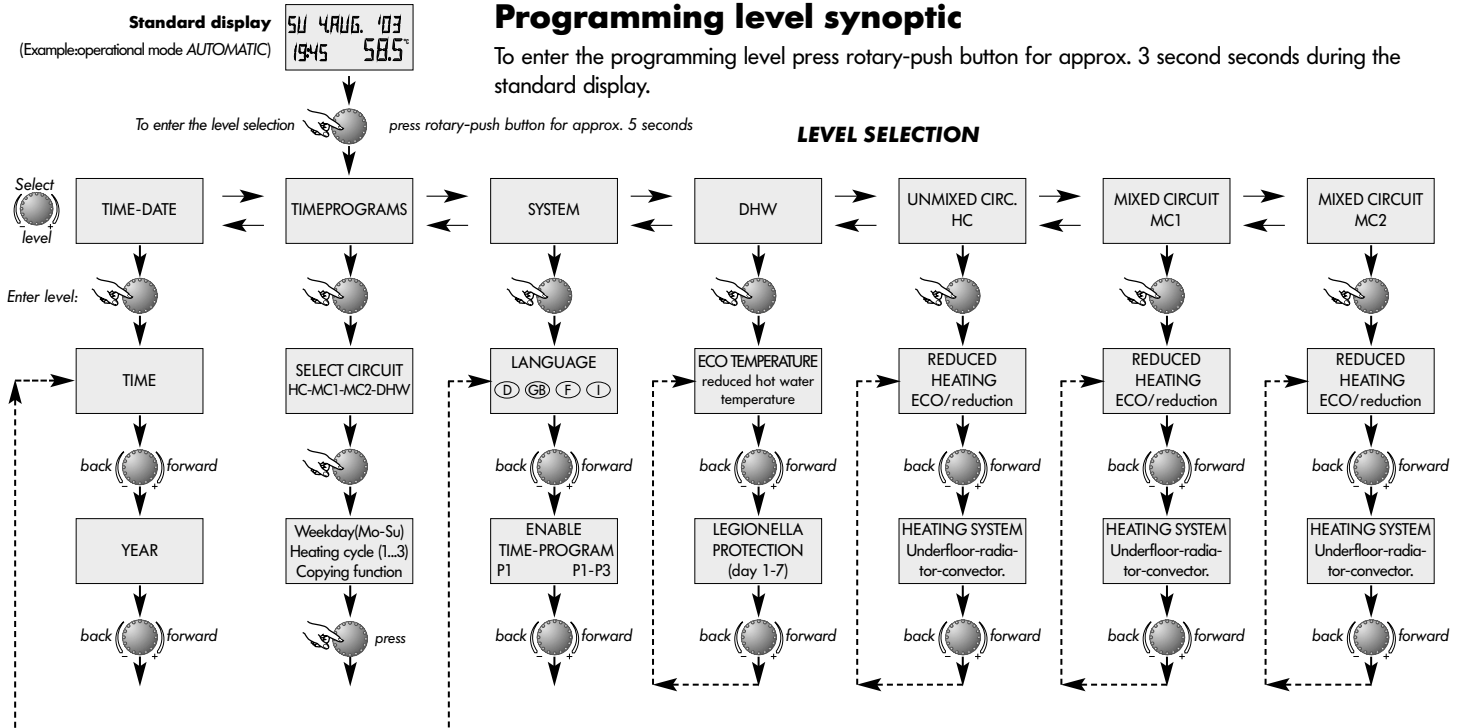
if room sensor is enabled:

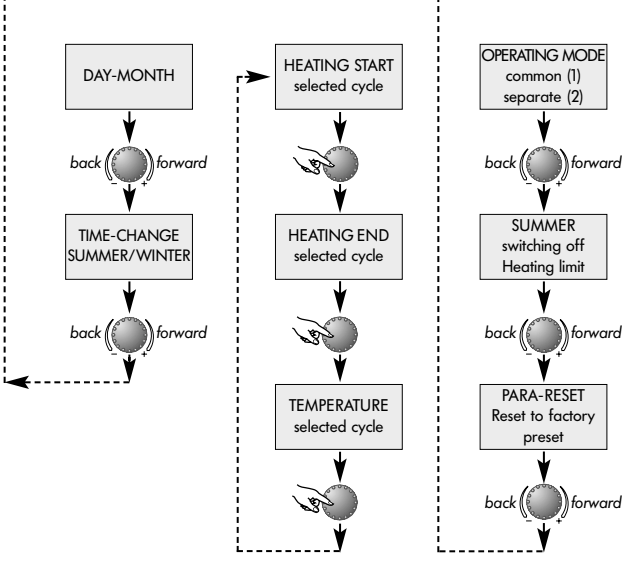
- *Room thermostat function (Heating ON/OFF)*
- *current room temperature of the respective heating circuit*

with mixer expansion module(s) ZMC 1 only

Programming level synoptic

To enter the programming level press rotary-push button for approx. 3 second seconds during the standard display.





Selection and modification of parameters and setting values

Entering into the programming level, principally the OPERATING-TIMES LEVEL appears at first. All other levels, such as

- DATE/TIME

- SYSTEM PARAMETERS

- DOMESTIC HOT WATER CIRCUIT

- DIRECT HEATING CIRCUIT

- MIXER-HEATING CIRCUIT-1 [1)]

- MIXER-HEATING CIRCUIT-2 [1)]

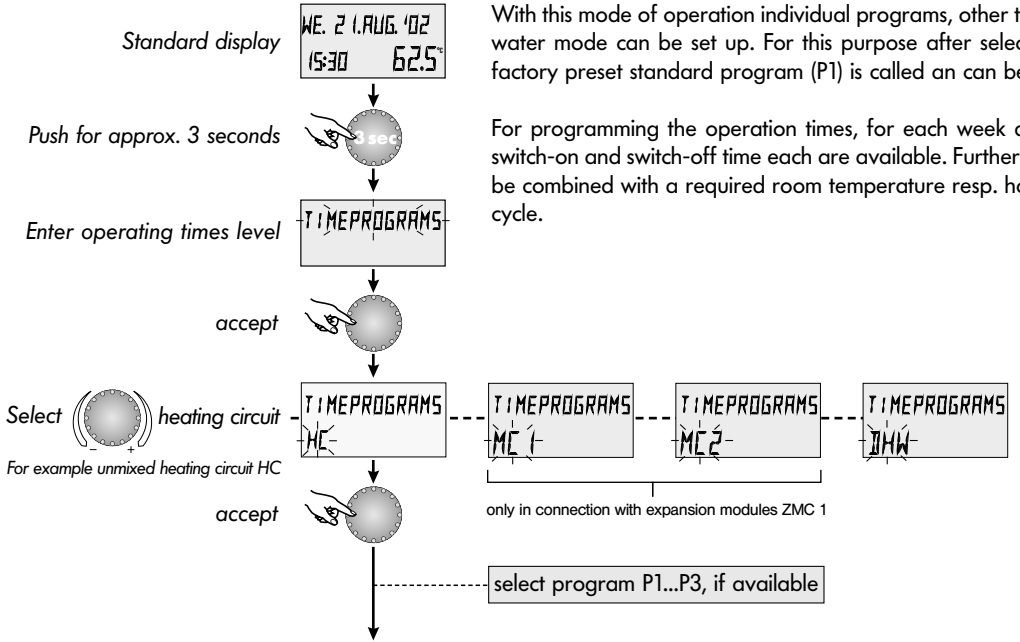
can be selected directly via the rotary-push button.

The selected flashing level is activated by pressing the rotary-push button, the first value resp. parameter appears flashing and can be modified and taken over via the rotary-push button. The following parameters within the selected level can be treated in the same way if necessary.

Re-entry into the level selection is done via the info button (i), re-entry into the standard display via the program-selection button (i) or automatically after approx. 60 seconds.

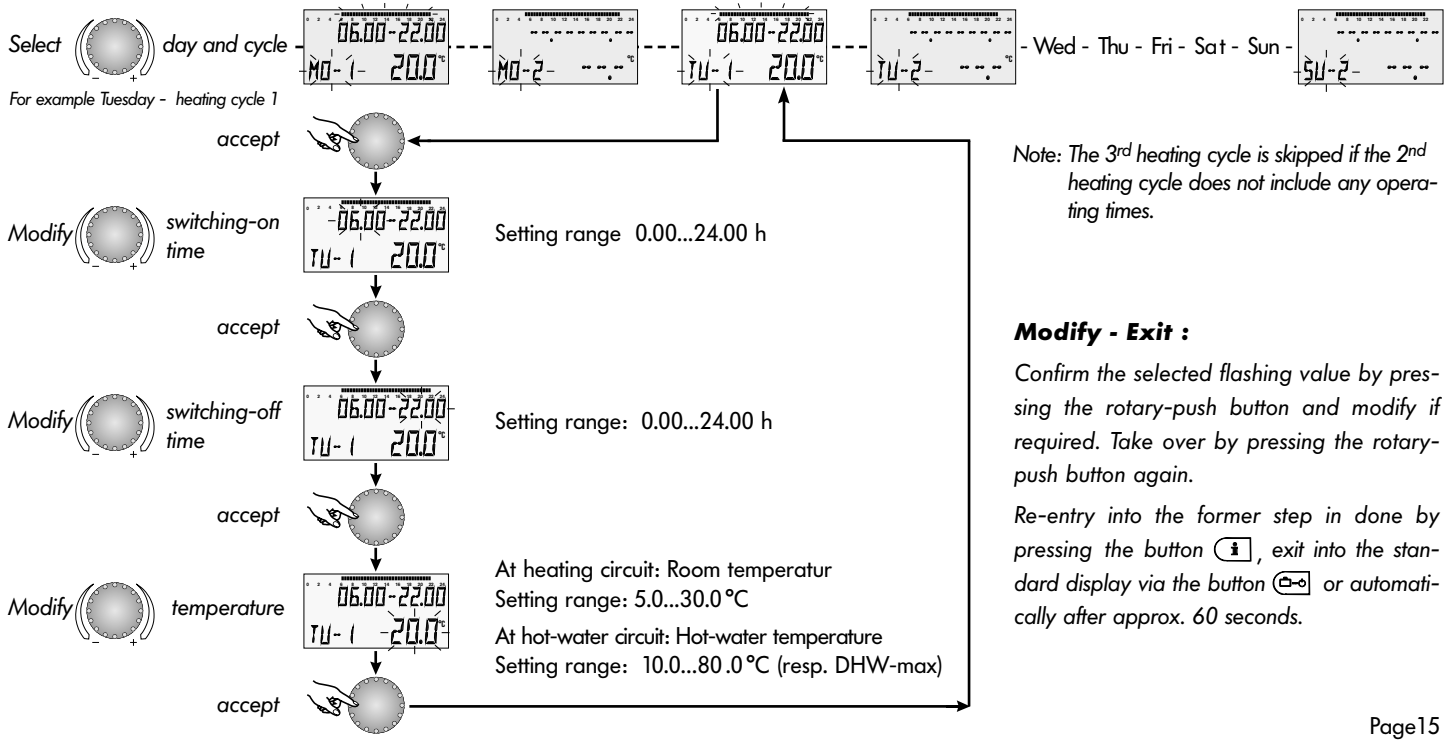
[1)] only in connection with expansion module(s) ZMC 1

Programming of operating times



With this mode of operation individual programs, other than standard programs for heating and hot-water mode can be set up. For this purpose after selecting the heating- resp. hot-water circuit the factory preset standard program (P1) is called an can be overwritten individually.

For programming the operation times, for each week day maximum three heating cycles with one switch-on and switch-off time each are available. Further more, the heating- resp. hot-water cycle can be combined with a required room temperature resp. hot-water temperature for the duration of the cycle.



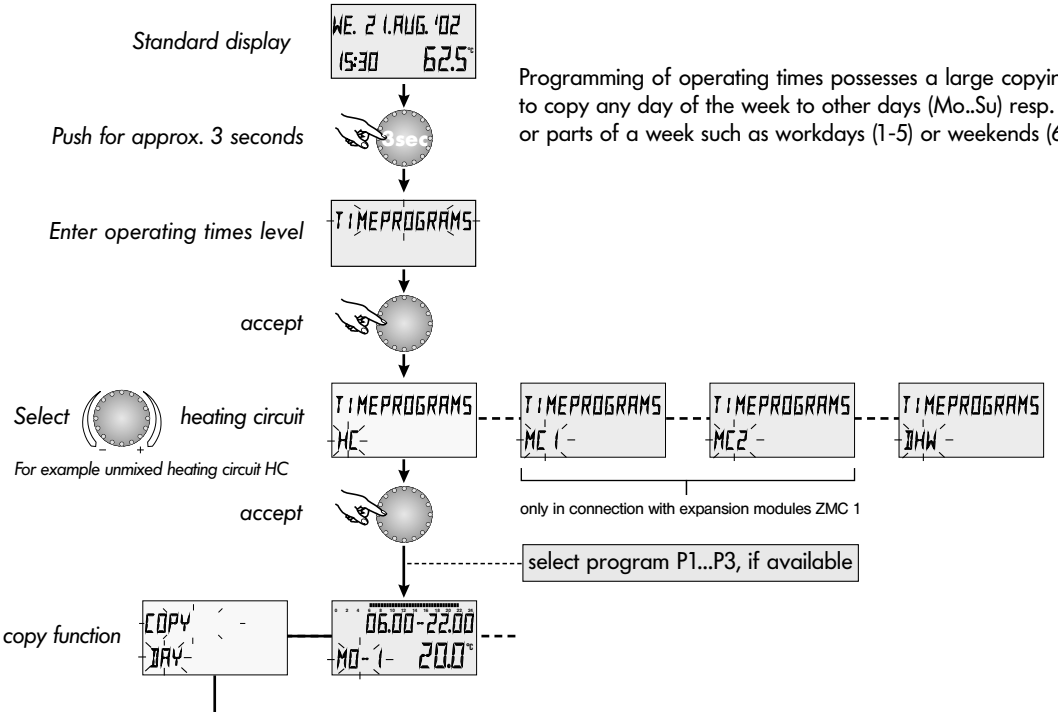
Note: The 3rd heating cycle is skipped if the 2nd heating cycle does not include any operating times.

Modify - Exit :

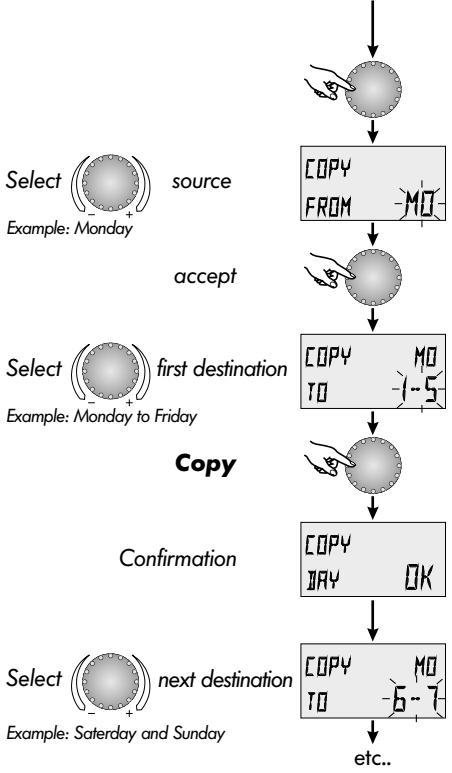
Confirm the selected flashing value by pressing the rotary-push button and modify if required. Take over by pressing the rotary-push button again.

Re-entry into the former step in done by pressing the button (i), exit into the standard display via the button ⊶ or automatically after approx. 60 seconds.

Copy operating times



Programming of operating times possesses a large copying function which allows to copy any day of the week to other days (Mo..Su) resp. to the whole week (1-7) or parts of a week such as workdays (1-5) or weekends (6-7).

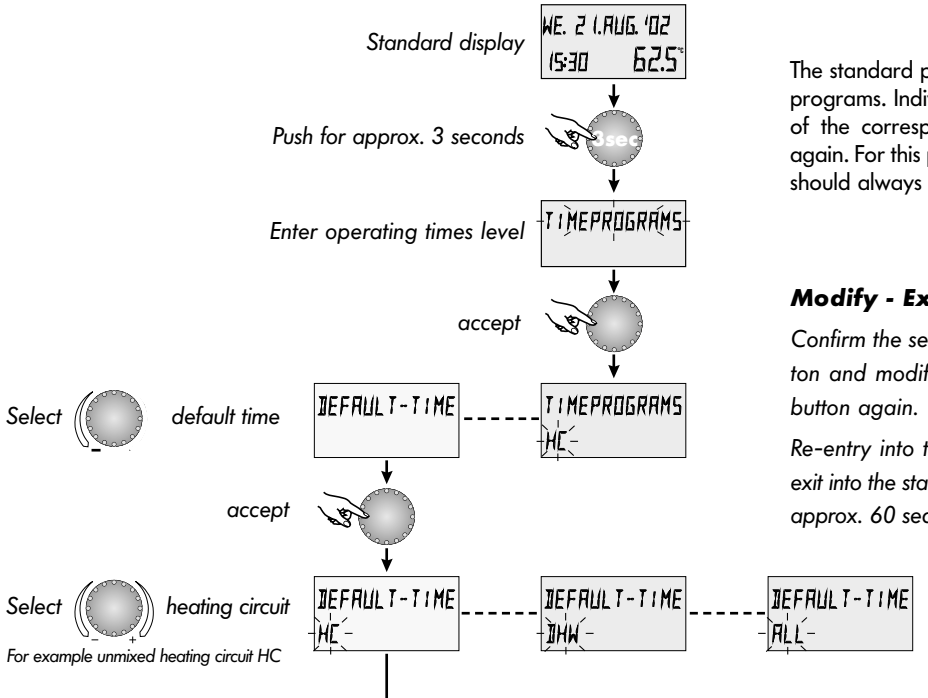


Modify - Exit :

Confirm the selected flashing value by pressing the rotary-push button and modify if required. Take over by pressing the rotary-push button again.

Re-entry into the former step in done by pressing the button (i), exit into the standard display via the button ⊶ or automatically after approx. 60 seconds.

Return loading of standard programs - deleting of individual operating-times programs

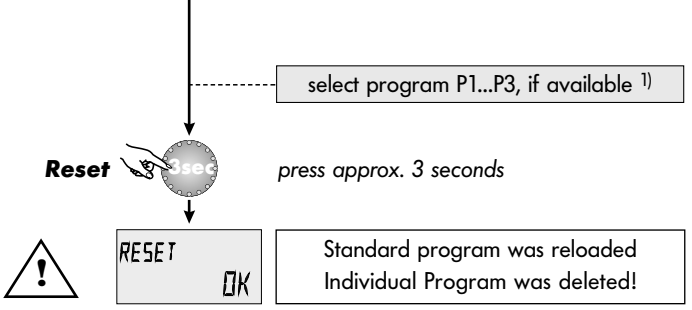


The standard programs do not get lost by overwriting with individual programs. Individual programs however are cancelled at a later call of the corresponding standard programs and have to be set up again. For this purpose individual switching-on and switching-off times should always be noted (see page 20/21).

Modify - Exit :

Confirm the selected flashing value by pressing the rotary-push button and modify if required. Take over by pressing the rotary-push button again.

Re-entry into the former step in done by pressing the button (i), exit into the standard display via the button ⊂⊃ or automatically after approx. 60 seconds.



1) see page 22 - parameter *PROGRAM*

2) only in connection with mixer expansion module(s)

Standard operating times programs

Standard operating-times program P1

Circuit	Day	Heating from...to
Heating circuits (HC, MC1[2], MC2[2])	Mo-Su	06.00 - 22.00 h
Domestic hot water (DHW)	Mo-Su	05.00 - 22.00 h

Standard operating-times program P2 1)

Circuit	Day	Heating from...to	
Heating circuits (HC, MC1[2], MC2[2])	Mo-Th	06.00-08.00	16.00-22.00h
	Fr	06.00-08.00	13.00-22.00h
	Sa-Su	07.00-23.00h	
Domestic hot water (DHW)	Mo-Th	05.00-08.00	15.30-22.00h
	Fr	05.00-08.00	12.30-22.00h
	Sa-Su	06.00-23.00h	

Standard operating-times program P3 1)

Circuit	Day	Heating from...to
Heating circuits (HC, MC1[2], MC2[2])	Mo-Fr	07.00-18.00 h
	Sa-Su	reduced heating
Domestic hot water (DHW)	Mo-Fr	06.00-18.00 h
	Sa-Su	reduced heating

Table for individual operating times and programs

Unmixed heating circuit (HC)

Day	Operating times program P1						Operating times program P2						Operating times program P3					
	1st cycle		2nd cycle		3rd cycle		1st cycle		2nd cycle		3nd cycle		1st cycle		2nd cycle		3rd cycle	
	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till
Mon																		
Tue																		
Wed																		
Thu																		
Fri																		
Sat																		
Sun																		

Domestic hot-water circuit (DHW)

Day	1st cycle		2nd cycle 2		3rd cycle		1st cycle		2nd cycle		3rd cycle		1st cycle		2nd cycle		3rd cycle	
	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till
Mon																		
Tue																		
Wed																		
Thu																		
Fri																		
Sat																		
Sun																		

Mixed heating circuit MC1 [1]

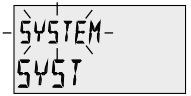
Day	Operating times program P1						Operating times program P2						Operating times program P3					
	1st cycle		2nd cycle		3rd cycle		1st cycle		2nd cycle		3rd cycle		1st cycle		2nd cycle		3rd cycle	
	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till
Mon																		
Tue																		
Wed																		
Thu																		
Fri																		
Sat																		
Sun																		

Mixed heating circuit MC2 [1]

Day	1st cycle		2nd cycle 2		3rd cycle		1st cycle		2nd cycle		3rd cycle		1st cycle		2nd cycle		3rd cycle	
	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till	from	till
Mon																		
Tue																		
Wed																		
Thu																		
Fri																		
Sat																		
Sun																		

[1] Only in connection with expansion module(s) ZMC1

SYSTEM



This level includes general delimiting parameters and options referring to the corresponding heating system

Entry: *see »Programming level synoptic« page 12-13.*

Exit: *via button ⊂⊃ or automatically after 60 seconds*

Modify: *Confirm selected flashing parameter by pressing the rotary-push button. Then set the new required value and accept by pressing the rotary-push button again. If necessary, the next parameters can be modified in the same way.*

Entry:

Language

Setting range: D = GERMAN GB = ENGLISH
F = FRENCH I = ITALIAN

Factory preset: D

next parameter

All information appearing on the display are available in the languages German, English, French and Italian. After entry as first parameter appears the language selection. The required language can be selected and accepted according to the above assignment.

Application: *Use of the instrument in the respective linguistic field.*

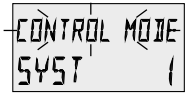
Operating times program

Setting range: P1, P1-P3
Factory preset: P1

next parameter

This parameter specifies the number of the cleared time programs. With the regulation P1 only <u>one</u> operating-times program is available, with the setting value P1-P3 <u>*all three*</u> programs are available and can be programmed individually.

Application: *Shift work, different programs for summer, transition period, winter etc.*



next parameter

Control mode

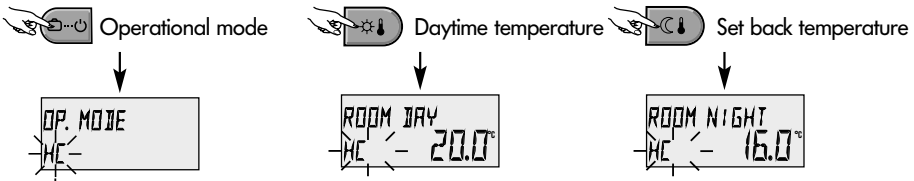
Setting range: 1 = common mode 2 = separated mode
Factory preset: 1

Common control mode:
The selected operational mode (via button for *Holiday, Absence, Party, Automatic etc.*) applies to the heating circuit and to the hot-water circuit together.

Application: *Objects with uniform seizure character (One-family houses etc).*

Separated control mode:
Heating- and hot-water circuits can be assigned with their own operational modes and temperature settings. To that the respective circuit has to be selected in accordance with the following scheme before setting the required operational mode.

Application: *Objects with different use of heating and hot-water (for example heating operation in Holiday mode, hot-water permanently in reduced mode).*



further operation see page 5 and 6

next parameter

Summer switching-off

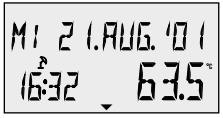
Setting range: OFF, 10.0 to 30,0 °C
Factory preset: 20.0 °C

This parameter specifies the heating delimiting value regarding the average resp. current outside temperature and puts the heating plant automatically out of service as soon as the outside temperature exceeds the set heating delimiting value. During summer switching-off the pump of the heating circuit is activated each day for approx. 10 seconds to protect it against corrosion.

With the regulation OFF summer switching-off is not effective.

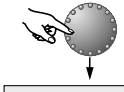
Hot water preparation is not affected by summer switching-off.

Note: The active summer switching-off appears on the standard display with a sunshade symbol.



Summer switching-off activated

Application: *All objects which do not require a heating operation during summertime*



Parameter-reset

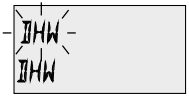
This function resets all individually entered values in the programming level to the factory preset.

Exception: Time-date, operating times

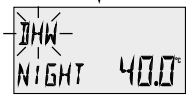
Reset: Press rotary-push button for approx. 5 sec. while indication SET is flashing, until standard display appears.

Important: Reset may only be executed if all individually entered values shall be replaced by the factory preset values!

DOMESTIC HOT WATER



Entry:



next parameter

This level includes the necessary parameters for programming the hot-water circuit with the exception of hot-water operating-times.

Entry: *see »Programming level synoptic« on page 12-13.*

Exit: *via button ⊂⊃ or automatically after 60 seconds*

Modify: *Confirm selected flashing parameter by pressing the rotary-push button. Then set the new required value and accept by pressing the rotary-push button again. If necessary, the next parameters can be modified in the same way.*

Hot-water economic temperature

Setting range: 10.0 °C up to the required hot water temperature
Factory preset: 40.0 °C

This parameter specifies the height of the reduced hot-water temperature outside the hot-water service readiness times (between the hot-water operating cycles) as well as in the operational mode *ABSENCE* for the duration of absence.

Application: *Supporting temperature inside the hot-water tank in order to avoid a cooling down of the tank.*

Note: *This parameter is skipped if a hot-water thermostat is used instead of an electronic hot-water sensor.*

Legionella protection (day)

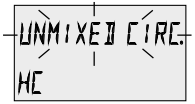
Setting range: OFF, MO...SU, ALL
Factory preset: OFF

The legionella protection serves to avoid a legionella infestation inside the hot-water tank an is activated on the selected weekday (Mon to Sun) or on every day at 2.00 o'clock. If the hot-water temperature should drop below 65 °C, the tank is reloaded.
With setting to OFF the legionella protection is not available.

Note: *Other legionella protection times can be regulated exclusively by the heating plant specialist.*

Important: *Danger of scalding! Use thermostatic mixing valve on DHW outlets.*

Unmixed heating circuit (mixed circuits only when using expansion modules ZMC-1)



Entry:

next parameter

This level includes the parameters required for programming the heating circuit(s) with the exception of the related operating-times programs.

Note: The parameters in this level refer to the direct circuit and are valid in same manner for mixed circuits provided that mixer expansion modules ZMC1 are used.

Reduced heating mode

Setting range: ECO, ABS
Factory preset: ECO

During the reduced operation the following modes can be selected:

ECO mode: At outside temperatures above the set plant frost protection the heating circuit is switched off completely. At temperatures below frost protection the heating circuit is controlled with reduced heating characteristic according to the required reduced temperature (see page 5).

RED mode: During the reduced mode the heating circuit pump remains activated. The heating circuit is controlled according to the reduced heating characteristic, the temperature does not drop below the set minimum temperature value.

Entry: *see »Programming level synoptic« on page 12-13.*

Exit: *via button ⊂⊃ or automatically after 60 seconds*

Modify: *Confirm selected flashing parameter by pressing the knob. Then set the new required value via the knob and accept by pressing the knob again. If necessary, the next parameters can be corrected in the same way.*

Application: *Objects with high insulation values*

Application: *Objects with low insulation values*

Adaptation to the heating system

Setting range: 1,00 to 10.0
Factory preset: 1,30

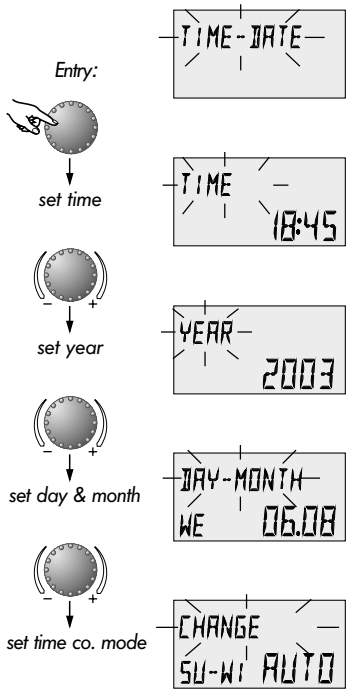
This parameter refers to the type of the heating system inside the heating circuit and has to be adapted to the exponents of the corresponding consumer (underfloor-radiator-convector). The setting value specifies the curvature of the heating curve of the weather dependent heating circuit and compensates the system-related efficiency losses at the lower temperature range by a progressive heating curve in conformity with the adjustment.

Applications:

The following setting values are recommended for the below-mentioned applications

Setting value	*Application*
1.00. . . 1.10	*Heating curve for underfloor heating systems or other static heating surfaces*
1.30. . . 2.20	*Normal standard heating curves for radiators*
3.00. . . 4.00	*Heating curves for convectors*
4.00. . . 10.0	*Special heating curves for ventilators with high starting temperatures*

TIME-DATE



Current time
Setting range:
0.00. . . 24.00 h

Calender year
Setting range:
2001. . . 2099

Calender day-month-weekday
Setting range: 01.01. . . 31.12.
Weekday is set automatically

Time changeover mode (summer-winter)
Setting range:
Auto: last Sunday in March & October
Manual: no time changeover

Entry: *See »Programming level synoptic« on page 12-13.*

Exit: *Via button ⊂⊃ or automatically after 60 seconds*

Modify: *Confirm selected flashing parameter by pressing the rotary-push button. Then set the new required value and accept by pressing the rotary-push button again. If necessary, the next parameters can be corrected in the same way.*

The beside standing values are factory preset and normally need not be updated. If in some exceptional cases corrections should be necessary, the values can be adapted to the real conditions.

The internal pre-programmed calender provides an automatic time changeover at the yearly repeating summer-wintertime changeover dates.

If required, the automatic time reset can be switched off (manual reset).

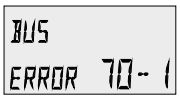
Application: Countries without summer-wintertime mode, change of changeover dates

Error messages

Example for error messages »sensor« (short or open circuit)
Error code 10...20 with index 0 or 1

Example for error messages »boiler« (control status)
Error code 30…40 with index 2…5

Example for logical error messages (control functions)
Error code 50…60 with index 2…4



Example for error messages »data bus« (address error)
Error code 70 with index 0 or 1

The instrument is equipped with an extensive error diagnostic features. The error displayed takes priority over other displays and varies dependent on the model in question.

Note: Error messages only appear alternating with the standard display.

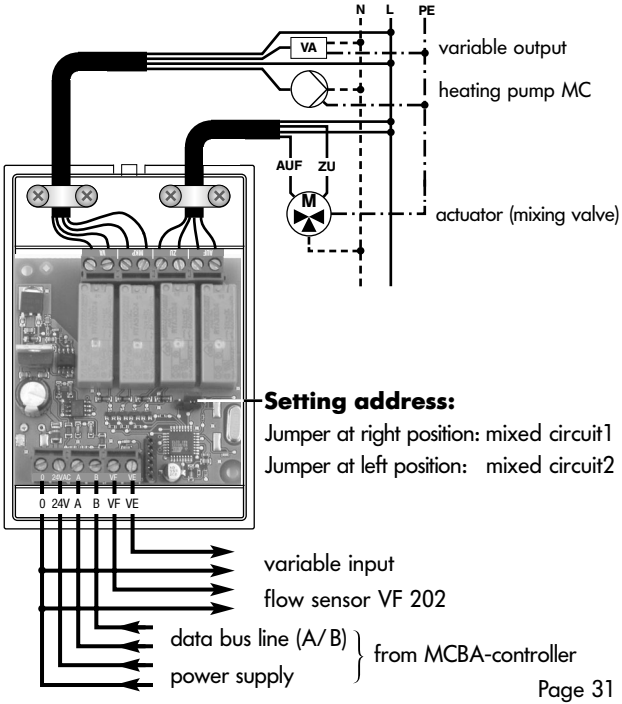
In case of error messages the heating specialist has to be informed!

Notes

Technical specification mixer expansion module ZMC1

Supply voltage:	Via data bus from MCBA-controller (DC-safety voltage)
Power consumption:	300 mW
Bus interface:	RS 485
Inputs:	Flow sensor VF 202
	Variable input
Outputs(floating):	Mixer actuator OPEN / CLOSED
	Heating pump (mixed circuit)
	Variable output
Ambient temperature:	0...50 °C
Storage temperature:	-25...60 °C
Protection type acc. to EN 60529:	IP 20
Protection class acc. to EN 60730:	III
Approval according to:	VDE 60730
Casing dimensions (BxHxD):	76 x 105 x 41 mm
Casing material:	ABS, antistatic
Electrical connections:	Screw terminals
Max. length of cable (data bus):	50 m
Recommended cable:	J-Y(St)Y 2x2x0.6

Electrical installation ZMC1

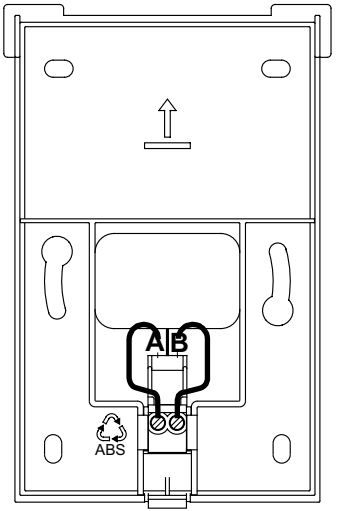


Technical specification

Supply voltage:	Via data bus (DC-safety voltage by EN 60730)
Power consumption:	300 mW
Bus interface:	RS 485
Ambient temperature:	0...50 °C
Storage temperature:	-25...60 °C
Protection type acc. to EN 60529:	IP 20
Protection class acc. to EN 60730:	III
Approval according to:	VDE 60730
Casing dimensions (BxHxD):	90 x 138 x 28 mm
Casing material:	ABS, antistatic
Electrical connections:	2-wire mode with plugable connection
Recommended cable:	J-Y(St)Y 2x2x0.6
Max. length of cable:	50 m
Data and timer back up:	Min. 5 years from date of delivery
Display:	Alphanumeric plain text and symbols
Weight:	Approx. 150 g

Electrical installation

Socket (unit removed)



Important: The two wires of the data bus (A, B) may not be changed !

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Subject to change

Inhalt