

Table of contents

Page 2

USER LEVEL

Display and Controls	4
Operation start-up - language selection - device identification - standard display	5-6
Temperature settings required daytime temperature, required reduced temperature, required hot water temperature	7
Operational mode selection for heating and hot water (summary)	8
Function of operational modes holiday, absence, party, automatic, summer, permanent heating, permanent reduced heating, standby	9
Quick operational mode selection (automatic, party, absence, hot-water reloading)	10
Heating curve adjustment	11
Heating system information	12-133

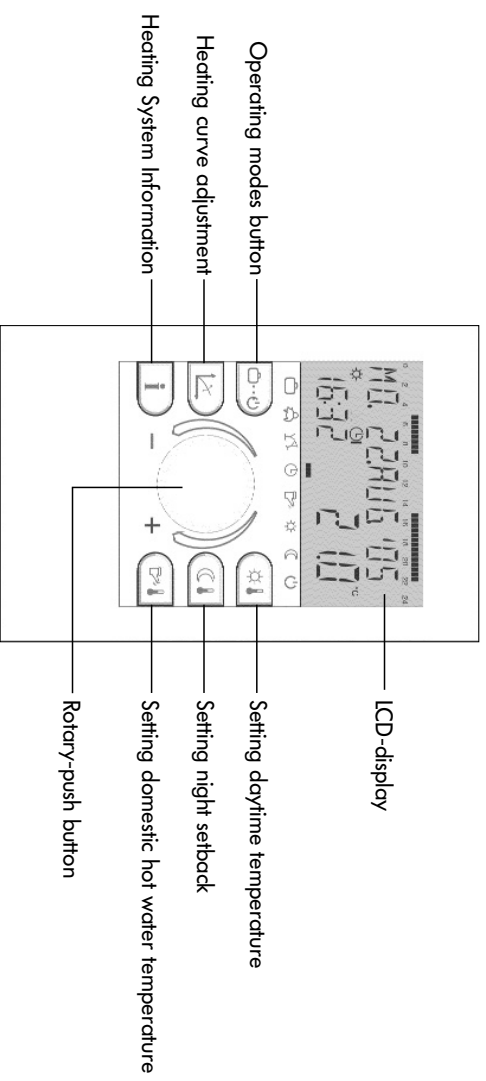
PROGRAMMING LEVEL

LEVEL SUMMARY	schematic block diagram	14-15
Level TIME PROGRAMS	Programming, copying, reloading of standard programs, table for individual programs	16-22
Level TIME-DATE	Time, calendar year, calendar month, calendar day, automatic summer-/wintertime reset	23
Level SYSTEM	Language selection, clearing of time programs, control mode, summer switching-off	22-26
Level DOMESTIC HOT WATER	Economic temperature, legionella protection	27
Level UNMIXED CIRCUIT	Reduced mode, heating system	28-29
Alarm messages		30
Notes		31
Technical specification		32

Display and Controls

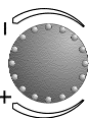
Operating instruments

Page 4



Operation

Symbolism used in this manual:



Turn: select parameters, change values



Press once: confirm, store

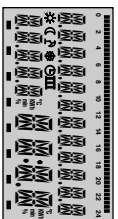
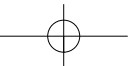
The center-positioned rotary-push button and the labeled keys guarantee a simple and easy operation. It is however recommended to read this manual attentively to be informed about the repeating steps.

- 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.

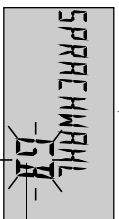
Turn to the right (+): Increase values

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.

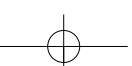


Display test



Language selection

Country code



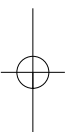
Start-up

In case of initiation of the plant or after every power failure a display test of the large display is carried out with automatic error diagnosis. At that all available segments and symbols will be displayed.

Language selection

In case of first initiation the desired language can be chosen after the display test. The languages DE, GB, FR, IT, NL, ES, PT, HU, CZ, PL, RO, RU, TR, S, N, BG can be selected.

Note: This display appears after every restart on day of first initiation until midnight. After that the language can only be changed in the level SYSTEM - parameter LANGUAGE.





Device identification
Interface and software version

Page 6

Device identification
After the display test and/or the language selection the device identification momentary appears with device type, interface and the corresponding number of software version.



Heating cycles
Standard display
Actual boiler temperature resp. room temperature

Basic display
Provided that there is not any error message, the basic display indicates the date, time, heating mode (☼ = daytime temperature, ☾ = reduced set back temperature) as well as the current boiler temperature or, if released, the room temperature. Response time program. The cursor below (■) indicates the current operating mode (see function of operating modes). The upper time bar shows the heating periods and the corresponding operating times of the current weekday.



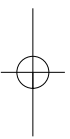
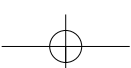
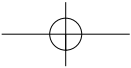
Standard display
Summer switching-off activated

An activated summer switch-off is represented in the basic display by a sunshade symbol (☼). The heating mode symbols ☼ or ☾ will be suppressed during an activated summer switch-off.

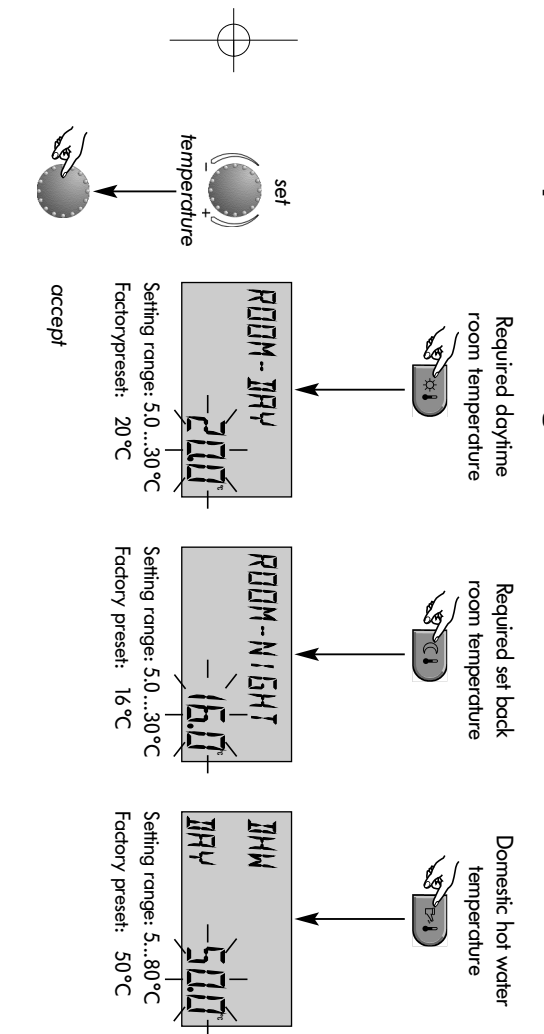



Standard display
Frost protection activated


With acting frost protection function an ice crystal symbol appears in the basic display (❄).




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):

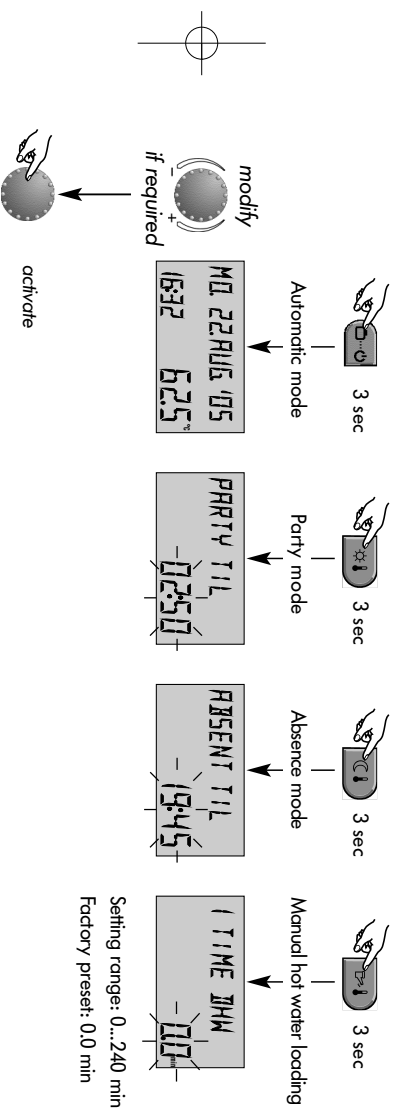
After pressing the button for the required temperature the current value appears flashing and can be adjusted directly with the rotary pushbutton.

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.

Functions of operational modes

Plant off during holiday	HOLIDAY TIL 1927 2409	Setting range: Actual date ... actual date + 250 days Return to the previously selected operational mode at 000 o'clock of the set return date. Hot water operation is set to frost protection temperature of 5 °C.
Interrupt heating operation	ABSENT TIL 1927 1930	Setting range P1: Heating operation is interrupted until next switching-on time of current operating time program (see level TIME PROGRAMS)
Extend heating operation	PARTY TIL 1927 0227	Setting range: P1: Heating operation is continued until next switching-on time of current operating time program (see level TIME PROGRAMS)
Heating operation via timer	MD 22PLUS 105 1927 565	Operating times: (see level TIME PROGRAMS) Heating and domestic hot water operation automatically according to settings of temperature values (see Temperature settings) and selected operating times program.
Domestic hot water only	SUMMER 1927 240	Operating times: (see level TIME PROGRAMS) Only hot water operation according to settings of hot water temperature (see Temperature settings) and selected operating times program. The heating operation is interrupted and frost protected.
Permanent heating operation	HEATING 1927 720	Permanent heating and reduced hot water operation round the clock according to the settings of daytime room temperature and domestic hot water temperature (see Temperature settings)
Permanent reduced heating operation	RED HEATING 1927 450	Permanent reduced heating and reduced hot water operation round the clock according to the settings of setback temperature (see Temperature settings), reduced heating mode (see level UNMIXED CIRCUIT) and hot water economic temperature (see level DHW).
Plant off frost protection	STANDBY 1927 190	Heating and hot water plant completely switched off except for frost protection mode.

Quick operational mode selection



Short-time operational modes

Page 10

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

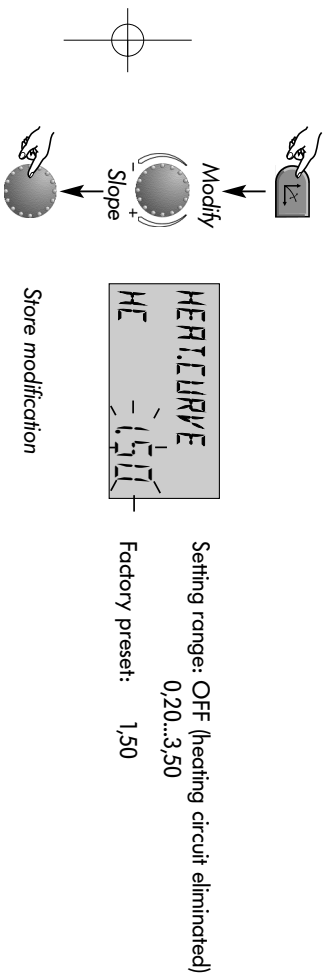
Pressing button for approx. 3 seconds activates the automatic mode via timer in-actively. Functions and setting range see *Operational mode selection for heating and hot water - Function of operational modes.*

Manual hot water loading

To activate manual hot water loading outdoor of operation times the button 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 pushbutton between 0 ...240 minutes. Pushing the rotary pushbutton activates loading. Afterwards the controller returns to program operation.

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

Heating system information

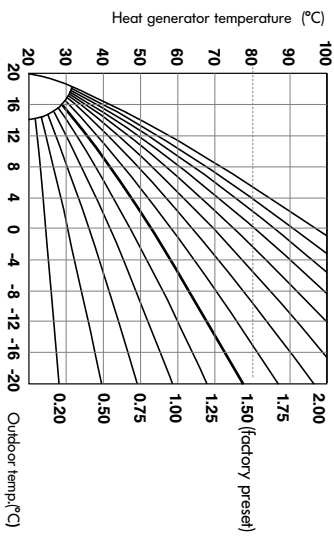


This button regulates the heating characteristics of the heating circuit in relation to outdoor temperature.

The adjustment is dependent of the plant installation and shows the relation between outdoor temperature and heat generator (boiler) temperature.

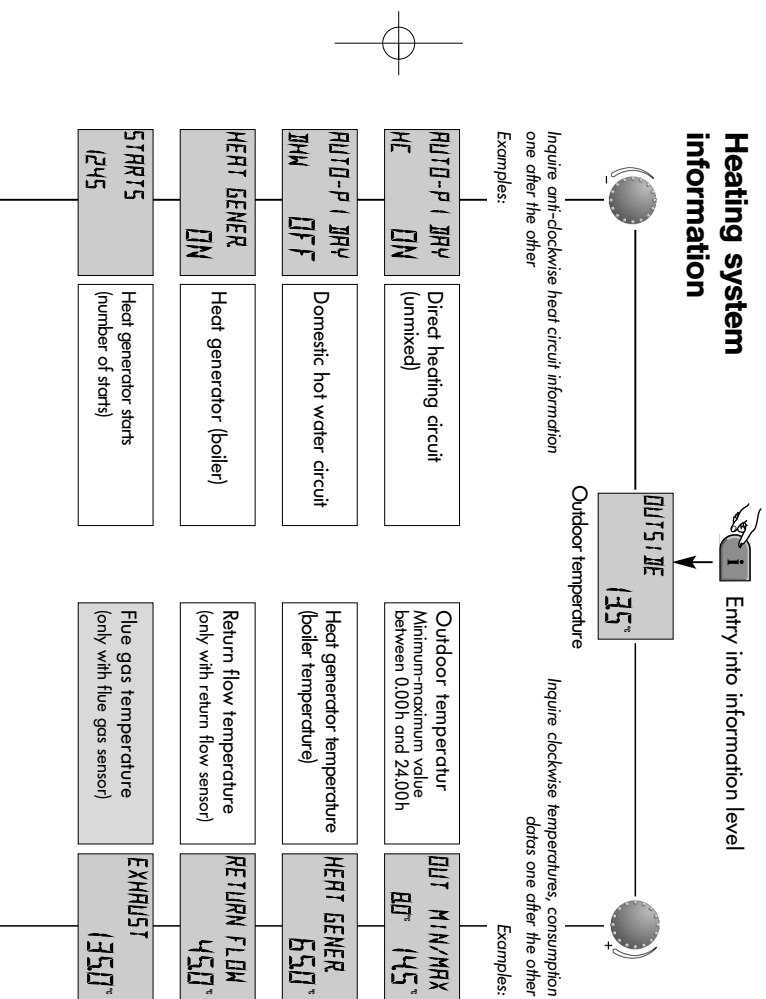
The slope sets the change of the supply temperature, if the outdoor temperature changes for 1 K.

Diagram of heating curves



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

Heating system information



This button displays all plant temperatures and states of all circuits. The information can be requested according to the direction with the rotary-push button.

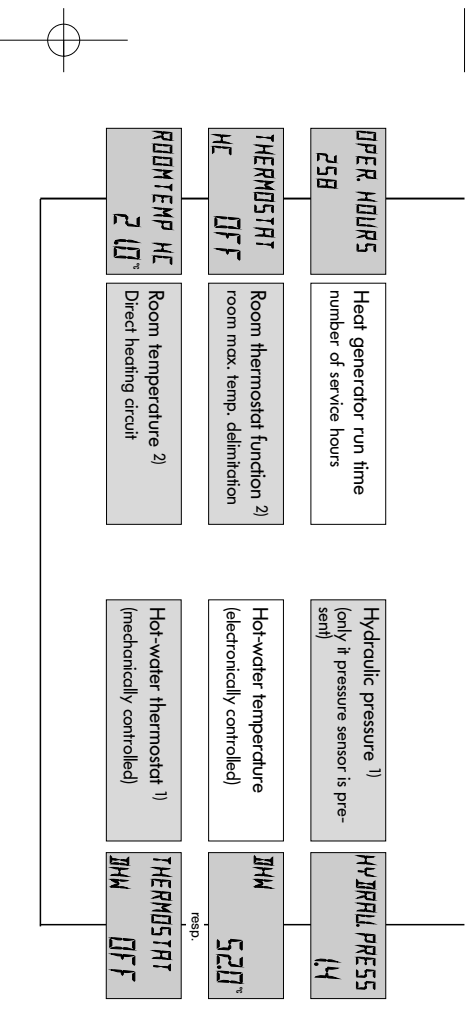
Page 12

Turning rotary-push button clockwise

- displays from all plant-specific temperatures
- the actual values and
 - the nominal values (pressing rotary-push button)
 - meter readings such as consumption data etc.

Turning rotary-push button anti-clockwise

- displays from direct heating circuit resp. DHW circuit
- operational mode (holiday, absence, party, auto etc.)
 - timer program P1 (P2 and P3 only when released)
 - heating mode (daytime-, reduced-, ECO-mode)
 - identification (direct circuit HC, hot water circuit DHW)
 - status of heating- and DHW charging pump (on, off)

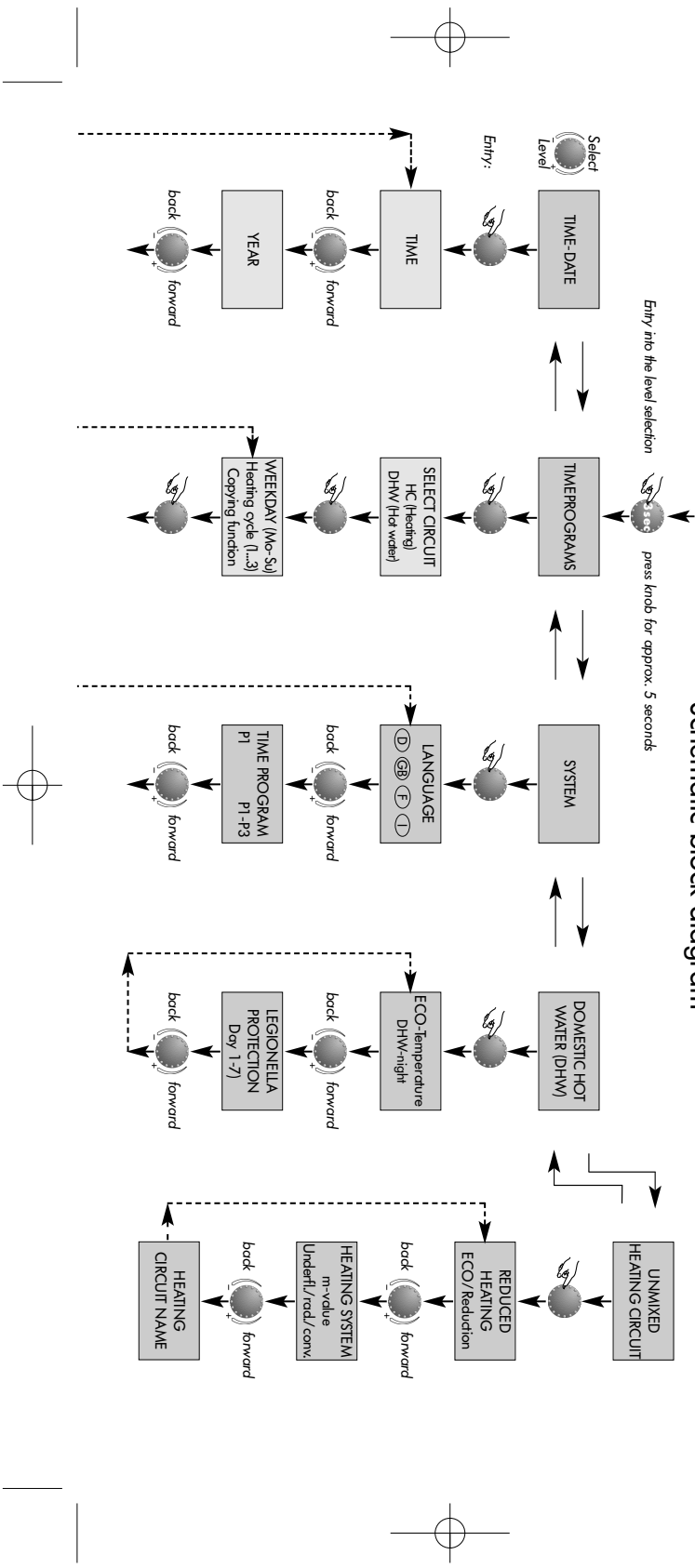


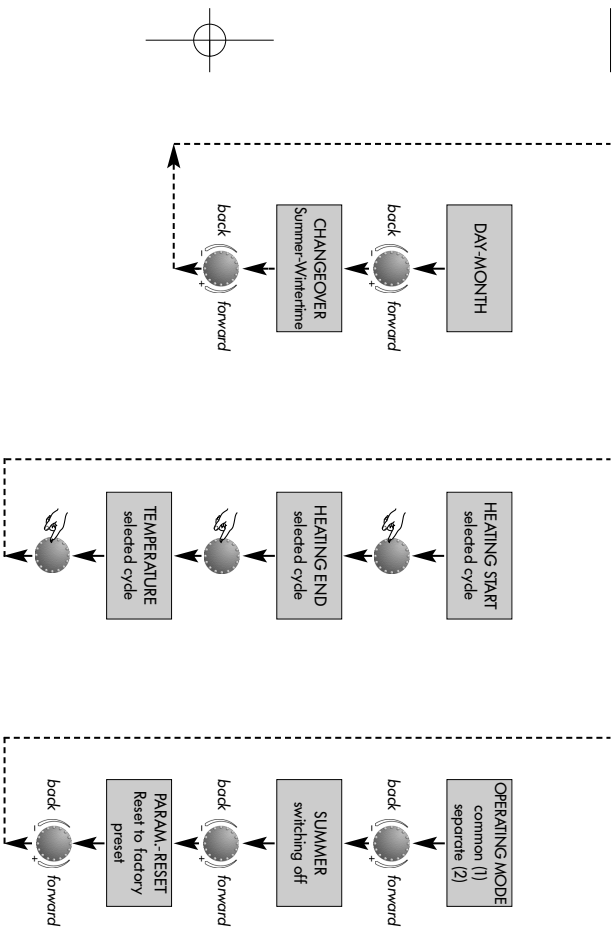
1) display dependent on the type of heat generator
 2) will be displayed only if the room sensor was activated before

- shows
 - operating status (on, off)
 - number of service hours
- number of starts of heat generator, boiler etc.
- shows
 - room thermostat function (heating on, off)
 - current room temperature
 - if room sensor is activated
- shows
 - water pressure
 - if pressure sensor is present

Standard display
 (Example: Operational mode AUTOMATIC)

Programming level - Level summary
 Schematic block diagram





Selection and modification of parameters and setting values

Entering into the programming level, principally the operating times level (TIME PROGRAMS) appears at first. All other levels, such as

- SYSTEM
- DHW
- UNMIXED CIRCUIT
- DATE-TIME

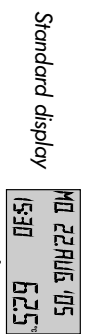
can be selected directly via rotary-push button

By pressing the rotary-push button, the selected flashing level is activated; the first value resp. parameter appears flashing; if necessary, it can be modified via the rotary-push button and accepted by pressing again. If necessary, the following parameters can be treated in the same way.

Re-entry into the level selection is done via the info button **[I]**, re-entry into the standard display via the program-selection button **[P]** or automatically after approx. 60 seconds.

Programming of operating times

Page 16



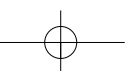
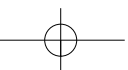
With this mode of operation individual programs, other than standard programs for heating and hot-water mode can be set up. For this purpose after selecting the heating- resp. hot-water circuit the factory preset standard program (P1) is called an can be overwritten individually.

Press for approx. 3 seconds



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.


Enter operating times level

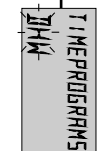
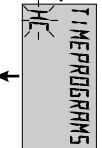


For programming the operation times, for each week day maximum three heating cycles with one switch-on and switch-off time each are available. Further more, the heating- resp. hot-water cycle can be combined with a required room temperature resp. hot-water temperature for the duration of the cycle.

accept



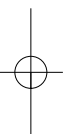
Select  heating circuit

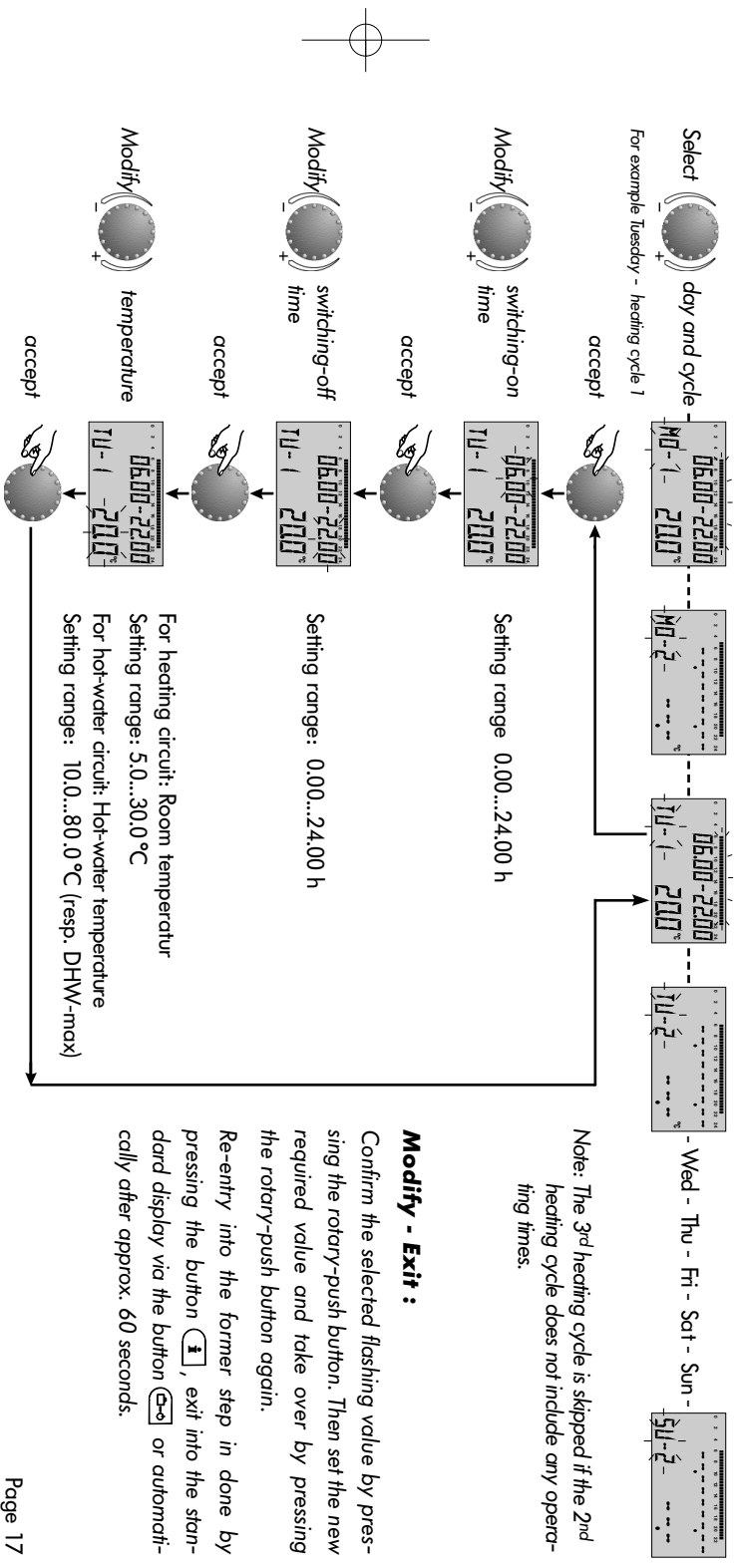


For example unmixed heating circuit HC



select program P1...P3, if released





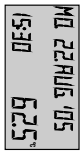
Note: The 3rd heating cycle is skipped if the 2nd heating cycle does not include any operating times.

Modify - Exit :

Confirm the selected flashing value by pressing the rotary-push button. Then set the new required value and take over by pressing the rotary-push button again.
Re-entry into the former step is done by pressing the button [Left Arrow], exit into the standard display via the button [Right Arrow] or automatically after approx. 60 seconds.

Copy operating times

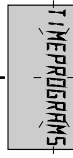
Standard display



Push for approx. 3 seconds



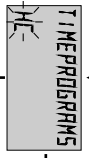
Enter operating times level



accept



Select heading circuit
For example unmixed heading circuit HC

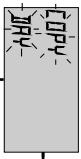


accept

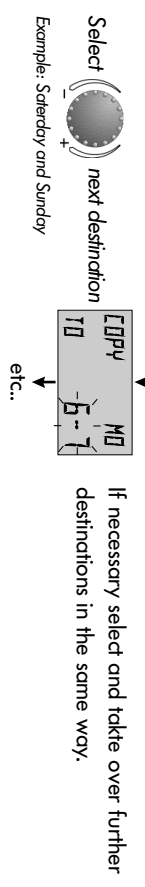
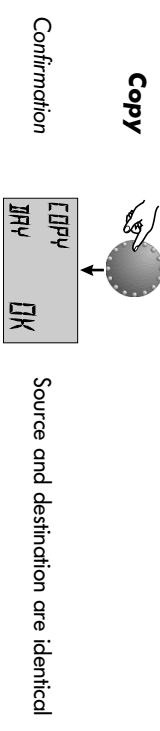
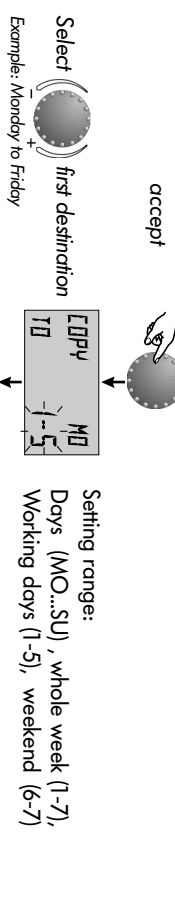
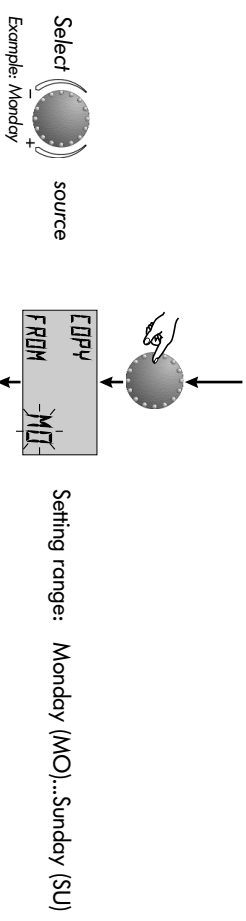


select program P1..P3, if available

Select copy function



Programming of operating times includes an extensive 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).

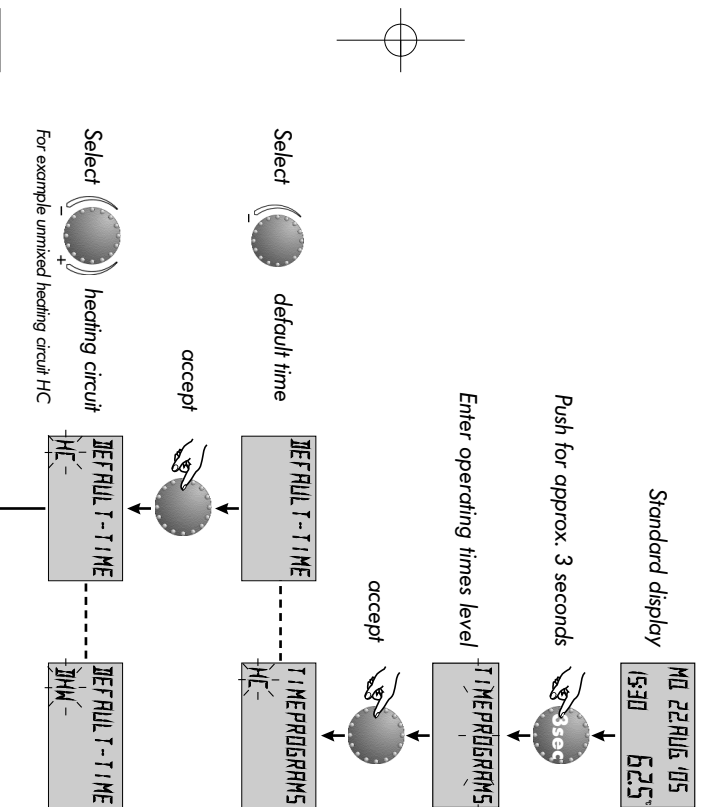


Modify - Exit :

Confirm the selected flashing value by pressing the rotary-push button. Then set the new required value and take over by pressing the rotary-push button again.
Re-entry into the former step is done by pressing the button , exit into the standard display via the button or automatically after approx. 60 seconds.



Reloading of standard time programs - deleting of individual time programs

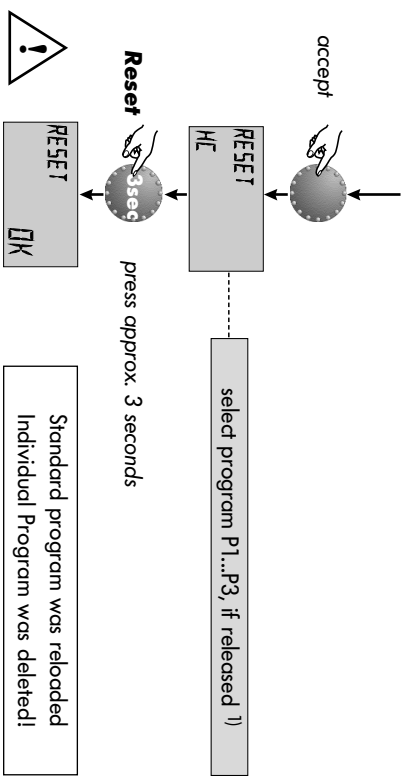
Page 20



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 level TIME PROGRAMS - table for individual programs).

Modify - Exit :

Confirm the selected flashing value by pressing the rotary-push button. Then set the new required value and take over by pressing the rotary-push button again.
Re-entry into the former step is done by pressing the button , exit into the standard display via the button  or automatically after approx. 60 seconds.



1) see level SYSTEM - parameter PROGRAM

Standard time programs

Standard operating-times program P1

Circuit	Day	Heating from...to
Unmixed heating circuit (HC)	Mo-Su	06.00 - 22.00 h
Domestic hot water (DHW)	Mo-Su	05.00 - 22.00 h

Standard operating-times program P1 1)

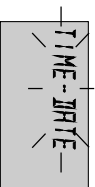
Circuit	Day	Heating from...to
Unmixed heating circuit (HC)	Mo-Th	06.00-08.00 16.00-22.00h
	Fr	06.00-08.00 13.00-22.00h
Domestic hot water (DHW)	Mo-Th	05.00-08.00 15.30-22.00h
	Fr	05.00-08.00 12.30-22.00h
Domestic hot water (DHW)	Sa-Su	06.00-23.00h

Standard operating-times program P3 1)

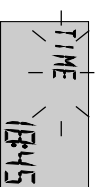
Circuit	Day	Heating from...to
Unmixed heating circuit (HC)	Mo-Fr	07.00-18.00 h
Domestic hot water (DHW)	Mo-Fr	06.00-18.00 h
Domestic hot water (DHW)	Sa-Su	reduced heating

TIME-DATE

Entry:

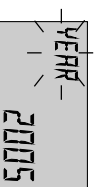


set time



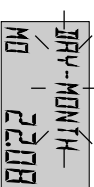
Current time
Setting range:
0.00... 24.00 h

set year



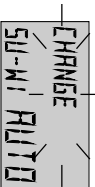
Calendar year
Setting range:
2001... 2099

set day & month




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

set changeover



Time changeover mode
Setting range:
Automatic: last Sunday in March & Oct.
Manual: no time reset

Entry: see » Programming level - Level summary «.

Exit: via button  or automatically after 60 seconds

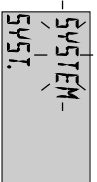
Modify: Confirm selected flashing parameter by pressing the rotary-push button. Then set the new required value via and accept by pressing the rotary-push button again. If necessary, correct the following parameters in the same way.

The values to the left are factory presets 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 calendar provides an automatic time changeover at the yearly repeating summer-wintertime dates. If required, the automatic time changeover can be switched off (manual reset).

SYSTEM

Page 24

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



Entry:

Language

Setting range:

DE = German	GB = English	FR = French
IT = Italian	NL = Dutch	ES = Spanish
PT = Portuguese	HU = Hungarian	CZ = Czech
PL = Polish	RO = Romanian	RU = Russian
TR = Turkish	S = Swedish	N = Norwegian
BG = Bulgarian		
Factory preset: DE		

All information that appears in the display is available in a number of languages. 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 at the corresponding language area.

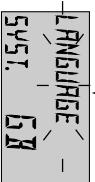
Operating times program

Setting range: P1, P1-P3

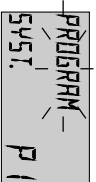
Factory preset: P1

This parameter specifies the number of the released time programs. With setting P1 only one operating-times program is available, with setting P1-P3 all three programs are released and can be selected for programming operating times.

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

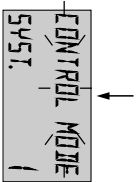


next parameter

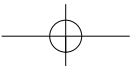


next parameter






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.

Separated control mode:

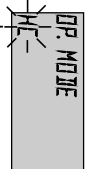
The heating- and hot-water circuit can be assigned with own operational mode.

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

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

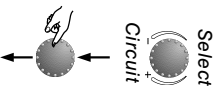


Operational mode

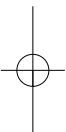


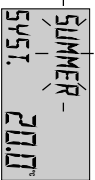
Unmixed circuit (HC), hot-water circuit (DHW)

accept



further operation see »Operational mode selection for heating and hot water« and »Temperature settings«





Summer switch-off
 Setting range: OFF, 10.0 to 30.0 °C
 Factory preset: 20.0 °C

Page 26

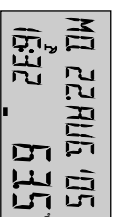
next parameter



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

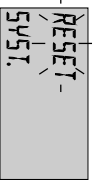
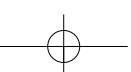
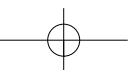
With setting OFF the summer switch-off is not effective. Hot water preparation is not affected by summer switch-off.

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



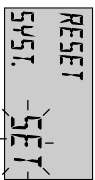
Summer switch-off activated

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



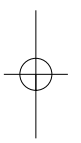
Parameter-reset
 This function resets all individually entered values in the programming level to factory preset.

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!

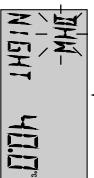


DOMESTIC HOT WATER

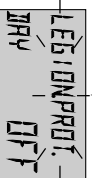
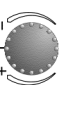
This level includes the necessary parameters for programming the hot-water circuit except the hot-water operating-times.



Entry:



next parameter



Hot-water economic temperature

Setting range: 5.0 °C up to the required hot water temperature
Factory preset: 40.0 °C


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

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 and is activated on the selected weekday (Mon to Sun) or every day at 2:00 o'clock. If the hot-water temperature should drop below 65 °C, the tank is reloaded. With setting **OFF** this function is not effective.

Entry: see » Programming level - Level summary «.

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 via and accept by pressing the rotary-push button again. If necessary, correct the following parameters in the same way.

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

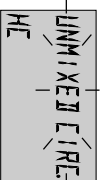
Note: This parameter is skipped if a hot-water thermostat is used instead of an electronic hot-water sensor.

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

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


Unmixed heating circuit (direct circuit)

Page 28

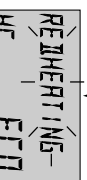


This level includes the parameters required for programming the heating circuit with the exception of the related operating-times programs.

Entry: see » Programming level - Level summary «.

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 via and accept by pressing the rotary-push button again. If necessary, correct the following parameters in the same way.



Reduced heating mode

Setting range: ECO, RED

Factory preset: ECO

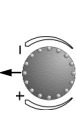
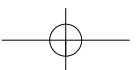
During the reduced operation the following modes can be selected:

ECO mode: At outdoor 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 »Temperature setting«).

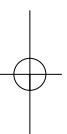
RED mode: During the reduced mode the heating circuit pump remains activated. The heating circuit is controlled according to the reduced heating characteristic, the temperature does not drop below the set minimum temperature value.

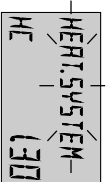
Application: Objects with high insulation values

Application: Objects with low insulation values



next parameter





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 and has to be adapted to the power characteristic of the corresponding consumer (underfloor systems, radiator, convector). The setting value specifies the curvature of the heating curve of the selected weather dependent heating circuit and compensates the system-related efficiency losses at lower temperatures by a progressive heating curve in conformity with the adjustment.

Heating circuit name

This is used to assign an individual, 5 character, abbreviated name to each heating circuit.

No individual name is assigned if the setting "empty" is used. The default abbreviated name appears.

- The character that blinks can be altered using the rotary knob according to the code number and accepted by pressing the knob once. The remaining characters can be altered in the same way.
- The individual heating circuit name display appears
 - in the menu
 - in the parameter tree
 - in the info level

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

Alarm messages



 0151 DE
 ERROR 10..20

Example for alarm message »sensor«
 (short or open circuit)
 Error code 10...20

HEAT GEN
 ERROR 30..n

Example for alarm message »heat generator«
 (flue gas temperature exceeded)
 Error code 30...40... 1)

2114
 ERROR 50..4

Example for logical alarm messages
 (control functions)
 Error code 50...60

2145
 ERROR 70..n

Example for alarm message »data bus«
 (address error)
 Error code 70

1) For these alarm messages the error codes of the heat generator in the corresponding installation manuals have to be considered.

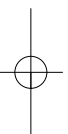
The instrument is equipped with an extensive error diagnostic features. The error displayed takes priority over other displays and varies dependent on the model in question.

For alarm messages from burner control (ERROR Xnm) the error codes in the corresponding installation manuals have to be considered.

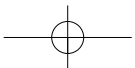
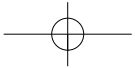
Note: Alarm messages only appear alternating with the standard display.



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



Personal notes



Technical specification

Supply voltage:	Via data bus (DC-safety voltage by EN 60730)
Power consumption:	300 mW
Bus interface:	T2B or OpenTherm according to model
Ambient temperature:	0...60 °C
Storage temperature:	-25...60 °C
Protection type acc. to EN 60529:	IP 30
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(Sf)Y 2 x 2 x 0,6 mm ²
Max. length of cable:	50 m
Data and timer back up:	Min. 5 years from date of delivery
Accuracy of the internal clock	± 2s/day
Weight:	Approx. 150 g

