SIEMENS

ALBATROS

RVA63.242 and RVA53.242
Boiler and Heating Circuit Controllers
Basic Documentation

Edition 1.3
Controller series B
CE1P2373E
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Siemens Building Technologies
Landis & Staefa Division

Contents

1 Summary

1.1 Brief description

The ALBATROS controllers described in this documentation are designed for integration in mass-produced heat generating equipment and offer the following control choices:

- Single- or 2-stage burner, modulating burner, one BMU
- D.h.w. charging pump or diverting valve
- 3-position mixing valve and circulating pump
- Various applications via multi-functional outputs

Systems

The range of products comprises several units that are complementary in terms of application and scope of functions. The controllers have communication capability and can be combined to form extensive heating systems.
For more detailed information about the generation of LPB systems, refer to “Local Process Bus (LPB), Basic Documentation, System Engineering“, document no. CE1P2370E.

1.2 Features

Heating circuits

- Heating controller for mixing and / or pump heating circuits with:
  - weather-compensated flow temperature control
  - weather-compensated flow temperature control with room influence
- 2 separately controlled heating circuits (one mixing and / or one pump heating circuit or 2 pump heating circuits)
- Quick setback and boost heating
- Automatic 24-hour heating limit
- Automatic summer / winter changeover
- Remote operation via digital room unit
- The building's thermal dynamics are taken into consideration
- Automatic adjustment of the heating curve to the type of building construction and the heat demand (provided a room unit is connected)
- Adjustable flow temperature boost with mixing heating circuit
- Floor curing function [1)]

Heat generation

- Single- or 2-stage burner
- Modulating burner
- BMU (Boiler Management Unit)
- Maintained boiler return temperature with bypass pump and mixing valve
- Buffer storage tank charging with heat source
- Buffer storage tank charging with solar heat
- System pump in different applications
- Integration in cascade as cascade slave
- Heat generation lock with contact H

Protection for the plant

- Protective boiler start-up
- Protection against boiler overtemperatures (pump overrun)
- Adjustable minimum and maximum limitation of boiler temperature (boiler flow temperature)
- Burner cycling protection by observing a minimum burner running time

- Frost protection for the house or building, the plant, d.h.w., the heating circuit, and the boiler
- Protection for the pump and the mixing valve through periodic control (pump and valve kick)
- Adjustable minimum and maximum limitation of flow temperature
- Protection against overtemperatures in the pump heating circuit

Operation

- Two 7-day heating programs
  - 7-day heating program no. 1 for heating circuit 1
  - 7-day heating program no. 2, selectable for heating circuit 2, or the d.h.w. circulating pump
- Separate 7-day heating program for d.h.w. heating
- Temperature adjustment with the setpoint knob
- Automatic button for efficient operation throughout the year
- Chimney sweep function at the touch of a button
- Manual operation at the touch of a button
- Straightforward selection of operating mode via buttons
- Change of operating mode with H-contact
- Output and input tests to assist commissioning and a functional test
- Service connection facility for local parameter settings and data logging

D.h.w.

- D.h.w. heating with a charging pump or diverting valve
- D.h.w. heating with one or 2 sensors
- Reduced setpoint of d.h.w. temperature
- Selectable d.h.w. program
- Integrated legionella function
- Selectable priority for d.h.w. heating
- Adjustable boost of the d.h.w. charging temperature
- Automatic d.h.w. push
- D.h.w. demand with a sensor or thermostat
- Protection against discharging
- D.h.w. heating: with solar heat
- D.h.w. circulating pump
- Electrical immersion heater

Use in extensive systems

- Communicating via Local Process Bus (LPB) [1)]
- Communicating via point-to-point interface (PPS)
- Integrity of system architecture with all RVA... controllers [1)]
- Can be extended to include up to 40 heating circuits (with central bus power supply)[1)]
- Optional remote supervision
- Fault status signals and indications (locally, LPB and PPS) [1)]
- Controllers of other manufacture can deliver their heat demand signal via potential-free H-contact
- Controllers of other manufacture can deliver their heat demand via DC 0…10 signal
- Analysis with service tool [1)]

Logging

- Logging the number of burner hours run of stages 1 and 2
- Logging the number of burner starts of stages 1 and 2
- Logging the flue gas temperature
- Display of plant diagram no.

[1)] Not with RVA53.242

1.3 Range of products

The following units and accessories are designed for use with the ALBATROS range:

Controllers	RVA63.242	Boiler and heating circuit controller		
	RVA53.242	Boiler and heating circuit controller		
Room units	QAA10	Digital room sensor		
	QAA50	Digital room unit		
	QAA70	Digital, multi-functional room unit		
Sensor	QAC31	Outside sensor (NTC 600)		
	QAC21	Outside sensor (Ni 1000)		
	QAZ21	Immersion sensor with cable		
	QAD21	Clamp-on temperature sensor		
	Pt1000	Flue gas sensor (third party product)		
		Collector sensor		
Screw type terminal strips (Rast 5)	AGP2S.02M	LPB (2 poles)	Violet	[1]
	AGP2S.02G	Room unit (2 poles)	blue	
	AGP2S.06A	Sensor (6 poles)	white	
	AGP2S.04G	Sensor (4 poles)	grey	
	AGP2S.04C	Sensor (4 poles)	yellow	
	AGP3S.02D	Mains (2 poles)	black	
	AGP3S.05D	Burner (5 poles)	red	
	AGP3S.03B	Pumps (3 poles)	brown	
	AGP3S.03K	Actuator (3-poles)	green	
	AGP3S.04F	Pumps (4 poles)	orange	

[1] Not for RVA53.242

1.4 Field of use

Target market
- OEMs
- Manufacturers of combi and heating boilers

Types of buildings
- Residential and non-residential buildings with own zone heating and d.h.w. heating facility
- Residential and non-residential buildings with central heating plant

Types of heating systems
- Standard heating systems, such as:
  radiator, convector, underfloor and ceiling heating systems, and radiant panels
- Suited for
  - heating plants with 2 heating circuits
  - different types of heating systems (creation of extensive systems)
  - several heating zones (creation of extensive systems)
- With or without d.h.w. heating

Types of heat sources
- Heating boilers with 1- or 2-stage oil or gas burners
- Heating boilers for modulating oil- or gas-fired boilers
- Gas boilers with BMU (Boiler Management Unit)
- Solar collectors

1.5 Product liability

- The products may only be used in building services plant and applications as described above
- When using the products, all requirements specified in "Technical data" and "Handling" must be satisfied
- When using the products in a system, all requirements contained in the documentation “Local Process Bus (LPB), Basic Documentation, System Engineering“ (document no. CE1P2370E) must be satisfied
- The local regulations (for installation, etc.) must be complied with

2 Handling

2.1 Installation

2.1.1 Regulations for installation

- Air circulation around the controller must be ensured, allowing the unit to emit the heat produced by it.
  A clearance of at least 10 mm must be provided for the controller's cooling slots which are situated a the top and bottom of the housing.
  The space should not be accessible and no objects should be placed there.
  If the controller is enclosed in another closed (insulating) casing, a clearance up to 100 mm must be observed on all sides
- The controller is designed conforming to the directives for safety class II mounted in compliance with these regulations
- Power to the controller may be supplied only after it is completely fitted in the cut-out. If this is not observed, there is a risk of electric shock hazard near the terminals and through the cooling slots
- The controller may not be exposed to dripping water
- Permissible ambient temperature when mounted and when ready to operate: 0...50 °C

2.1.2 Mounting location

- In the boiler front
- In the control panel front

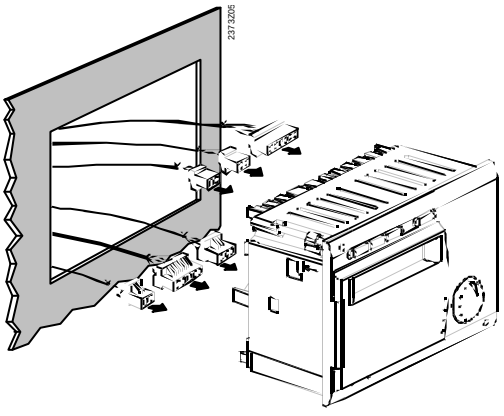
2.1.3 Mounting procedure

1. Making the connections

- Turn off power supply
- Pull the prefabricated cables through the cut-out
- Plug the connectors into the respective sockets at the rear of the controller

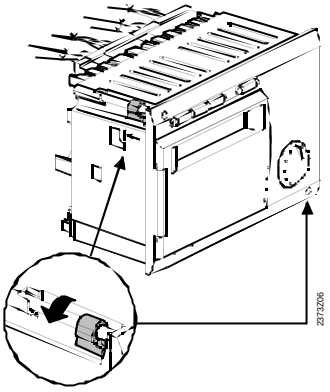
➔ *Note:*

The connectors are coded to make certain they cannot be mixed up.



2. Check

- Check to ensure the fixing levers are turned inward
- Check to make certain there is sufficient space between the front panel and the fixing levers

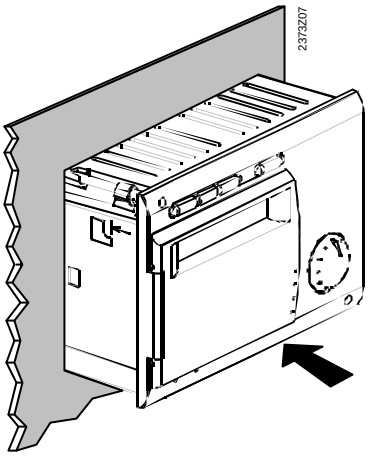


3. Fitting

- Slide the controller into the panel cut-out without applying any force

➔ *Note:*

Do not use any tools when inserting the unit into the cut-out. If it does not fit, check the size of the cut-out and the position of the fixing levers.

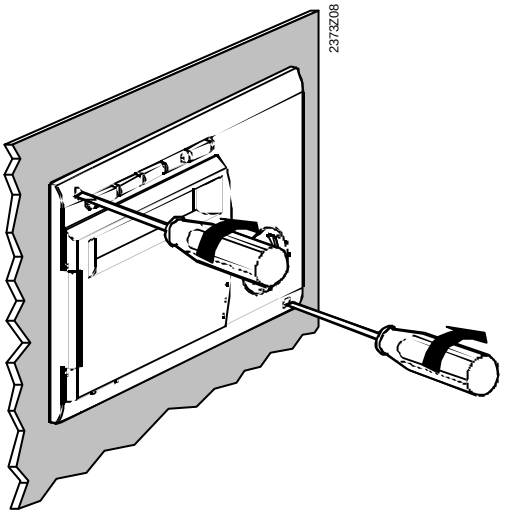


4. Fixing

Tighten the 2 screws on the front of the controller

➔ *Note:*

Tighten the screws only slightly, applying a torque of maximum 20 Ncm.
When tightening the screws, the fixing levers automatically assume their correct positions.



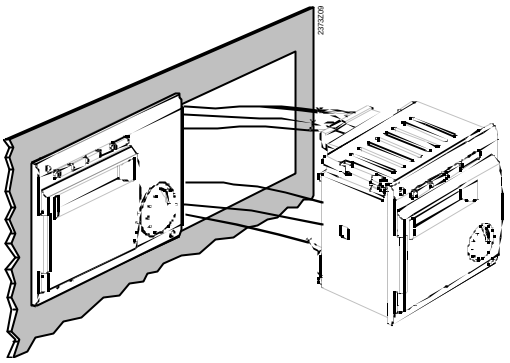
2.1.4 Required cut-out

Dimensions of cut-out

The controller's mounting dimensions are 91 x 137 mm
Due to the dimensions of the front, however, the standard spacing is 144 mm
The controller can be fitted in front panels of different thicknesses

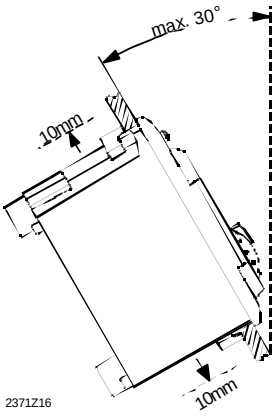
Combination of controllers

The mechanical mounting facility makes it possible to arrange several controllers in a row in one cut-out. In that case, it is merely necessary to have a wider panel cutout.
Also refer to "Dimensions" in Index.



2.1.5 Orientation

To avoid overtemperatures inside the controller, the inclination may be no more than 30° and there must be a clearance of at least 10 mm above and below the cooling slots.
This allows the controller to emit the heat generated during operation.



2.2 Electrical installation

2.2.1 Regulations for installation

- Prior to installing the controller, the power supply must be turned off
- The connections for mains and low voltage are separated
- The wiring must be made in compliance with the requirements of safety class II. This means that sensor and mains cables may not be run in the same duct

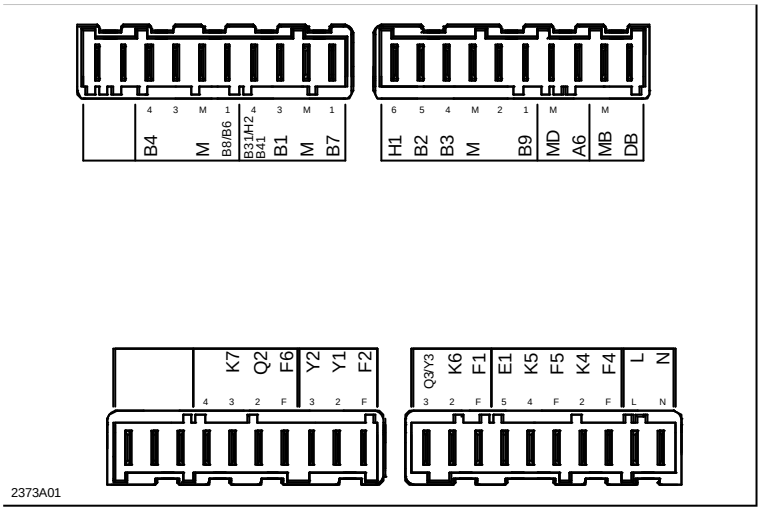
2.2.2 Wiring

When using prefabricated cables with connectors, the electrical installation is very straightforward, owing to coding.

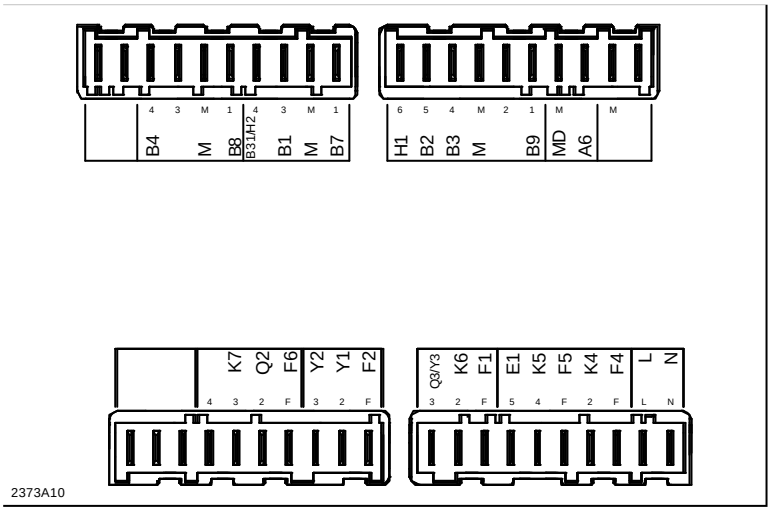
Note

Rear of controller

Connection terminals of RVA63.242



Connection terminals of RVA53.242



Low voltage side

Terminal	*Terminals*	*Connector*	*Color*
–	Not used	–	
–	Not used		
B4	Buffer storage tank sensor 1	AGP2S.04C	yellow
–	Not used		
M	Ground sensors		
B8/B6	Flue gas temperature sensor / collector temperature sensor		
B31/H2	D.h.w. temperature sensor 2 / input H2 / buffer storage tank temperature sensor 2	AGP2S.04G	grey
B1	Flow temperature sensor mixing valve		
M	Ground sensors		
B7	Return temperature sensor		
H1	Signal input H1	AGP2S.06A	white
B2	Boiler temperature sensor 1		
B3	D.h.w. temperature sensor / thermostat		
M	Ground sensors		
–	Not used		
B9	Outside sensor		
MD	Ground PPS (room unit, BMU)	AGP2S.02G	blue
A6	PPS (room unit, BMU)		
MB	Ground bus (LPB)	AGP2S.02M	violet
DB	Data bus (LPB)		

Mains voltage side

Terminal	*Terminals*	*Connector*	*Color*
–	Not used	–	
–	Not used		
–	Not used		
–	Not used	AGP3S.04F	orange
K7	Multi-functional output		
Q2	Circulating pump mixing heating circuit		
F6	Phases Q2 and K7		
Y2	Mixing valve CLOSED	AGP3S.03K	green
Y1	Mixing valve OPEN		
F2	Phases Y1 and Y2		
Q3/Y3	D.h.w. charging pump / d.h.w. diverting valve	AGP3S.03B	brown
K6	Multi-functional output		
F1	Phases K6 and Q3/Y3		
E1	Hours run burner stage 1	AGP3S.05D	red
K5	Burner stage 2		
F5	Phase burner stage 2		
K4	Burner stage 1		
F4	Phase burner stage 1		
L	Live AC 230 V (mains connection)	AGP3S.02D	black
N	Neutral (mains connection)		

2.3 Commissioning

Prerequisites

To commission the controller:

- Make certain that mounting and electrical installation are in compliance with the relevant requirements
- Make all plant-specific settings as described in section "Parameter settings"
- Reset the attenuated outside temperature
- Make the functional checks

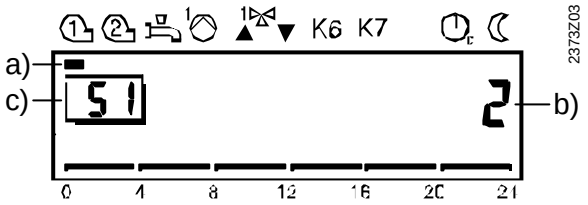
2.3.1 Functional checks

To facilitate commissioning and fault tracing, the controller allows output and input tests to be made. With these tests, the controller's inputs and outputs can be checked.

Output test

	Buttons	*Explanation*	*Line*
1		Press one of the line selection buttons. This will take you to the programming mode.	
2		Press both line selection buttons for at least 3 seconds. This will take you to the programming mode "Heating engineer" and, at the same time, to the output test.	
3		Press the + or - button repeatedly, which will take you one test step further: Test step 0 — All outputs are switched according to normal control operation Test step 1 — All outputs are deactivated Test step 2 — Burner stage 1 (K4) is activated Test step 3 — Burner stages 1 and 2 (K4 + K5) are activated Test step 4 — D.h.w. charging pump / diverting valve (Q3 / Y3) is activated Test step 5 — Mixing heating circuit / boiler pump (Q2) is activated Test step 6 — Mixing valve OPEN (Y1) is activated Test step 7 — Mixing valve CLOSED (Y2) is activated Test step 8 — Multi-functional output (K6) is activated Test step 9 — Multi-functional output (K7) is activated	
4	 	By pressing any of the operating mode or line selection buttons, you leave the programming mode and thus the output test. • Note: If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.	

Display



a) The pointer below the symbol indicates the output activated
b) The number indicates the current test step
c) The number indicates the selected setting line

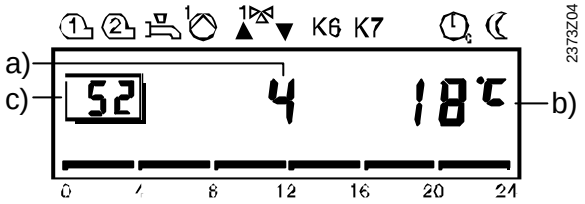
Input test

	Buttons	*Explanation*	*Line*
1		Press one of the line selection buttons. This will take you to the programming mode.	
2		Press both line selection buttons for at least 3 seconds. This will take you to the programming mode "Heating engineer".	
3		Press line selection button UP until you reach line 52. This will take you to the input test.	
4		Press the + or - button repeatedly, which will take you one test step further: Test step 0 Display of boiler temperature acquired with sensor B2 Test step 1 Display of d.h.w. temperature acquired with sensor B3 Test step 2 Display of input B31/H2/B41 according to the function selected on line 174 [°C or 000 or ---] Test step 3 Display of flow temperature acquired with sensor HK1 B1 Test step 4 Display of the outside temperature acquired with sensor B9 Test step 5 Display of room temperature acquired with sensor A6 Test step 6 Display of the return temperature acquired with sensor B7 Test step 7 Display of flue gas / collector temperature acquired with sensor B8/B6 Test step 8 Buffer temperature 1 acquired with sensor B4 Test step 9 Display of input H1 according to the function selected on operating line 170 [°C, 000, - - -] Test step 10 Display of switching status input E1	
5		By pressing any of the operating mode buttons, you leave the programming mode and thus the input test. • Note: If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.	Continuous display

Note

The selected sensor values are updated within a maximum of 5 seconds.
An open-circuit is displayed as – – –.
A short-circuit is displayed as o o o.

Display



a) The number indicates the current test step
b) Displayed value of the temperature measured
c) The number indicates the selected setting line

2.4 Parameter settings for the end-user

Description

The following settings can be made to meet the individual needs of the end-user.

Setting

	Buttons	*Explanation*	*Line*
1		Press one of the line selection buttons UP/DOWN. *This will take you directly to the programming mode "End-user".*	
2		Press the line selection buttons to select the required line. *The parameter list on the next 2 pages contains all available lines.*	
3		Press the + or - button to set the required value. The setting will be stored as soon as you leave the programming mode or change to another line. *The parameter list on the next 2 pages contains all settings that can be made.*	
4		By pressing any of the operating mode buttons, you leave the programming mode "End-user". • Note: *If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.*	Continuous display

2.4.1 Overview of end-user parameters

RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
Setting the clock						
1	1	Time of day	0...23:59	h / min	1 min	00:00
2	2	Weekday	1...7	Day	1 day	1
3	3	Date (day, month)	01.01...31.12	tt.MM	1	-
4	4	Year	1999...2099	jjjj	1	-
Time switch program 1						
5	5	Pre-selection of weekday 1-7 7-day block 1...7 Individual days	1-7 / 1...7	Day	1 day	-
6	6	Switch-on time 1st period	- -:- -...24:00	h / min	10 min	06:00
7	7	Switch-off time 1st period	- -:- -...24:00	h / min	10 min	22:00
8	8	Switch-on time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
9	9	Switch-off time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
10	10	Switch-on time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
11	11	Switch-off time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
Time switch program 2						
12	12	Pre-selection of weekday 1-7 7-day block 1...7 Individual days	1-7 / 1...7	Day	1 day	-
13	13	Switch-on time 1st period	- -:- -...24:00	h / min	10 min	06:00
14	14	Switch-off time 1st period	- -:- -...24:00	h / min	10 min	22:00
15	15	Switch-on time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
16	16	Switch-off time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
17	17	Switch-on time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
18	18	Switch-off time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
Time switch program 3 (d.h.w.)						
19	19	Pre-selection of weekday 1-7 7-day block 1...7 Individual days	1-7 / 1...7	Day	1 day	-
20	20	Switch-on time 1st period	- -:- -...24:00	h / min	10 min	06:00
21	21	Switch-off time 1st period	- -:- -...24:00	h / min	10 min	22:00
22	22	Switch-on time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
23	23	Switch-off time 2nd period	- -:- -...24:00	h / min	10 min	- -:- -
24	24	Switch-on time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
25	25	Switch-off time 3rd period	- -:- -...24:00	h / min	10 min	- -:- -
D.h.w.						
26	26	Nominal setpoint of d.h.w. temperature (TBWw) TBWRw Line 120 TBWmax Line 50 (OEM)	TBWR...TBWmax	°C	1	55
Heating circuit						
27	27	Reduced room temperature setpoint (TRRw) heating circuits 1 and 2 TRF Frost protection setpoint of the room temperature, line 28 TRN Setpoint knob heating circuit	TRF...TRN	°C	0.5	16
28	28	Room temperature frost protection setpoint (TRFw) heating circuits 1 and 2 TRRw Line 27	4...TRRw	°C	0.5	10

RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
29	29	Summer / winter changeover temperature heating circuit 1 (THG1)	8...30	°C	0.5	17
30	30	Heating curve slope HK1 (S1) - : - - Inactive 2.5...40 Active	- : - - / 2.5...40	-	0.5	15
31	31	Summer / winter changeover temperature heating circuit 2 (THG2)	8 ... 30	°C	0.5	17
32	32	Heating curve slope HK2 (S2) -:- - Inactive 2.5...40 Active	-:- - / 2.5...40	-	0.5	15
33	33	Actual value of room temperature (TRx)	0...50	°C	0.5	-
34	34	Actual value of outside temperature (TAx) To reset the attenuated outside temperature to TAx, press the + and - buttons simultaneously for 3 seconds.	-50...+50	°C	0.5	-
Heat source						
35	35	Burner hours run stage 1 or BMU (tBR1)	0 ... 65535	h	1	0
36	36	Burner hours run stage 2 (tBR2) Output K5	0 ... 65535	h	1	0
37	37	Number of burner starts stage 1	0 ... 65535	-	1	0
38	38	Number of burner starts stage 2	0 ... 65535	-	1	0
Standard values						
39	39	Standard times for switching programs 1, 2, 3 (lines 6...11, 13...18 and 20...25) To activate, press the + and - buttons simultaneously for 3 seconds	-	-	-	-
Holidays						
40	40	Holiday period HK1+HK2	1...8	-	1	1
41	41	Holiday period HK1+HK2 - -.- - No holiday period programmed Month, day To reset the holiday period, press the + and - buttons simultaneously for 3 seconds.	- - . - - 01.01...31.12	tt.MM	1	-
42	42	End of holiday period HK1+HK2 - -.- - No holiday period programmed Month, day To reset the selected holiday period, press the + and - buttons simultaneously for 3 seconds.	- - . - - 01.01...31.12	tt.MM	1	-
Service						
49	49	Indication of BMU error code 0...255 Error code	0...255	-	1	-
50	50	Indication of faults	0...255	-	1	-

2.5 Parameter settings for the heating engineer

Description

Configuration and parameter settings to be made by the heating engineer.

Setting

	Buttons	*Explanation*	*Line*
1		Press one of the line selection buttons UP/DOWN. *This will take you directly to the programming mode "End-user".*	
2		Press both line selection buttons for at least 3 seconds. *This will take you directly to the programming mode "Heating engineer".*	
3		Press the line selection buttons to select the required line. *The parameter list on the next 2 pages contains all available lines.*	
4		Press the + or - button to set the required value. The setting will be stored as soon as you leave the programming mode or change to another line. *The parameter list on the next 2 pages contains all settings that can be made.*	
5		By pressing any of the operating mode buttons you leave the programming mode "Heating engineer". ➔ Note: *If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.*	Continuous display

1.1.1 Overview of heating engineer parameters

RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
Service values						
51	51	Output test 0 Control mode according to the operating state 1 All outputs OFF 2 Burner stage 1 ON K4 3 Burner stages 1 and 2 ON K4 / K5 4 D.h.w. charging pump ON Q3/Y3 D.h.w. diverting valve OPEN Q3 / **Y3** 5 Heating circuit pump 1 Q2 Boiler pump ON Q2 6 Mixing valve 1 open Y1 7 Mixing valve 2 close Y2 8 Multi-functional output ON K6 9 Mult-functional output ON K7	0…9	-	1	0
52	52	Input test 0 Boiler sensor B2 1 D.h.w. sensor 1 B3 2 D.h.w. sensor 2 B31/H2 Buffer storage tank sensor 2 B31/H2 H2 B31/H2 4 Outside sensor B9 5 Room sensor A6 6 Return sensor B7 7 Flue gas sensor B8/B6 Collector sensor B8/B6 8 Buffer storage tank sensor 1 B4 9 Display of input H1 H1 10 Display switching status input E1. E1	0...10	-	1	0
53	53	Display of plant type	1...150	-	1	-
Actual values						
55	55	Actual value of flow temperature (TVx) Input B1	0...140	°C	1	-
56	56	Actual value of boiler temperature (TKx) Input B2/B4	0...140	°C	1	-
57	-	Actual value of common flow temperature	0...140	°C	1	-
58	58	Actual value of cascade return temperature	0 ...140	°C	1	-
59	59	Actual value 1 of buffer storage tank temperature	0 ...140	°C	1	-
60	-	Actual value 2 of buffer storage tank temperature	0...140	°C	1	-
61	61	Actual value 1 of d.h.w. temperature (TBWx) (Higher temperature)	0...140	°C	1	-
62	62	Actual value 2 of d.h.w. temperature (TBWx) (Lower temperature)	0...140	°C	1	-
63	63	Display of max. flue gas temperature (TGxmax) To make a reset to the current value, press the + and – buttons simultaneously for 3 seconds	0...350	°C	1	-
64	-	Actual value of collector temperature (B6)	0...350 (Pt1000) 0...230 (Ni1000)	°C	1	-
65	65	Attenuated outside temperature (TAxged)	-50...+50	°C	0.5	-
66	66	Composite outside temperature (Taxgem)	-50...+50	°C	0.5	-
67	-	Outside temperature source - - . - - No signal 00.01...14.16 Address	- -:- / 00.01...14.16	-	1	-

RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
Setpoints						
68	68	Display of boiler temperature setpoint	0...140	°C	1	-
69	-	Display of flow temperature setpoint	0...140	°C	1	-
70	70	Display of d.h.w temperature setpoint	0...140	°C	1	-
71	71	Display of nominal room temperature setpoint HK1 Nominal setpoint incl. room unit readjustment	0...35	°C	0.5	-
72	72	Display of nominal room temperature setpoint Nominal setpoint incl. room unit readjustment	0...35	°C	0.5	-
73	73	Display of setpoint of room temperature HK1 (TRw)	0...35	°C	0.5	-
74	74	Display of setpoint of room temperature HK1 (TRw)	0...35	°C	0.5	-
75	75	Display of setpoint of room temperature HK1 (TRw)	0...140	°C	1	-
76	76	Display of flow temperature setpoint HK2 (TVw)	0...140	°C	1	-
77	-	Floor curing dates HK1 Day Flow temperature setpoint	0...32 0...95	- °C	1	-
Heat source						
80	80	Type of heat source 0 No heat generation or PPS-BMU 1 Single-stage burner 2 2-stage burner 2 Modulating burner, 3-position air damper actuator 4 Modulating burner, 2-position air damper actuator 5 Cascade (2 single-stage burners)	0...5	-	1	2
81	81	Min. limitation of boiler temperature (TKmin) $Tkmin_{OEM}$ Line 1 OEM Tkmax Line 2 OEM	$TKmin_{OEM}$...TKmax	°C	1	40
82	82	Extra heating for the bathroom (output K6 or K7 as heating circuit pump 2) 0 Inactive 1 Active	0 / 1	-	1	0
Configuration of plant						
95	95	Pump function output (K6) 0 No function 1 Heating circuit pump 2 System pump after d.h.w. 3 System pump before d.h.w. 4 System pump with external demand 5 D.h.w. circulating pump 6 Electric immersion heater for d.h.w. 7 Solar pump [2] 8 Pump H1 9 Boiler pump 10 Boiler bypass pump 11 Alarm output	0...11	-	1	1
96	96	Pump function output (K7) 0 No function 1 Heating circuit pump 2 D.h.w. circulating pump 3 Electric immersion heater for d.h.w. 4 Solar pump [2] 5 Pump H2 6 Boiler bypass pump 7 Alarm output	0...7	-	1	0

RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
98	-	Solar application 0 No solar 1 Solar in d.h.w. storage tank 2 Solar in buffer storage tank	0…2	-	1	0
99	-	Sensor input B8/B6 0 Flue gas Pt 1000 1 Collector Ni 1000 2 Collector Pt 1000	0…2	-	1	0
Heating circuit						
100	100	Parallel displacement of heating circuits 1 and 2	-4.5...+4.5	°C (K)	0.5	0.0
101	101	Room influence 0 Inactive 1 Active	0 / 1	-	1	1
102	102	Switching differential of room temperature (SDR) heating circuits 1 and 2 - - . - Inactive 0.5...4.0 Active	- -:-...4.0	°C (K)	0.5	- -:-
103	103	Operating mode of room unit 0 Acting on heating circuit 1 1 Acting on heating circuit 2 2 Acting on heating circuits 1 and 2	0…2	-	1	0
104	104	Room unit values 0 Acting on heating circuit 1 1 Acting on heating circuit 2 2 Acting on heating circuits 1 and 2	0…2	-	1	0
105	105	Min. limitation of flow temperature setpoint (TVmin) heating circuit 1 TVmax Line 107	8...TVmax	°C	1	8
106	106	Min. limitation of flow temperature setpoint (TVmin) heating circuit 2 TVmax Line 108	8...TVmax	°C	1	8
107	107	Max. limitation of flow temperature setpoint (TVmax) heating circuit 1 Tvmin Line 105	TVmin...95	°C	1	80
108	108	Max. limitation of flow temperature setpoint (TVmax) heating circuit 2 Tvmin Line 106	TVmin...95	°C	1	80
109	109	Max. forward shift of optimum start control 0 No forward shift	00:00...06:00	hh:mm	10 min	00:00
110	110	Max. forward shift of optimum start control 0 No forward shift	00:00...06:00	hh:mm	10 min	00:00
113	113	Type of building construction 0 Heavy 1 Light	0 / 1	-	1	1
114	114	Adaption of heating curve HK1+HK2 0 Inactive 1 Active	0 / 1	-	1	1
115	115	Gain of locking signal	0...200	%	1	100
116	-	Floor curing HK1 0 Off 1 Functional heating 2 Floor curing heating 3 Functional and floor curing heating	0…3	-	1	0
D.h.w.						

RVA63.242	*RVA53.242*	*Function*	*Range*	*Unit*	*Resolution*	*Factory setting*
120	120	Reduced setpoint of d.h.w. temperature (TBWR) TBWw Line 26	8...TBWw	°C	1	40
121	121	D.h.w. program 0 24 h/day 1 System heating program with forward shift 2 Time switch program 3	0…2	-	1	1
122	122	Switching program selection circulating pump 0 According to time switch program 2 1 According to the d.h.w. program (line 121)	0 / 1	-	1	1
123	-	Assignment of d.h.w. heating 0 Local heating circuit 1 All heating circuits in the system 2 All heating circuits in the system	0…2	-	1	2
124	124	D.h.w. charging 0 Once per day with a forward shift of 2.5 hours 1 Several times per day with a 1 h forward shift	0 / 1	-	1	1
125	125	Type of d.h.w. demand 0 Sensor 1 Control thermostat	0 / 1	-	1	0
126	126	Boost of flow temperature setpoint for d.h.w. heating (UEBW)	0...30	°C (K)	1	16
127	127	D.h.w. priority 0 Absolute (mixing and pump heating circuit) 1 Shifting (mixing and pump heating circuit) 2 None (parallel) 3 Mixing heating circuit (shifted), pump heating circuit absolute	0…3	-	1	1
128	128	Controlling element for d.h.w. 0 Charging pump 1 Diverting valve	0 / 1	-	1	0
129	-	Separate d.h.w. circuit 0 Off 1 ON	0 / 1	-	1	0
Cascade						
130	130	Changeover of boiler sequence in a cascade 2 x single-stage - - - No automatic changeover (fixed boiler sequence) 10...990 Changeover according to the selected number of hours	- - - / 10...990	- / hours	10	500
131	131	Release integral for boiler sequence	0...500	K*min	1	200
132	132	Reset integral for sequence	0...500	K*min	1	50
LPB / system						
140	-	LPB device address 0 Standalone 1...16 Device address (system)	0...16	-	1	0
141	-	LPB segment address 0 Heat source segment 1...14 Heat consumption segments	0...14	-	1	0
142	-	LPB power supply 0 Off (central bus power supply) 1 Auto (bus power supply via controller)	0 / 1	-	1	1
143	-	Display of LPB power supply	On / OFF	-		-
145	-	Range of action of central changeover 0 In the segment 1 In the system (if segment address = 0)	0 / 1	-	1	1
146	-	Automatic summer / winter changeover 0 Local change 1 Central changeover of all heating circuits	0 / 1	-	1	0

RVA63.242	*RVA53.242*	*Function*	*Range*	*Unit*	*Resolution*	*Factory setting*
147	-	Central stand-by switch [1)] 0 Off 1 ON	0 / 1	-	1	0
148	-	Clock mode 0 Autonomous clock 1 System time with remote adjustment 2 (System time with adjustment) 3 System clock (master)	0…3	-	1	0
150	150	Winter- / summertime changeover	01.01...31.12	tt.MM	1	25.03
151	151	Summer- / wintertime changeover	01.01...31.12	tt.MM	1	25.10
155	155	Display of PPS communication - - - No communication 0...255 Communication ok 0 0 0 Communication line with a short-circuit	- - - / 0...255 / 0 0 0	-	1	-
Solar / buffer storage tank settings						
160	-	Temperature differential solar ON (TSdEin)	TSdAus...40	°C (K)	0.5	20
161	-	Temperature differential solar OFF (TSdAus)	0...TSdEin	°C (K)	0.5	8
162	-	Temperature level solar charging strategy - - - Inactive 20...130 Charging level	- - - /20...130	°C (K)	1	- - -
163	-	Max. solar charging temperature	20...130	°C (K)	1	80
164	164	Demand for heat with reduced d.h.w. setpoint 0 No (buffer storage tank) 1 Yes	0 / 1	-	1	1
Multi-functional inputs (H1) (H2/B31/B41)						
170	170	Input H1 0 Changeover of operating mode of all HK and d.h.w. 1 Changeover of operating mode of all HK 2 Min. flow temperature setpoint (TVHw) 3 Heat generation lock 4 Demand for heat DC 0...10 V	0…4	-	1	0
171	171	Min. setpoint of flow temperature contact H (TVHw) ...TKmax Line 2 OEM	8...TKmax	°C	1	70
172	172	Max. value of heat demand signal (DC 0...10 V) H1	5...130	°C	1	100
173	173	Operating action contacts H1 and H2 0 N.C. 1 N.O.	0 / 1	-	1	1
174	174	Input B31/H2/B41 0 D.h.w. temperature sensor 2 1 Min. flow temperature setpoint (TVHw) 2 Heat generation lock **3** Buffer temperature sensor 2	0…3	-	1	0

[1)] This line is active only if the unit is addressed as the heat generation master. Also refer to "LPB device address" in Index.

[2)] This setting is not integrated for RVA53...

2.6 Parameter settings for the OEM

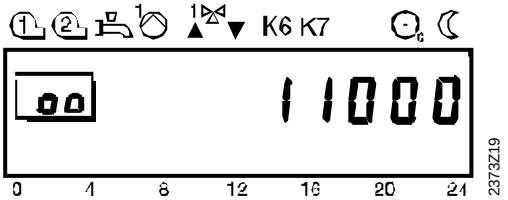
Description

Boiler-specific settings and protective functions for the boiler manufacturer.

Setting

	Buttons	*Explanation*	*Line*
1		Press one of the line selection buttons UP/DOWN. *This will take you directly to the programming mode "End-user".*	
2	 9 s	Press both line selection buttons for at least 9 seconds. *A special display for entering the code will appear.*	
3	**CODE**	Press buttons  and  to enter the required combination of the access code. *If the combination of buttons is correct, you reach the programming mode "OEM".* ➔ Wrong code: If the code has been entered incorrectly, the display will change to the "Parameter settings for the heating engineer".	
4		Press the line selection buttons to select the required line. *The parameter list on the next 2 pages contains all available lines.*	
5		Press the + or - button to set the required value. The setting will be stored as soon as you leave the programming mode or change to another line. *The parameter list on the next 2 pages contains all settings that can be made.*	
6		By pressing any of the operating mode buttons you leave the programming mode "OEM". ➔ Note: *If no button is pressed for about 8 minutes, the controller will automatically return to the operating mode selected last.*	Continuous display

Example



Whether correct or incorrect, each push of a button will be adopted as a digit of the code. As a confirmation, the respective digit changes to 1.

2.6.1 Overview of OEM parameters

RVA63.242	*RVA53.242*	*Function*	*Range*	*Unit*	*Resolution*	*Factory setting*
Heat source						
1	1	Min. limitation of boiler temperature OEM ($TKmin_{OEM}$) Tkmin Line 81	8...TKmin	°C	1	40
2	2	Max. limitation of boiler temperature (TKmax) Tkmin Line 81	TKmin...120	°C	1	80
3	3	Switching differential of boiler temperature	0...20	°C (K)	1	8
4	4	Min. limitation of burner running time	0...10	min	1	4
5	5	Release limit (integral) of burner stage 2	0...500	°C (K) min	1	50
6	6	Reset limit (integral) of burner stage 2	0...500	°C (K) min	1	10
8	8	Pump overrun time (after burner OFF)	0...20	min	1	5
9	9	Operating mode of boiler 0 Continuous mode: without extended burner running time 1 Automatic mode: without extended burner running time 2 Automatic mode: with extended burner running time	0…2	-	1	1
10	10	Protective boiler start-up 0 No 1 Yes	0 / 1	-	1	1
12	12	Control of boiler pump 0 Max. temperature requisition 1 Parallel to burner operation	0 / 1	-	1	0
13	13	Air damper running time (s)	7.5...480	s		60
14	14	Proportional band (Xp)	1...200	°C (K)	1	20
15	15	Integral action time (Tn)	10...500	s	1	150
16	16	Derivative action time (Tv)	0...30	s	0.25	4.5
17	17	Switching differential air damper actuator	0...20	°C (K)	1	2
20	20	Maintained boiler return temperature with mixing valve 0 Inactive 1 Active	0 / 1	-	1	0
21	21	Maintained boiler return temperature with consumer influence	0 / 1	-	1	1
22	22	Min. limitation of boiler return temperature	8...95	°C	1	8
23	23	Switching differential of bypass pump (SDBP)	0...20	°C (K)	1	6
24	24	Control of bypass pump 0 Parallel to burner operation 1 According to the boiler return temperature	0 / 1	-	1	0
Heating circuit						
30	30	Boost of flow temperature setpoint mixing valve (UEM)	0...50	°C (K)	1	10
31	31	Gain factor of room influence (KORR)	0...20	-	1	4
32	32	Constant for quick setback and optimum start control (KON)	0...20	-	1	2
33	33	Boost of the room temperature setpoint (DTRSA) (with boost heating)	0...20	°C (K)	1	5

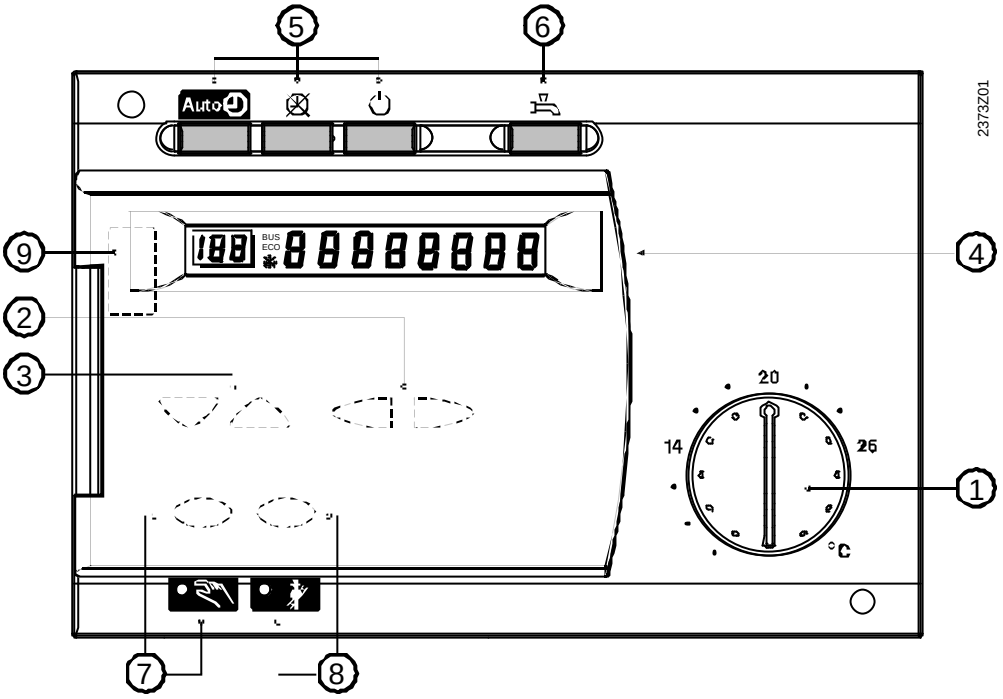
RVA63.242	RVA53.242	Function	Range	Unit	Resolution	Factory setting
34	34	Frost protection for the plant 0 Inactive 1 Active	0 / 1	-	1	1
35	35	Control mode of actuator 0 2-position (Y1) 1 3-position (Y1,Y2)	0 / 1	-	1	1
36	36	Switching differential of actuator For 2-position mixing valve	0...20	°C (K)	1	2
37	37	Overtemperature protection for the pump heating circuit 0 Inactive 1 Active	0 / 1	-	1	1
38	38	Heat gains (Tf)	-2...+4	°C	0.1	0
39	39	Adaption sensitivity 1 (ZAF1)	1...15	-	1	15
40	40	Adaption sensitivity 2 (ZAF2)	1...15	-	1	15
41	41	P-band mixing valve (Xp)	1...100	°C (K)	1	32
42	42	Integral action time mixing valve (Tn)	10...873	s	1	120
43	43	Actuator running time mixing valve	30...873	s	1	120
D.h.w.						
50	50	Max. nominal setpoint of d.h.w. temperature (TBWmax)	8...80	°C	1	60
51	51	Switching differential of d.h.w. temperature (SDBW)	0...20	°C (K)	1	5
52	52	Legionella function 0 Inactive 1 Active	0 / 1	-	1	1
53	53	Setpoint of legionella function	8...95	°C	1	65
54	54	Discharching protection during d.h.w. heating 0 No 1 Continuously 2 Partly	0…2	-	1	2
Service						
90	90	Continuous display 0 Weekday / time of day 1 Actual value of boiler temperature	0 / 1	-	1	0
91	91	Software version	00.0...99.0	-	1	-
92	92	Device operating hours	0...500000	h	1	0

2.7 Operation

Introduction

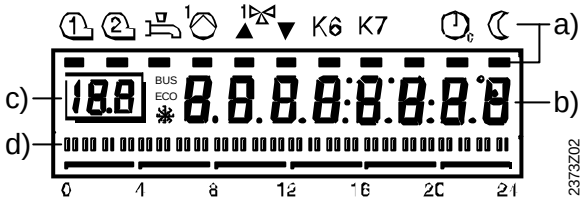
Operating instructions are inserted at the rear of the unit's front cover.

2.7.1 Operating elements



	Operating element	*Function*
1	Room temperature setpoint knob	Adjustment of room temperature setpoint
2	Setting buttons	Parameter settings
3	Line selection buttons	Parameter settings
4	Display	Display of actual values and settings
5	Operating mode buttons heating circuit	Operating mode changes to: Auto Automatic operation Continuous operation Stand-by
6	Operating mode button d.h.w.	D.h.w. heating ON / OFF
7	Function button with LED for manual operation	Activation of manual operation
8	Function button with LED for chimney sweep	Activation of chimney sweep function
9	Connection facility for PC tool	Diagnostics and service

Display



a) Symbols - indication of operating state with the black pointers
b) Display during normal control mode or when making settings
c) Programming line when making settings
d) Heating program of current day

2.8 Operational faults

No display on the controller:

- Is the heating plant's main switch turned on?
- Are the fuses in order?
- Check the wiring

Heating control does not function. There is no display of the time of day, or the time displayed is incorrect

- Check fuses of the plant
- Make a reset: Isolate controller from the mains supply for about 5 seconds (e.g. turn off the boiler's main switch for 5 seconds)
- Set the correct time of day on the controller (operating line 1)
- Check the time of day on the clock time master if the controller is used in a system

Controlling element does not open / close or does not operate correctly.

- Manual lever of controlling element may not be engaged
- Wiring to the controlling element interrupted (output test)
- Check wiring of the sensors (input test)
- Quick setback or the automatic 24-hour heating limit is active
- Check the settings

Heating circuit pump does not run

- Is the right type of plant displayed (setting line 53)?
- Check wiring and fuse (output test)
- Check wiring of the sensors (input test)
- Check the settings

Burner does not switch on

- Press burner's reset button
- Check the fuses
- Wiring to the controlling element interrupted (output test)
- Check the electromechanical control thermostat (TR) and the manual reset safety limit thermostat (STB)
- Quick setback or automatic 24-hour heating limit is active
- Check wiring of the boiler temperature sensor (input test)

Pump does not run

- Check wiring and fuse (output test)
- Check wiring of the sensors (input test)

D.h.w. is not being heated

- Has the button for d.h.w. heating been activated?
- Check setting of the electromechanical control thermostat (TR) installed on the boiler. It must be above the TKmax setting
- Check setpoint of the d.h.w. temperature
- Check actual value of the d.h.w. temperature
- Check if d.h.w. heating is released

- Check wiring and fuse of the charging pump (input test)
- Check wiring of the d.h.w. temperature sensor (output test)

The room temperature does not agree with the required temperature level:

- Check the room temperature setpoints
- Is the required operating mode indicated?
- Is automatic operation overridden by the room unit?
- Are weekday, time of day and the displayed heating program correct?
- Has the heating curve slope been correctly set?
- Check wiring of outside sensor

Heating plant does not function properly

- Check all parameters based on the setting instructions "Heating engineer" and the operating instructions "End-user"
- Carry out the input testCarry out the output testCheck the electromechanical control thermostat (TR) and the manual reset safety limit thermostat (STB)

Frost protection for the plant does not function at all, or does not function correctly

- Check correct functioning of the burner
- Check correct functioning of the pumps
- Frost protection for the plant in the case of pump heating circuits with active room temperature limitation

Quick setback or boost heating does not function

- Check settings made on the heating engineer's level
- Check the sensor connected to A6 (input test)

Fault status signal; display shows "ER"

- For cause of error, refer to section "Parameter settings for end-user" on line 50

3 Description of end-user settings

User interface

3.1 Operating modes of heating circuit

Benefit

Straightforward and direct selection of heating circuit operating modes.

Description

The control provides 3 different heating circuit operating modes that can be directly selected as required.

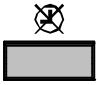
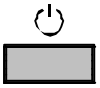
Setting

Select the required operating mode by pressing the respective operating mode button. It is located on the controller front for direct access by the user.

Note

The d.h.w. operating mode will not be affected by the selected heating circuit operating mode, with the exception of the holiday function and when the remote telephone switch is activated

Effect

Operating mode	*Designation*	*Effect of selected operating mode*
	Automatic operation	• Heating according to the time program (lines 5 to 11) • Temperature setpoints according to the heating program • Protective functions active • Changeover on the room unit active • Automatic summer / winter changeover (ECO functions) and automatic 24-hour heating limit active
	Continuous operation	• Heating mode with no time program • Temperature adjustment with the setpoint knob • Protective functions active • Changeover on room unit **in**active • Automatic summer / winter changeover (ECO functions) inactive
	Stand-by	• Heating OFF • Temperature according to frost protection • Protective functions active • Changeover on room unit **in**active • Automatic summer / winter changeover (ECO functions) and automatic 24-hour heating limit active

Illuminated buttons

The selected operating mode is indicated by illuminated buttons. A number of functions can cause the displayed selection to change. The following table shows the possible statuses. The following table shows the possible statuses:

Settings on the controller

Function	*Effect on button and meaning*
Heat generation lock Line 170 = 3 or 174 = 2	• Selected **HC operating mode button flashes** when contact H1 or H2 is closed • **D.h.w. operating mode button flashes** when switched on
Changeover of operating mode Line 170 = 0	• HC operating mode ⏻ button flashes when contact H1 is closed • D.h.w. operating mode button flashes when switched on
Changeover of operating mode Line 170 = 1	• Selected **HC operating mode button flashes** when contact H1 is closed • **D.h.w. operating mode button** will not be affected
Minimum setpoint of flow temperature Line 170 = 2 or 174 = 1	• Selected **HC operating mode button flashes** when contact H1 or H2 is closed • **D.h.w. operating mode button** will not be affected
Heat demand DC 0…10 V Line 170 = 4	• Selected **HC operating mode button flashes** when H1 demand is valid • D.h.w. operating mode button will not be affected
Central stand-by switch Line 147 = 1	• HC operating mode ⏻ flashes • D.h.w. operating mode button will not be affected

Settings on the room unit

Occupancy button	• **HC operating mode Auto flashes** when occupancy button is active. • **D.h.w. operating mode button** will not be affected
Holiday function	• **HC operating mode Auto flashes** when holiday function is active • Depending on the setting made on line 123, **the d.h.w. operating mode button flashes** when switched on

Influence of room unit

Changeover of the operating mode on the room unit is active only when the controller is in automatic mode Auto.

The room temperature is transmitted to the controller via PPS, independent of the selected operating mode.

3.2 Operating mode of d.h.w. heating

Benefits

Selection of d.h.w. heating mode independent of heating operation.
Selection is made directly on the user interface.

Setting

D.h.w. heating is selected by pressing the respective button on the controller's user interface.

Effect

By pressing the respective button, d.h.w. heating is switched on or off.

- D.h.w. heating **OFF** - button dark.
  D.h.w. is not being heated. Frost protection remains active, however, and prevents the storage tank temperature from falling below a certain level
- D.h.w. heating **ON** - button illuminated.
  The d.h.w. is heated according to the settings made

Required settings

The following settings affect d.h.w. heating and must be checked to ensure proper functioning:

Setting	*Setting*
• Time switch program 3	19-25
• Nominal setpoint of d.h.w. temperature	26
• Summer / winter changeover HC1 and HC2 (when using an electric immersion heater)	29, 31
• Assignment of d.h.w. heating	123
• Reduced setpoint of the d.h.w. temperature	120
• D.h.w. heating program	121
• D.h.w. heating	124
• Type of d.h.w. demand	125

3.3 Nominal room temperature setpoint

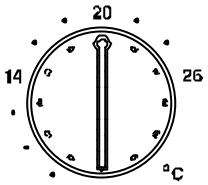
Benefit

Straightforward and direct setting of the required nominal room temperature setpoint.

Description

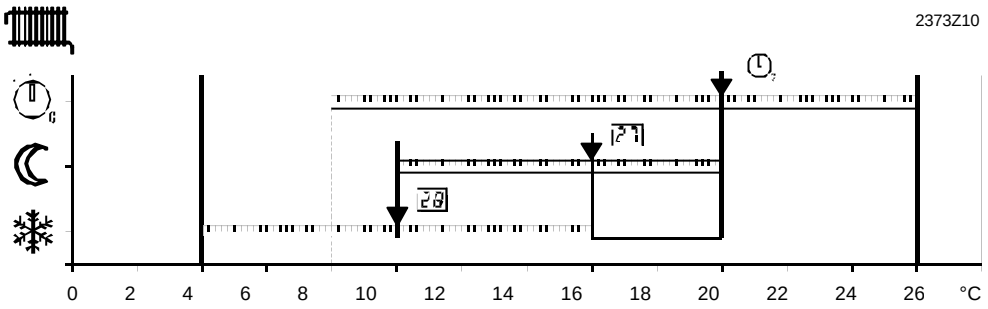
The heating system uses 3 different setpoints that can be adjusted:
The nominal room temperature setpoint described here
The reduced room temperature setpoint (setting on line 27)
The frost protection setpoint of the room temperature (setting on line 28)

Setting



The nominal room temperature setpoint is preadjusted with the setpoint knob. It is located on the controller front for direct access by the user.

Setting range	*Unit*	*Factory setting*
8...26	°C	20



Room temperature setpoint setting ranges

27 Setting "Reduced room temperature setpoint"
28 Setting "Frost protection setpoint of the room temperature"

Effect of temperature setting

When the nominal room temperature setpoint is active, the rooms will be heated according to the adjustment made with the setpoint knob.
Effect in the various operating modes:

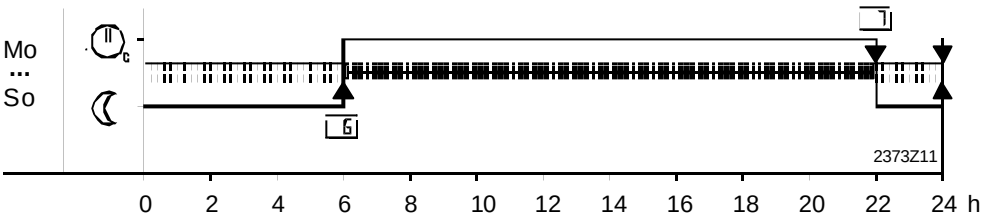
Operating mode	*Effect of knob adjustment*
	Adjustment acts on the heating periods
	Adjustment acts continuously
	Adjustment has no effect

Note

The adjustment made with the setpoint knob has priority over the reduced room temperature setpoint entered (line 27). Especially in a situation when the adjustment made with the knob is lower.

Example

During the heating periods, the nominal room temperature setpoint is maintained. The heating periods are in accordance with the settings made on lines 6 through 11 and 13 through 18.



3.3.1 Temperature adjustment via room unit

Temperature adjustment or readjustment via a room unit is active only when, on the controller, automatic mode has been selected!

Without room unit

	Adjustment made with the controller's setpoint knob
=	controller's nominal room temperature setpoint

QAA50

The QAA50 room unit has a knob for readjusting the setpoint in a + / - range. The readjustment is added to the actual setpoint adjusted with the controller's setpoint knob.

	Adjustment made with the controller's setpoint knob
+	readjustment made on the room unit (± 3 °C)
=	controller's nominal room temperature setpoint

Example:

Adjustment made with the controller's setpoint knob	20 °C
Adjustment made with the controller's setpoint knob	+ 2 °C
Resulting setpoint	22 °C

QAA70

The QAA70 room unit has an absolute setpoint adjustment using a line, which replaces the setpoint adjusted with the controller's setpoint knob, provided automatic mode has been selected on the controller.
In addition, the QAA70 has a knob for readjusting the setpoint in a + / - range. The readjustment is added to the actual setpoint adjusted with the controller's setpoint knob.

	Setpoint programmed with the room unit
+	readjustment made on the room unit (± 3 °C)
=	controller's nominal room temperature setpoint

Example:

Adjustment made with the controller's setpoint knob (inactive)	22 °C
Setpoint adjustment on the room unit's line	19 °C
Adjustment made with the controller's setpoint knob	+ 2 °C
Resulting setpoint	21 °C

3.4 Chimney sweep

Benefit

At the touch of a button, the plant is ready for making flue gas measurements.

Description

A function designed specifically for carrying out periodic flue gas measurements.

Setting

Activation: The chimney sweep function is activated by pressing this button. It is accessible only when the cover of the controller is open

Deactivation: By pressing one of the operating mode or function buttons
By pressing again the chimney sweep button
Automatically after one hour
By selecting a number in the output test

Adaption of output

During the time the chimney sweep function is activated, the heat output can be increased or decreased by pressing the + / - buttons.

- With multi-stage burner:
  The second burner stage can be switched on or off.

Notes

- When leaving the function, the controller will automatically return to the operating mode previously selected

LED

When the LED in the chimney sweep button is lit, the chimney sweep function is active.

Effect

Multistage burner:	Burner stages 1 and 2 will be switched on
Modulating burner	Maximum heat output
2 x 1 cascade:	Both burners will be switched on
BMU	The chimney sweep button has no effect. But the forced signals will be generated as described below if the chimney sweep function on the BMU is activated

Multi-stage burner

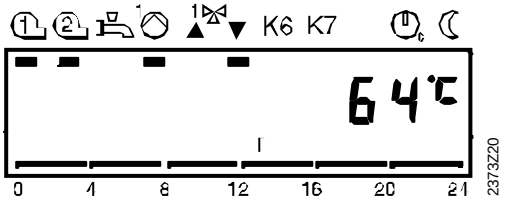
The boiler's switching differential will not be taken into consideration. To ensure continuous burner operation, the only switch-off point used is the boiler temperature's maximum limitation (TKmax).

First, all connected loads will be locked to ensure the boiler temperature will reach the setpoint of 64 °C as quickly as possible.
When the minimum temperature of 64 °C is attained, the available heating circuits are switched on one by one, using a dummy load, to make sure the heat generated by the boiler is drawn off so that the burner will remain in operation.

BMU

In the case of a BMU, the loads will immediately be released.

Display



3.5 Manual operation

Benefit

Manual heating operation in case the control system fails.

Description

Manual operation is an operating mode in which all required plant components must be manually adjusted and monitored. The controller's control functions have no more impact on the relays.

Boiler temperature

The required boiler temperature setpoint must be manually adjusted on the boiler's control thermostat. The boiler temperature is displayed on setting line 56.

Room temperature

The temperature of the heating circuits can be adjusted with the mixing valve, which must also be set to manual operation. The room temperature is still displayed on setting line 33.

Setting

Activation: Manual operation is activated by pressing this button. It is accessible only when the cover of the controller is open

Deactivation:
- By pressing one of the operating mode buttons
- By pressing again the manual operation button

Note

When deactivating the function, the controller will automatically return to the operating mode previously selected.

Effect

As soon as manual operation is activated, the following values are used for the heat demand:
For space heating:
Maximum limitation of flow temperature setpoint (lines 107 and 108).
For the d.h.w.:
Nominal setpoint of d.h.w. temperature (line 26) + setpoint boost of d.h.w. flow temperature (line 126).
For the minimum flow temperature setpoint and heat demand DC 0…10 V:
Minimum setpoint of the flow temperature, contact H (line 171).

The outputs will be switched to the following states:

Output	*Terminals*	*State*
Burner stages 1 and 2	K4, K5	ON
Heating circuit pump	Q2	ON
D.h.w. charging pump D.h.w. diverting valve	Q3 Y3	ON OFF
Mixing valve outputs	Y1 / Y2	OFF (de-energized) [1]
Multi-functional output	K6 / K7	2 = ON [2]

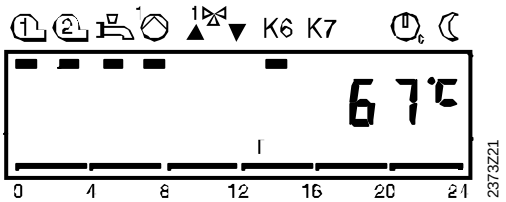
[1] With maintained return temperature with the mixing valve, Y1 will be controlled for a period of time that equals 5 times the set valve running time. Then, Y1 is de-energized.

[2] Except with the settings of the multifunctional outputs solar, alarm output and modulating burner (only K7). In these cases, K6/K7 are OFF.

Note

The following functions are no longer active in manual operation:
maximum limitation of the boiler temperature:
Maintained return temperature with mixing valve

Display



Setting the clock

Benefits

Automatic changeover from summer- to wintertime, and vice versa.
Fast and easy-to-understand time settings.

Description

To ensure proper operation of the heating program, the 24-hour time switch with the time of day and weekday must be correctly set.

Note

Between setting of date (line 3) and setting of weekday (line 2) there is no link. This means that when the set date falls on a Wednesday, for example, Wednesday as a weekday must also be set.

Summer- / wintertime

Automatic summer- / wintertime changeover adapts the time of day automatically. Also refer to "summer- / wintertime" in Index.

System time

The time of day can be set from a remote location via the bus system, provided clock operation is appropriately set. Also refer to "clock mode" in Index.

3.6 Time of day

Setting

Setting range	*Unit*
00:00...23:59	Hour : Minute

Effect

The controller's clock time is set in agreement with the correct time. This setting is important to make certain the controller's heating program will operate correctly.

Notes

During the setting procedure, the clock continues to run.
Each time the + or - button is pressed, the seconds are reset to zero.

3.7 Weekday

Setting

Setting range	*Unit*
1…7	Day

Effect

The time switch will be set to the selected weekday. This setting is important to make certain the controller's heating program will operate correctly.

Weekday table

1	=	Monday	5	=	Friday
2	=	Tuesday	6	=	Saturday
3	=	Wednesday	7	=	Sunday
4	=	Thursday			

3.8 Date (day, month)

Setting

Setting range	*Unit*
01:01...31:12	Day. Month

Effect

Day and month of the controller will be based on this setting. This setting of date is important to make certain the controller's holiday program and summer- / wintertime changeover will operate correctly.

3.9 Year

Setting

Setting range	*Unit*
1999...2099	Year

Effect

The year of the controller will be based on this setting. This setting of year is important to make certain the controller's holiday program and summer- / wintertime changeover will operate correctly.

Benefits

The heating system operates only if there is demand for heat.
The user can set the heating periods to suit his lifestyle.
Energy can be saved by making adequate use of the heating program.

Description

The time switch program consists of the switching times to be entered for the weekdays or the 7-day block. The controller has 3 time switch programs that function independently of one another.
Time switch program 1 is always used with heating circuit 1.

3.10 Preselection of weekday for time switch program 1

Description

This is a preselection of the weekdays or of the 7-day block to set the switching times for time switch program 1.
The heating program thus set becomes active when selecting automatic mode Auto.

Setting

5

Setting range	*Unit*
1-7	7-day block
1…7	Individual days

Important

This setting must be made before the switching times are entered!
For every day on which other switching times shall apply, preselection of the individual day with subsequent entry of the switching times must be repeated.

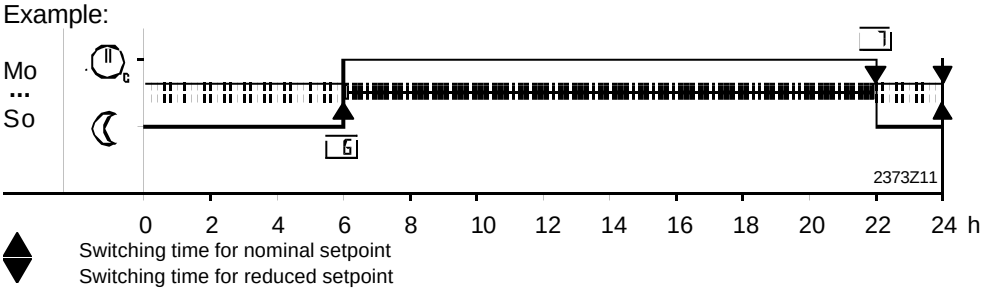
Effect

This setting is used to select either the whole week (1-7) or individual days (1...7).

Entry of **1-7**

7-day block
Entry of the switching times from line 6 to 11 is identical for every day from Monday through Sunday.

Example:

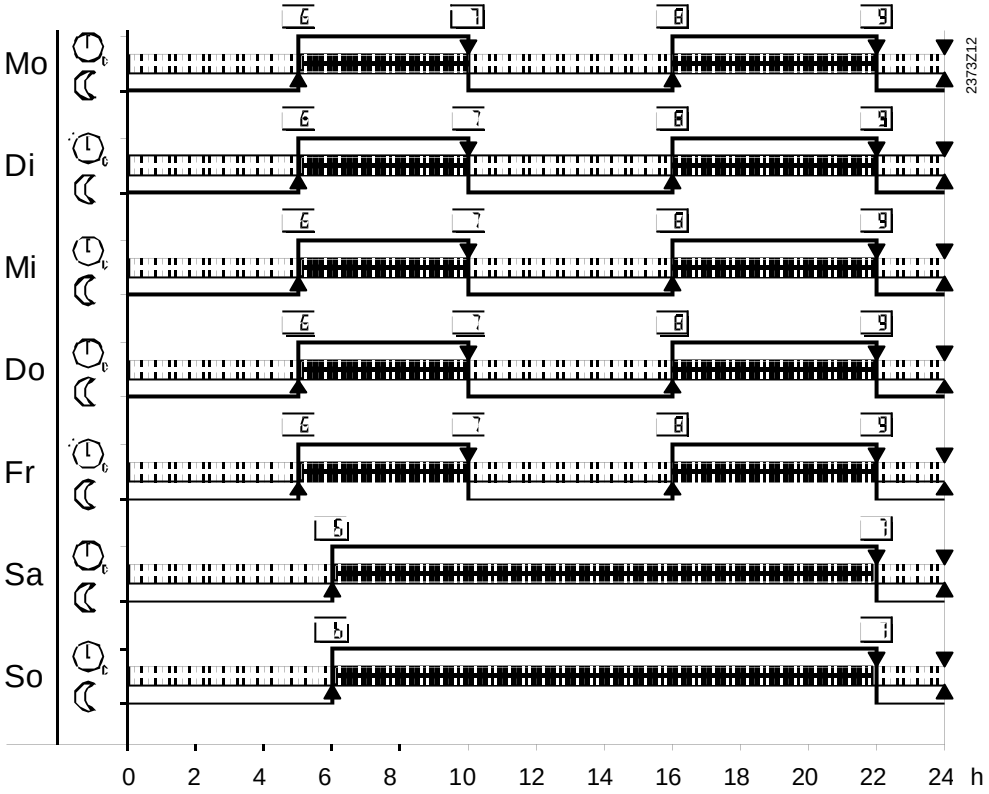


Entry of **1...7**

Individual days
The setting of the switching times from line 6 through 11 is entered **only** for the individual day selected here.

➔ *Tip*
First, choose the 7-day block (1-7) to enter the switching times that apply to the majority of days; then, select the individual days (1...7) to make the required adjustments.

Example:



3.11 Switching times of time switch program 1

Description

This is the setting of the switching times of time switch program at which the temperature setpoints for the relevant heating circuit will change.
The heating program thus set becomes active with automatic mode Auto.

Setting

6 ... 11

Setting range	*Unit*	*Factory setting*
- -:- -...24:00	h : min	See "Program overview" below

Important

First, select the weekday for which the switching times shall be entered!

Note

The controller makes a final check to ensure the entries have been made in the correct order.

Effect

At the times entered, the program will switch to the respective temperature setpoints.
The table below shows at what times the setpoints will be activated.
Entry:
– – : – – Switching point inactive.

00:00...24:00 At the time entered, heating to the respective temperature is ensured.

Program overview

Line	*Switching point*	*Temperature setpoint*		*Standard*
6	Switch-on time period 1	Setpoint of knob		06:00
7	Switch-off time period 1	Reduced setpoint	27	22:00
8	Switch-on time period 2	Setpoint of knob		– – : – –
9	Switch-off time period 2	Reduced setpoint	27	– – : – –
10	Switch-on time period 3	Setpoint of knob		– – : – –
11	Switch-off time period 3	Reduced setpoint	27	– – : – –

Effect of room unit

In AUTO mode, the time switch program can be set on both the controller (as described above) and on the QAA70 room unit. It is always the last action that is active.

Benefits

The heating system operates only if there is demand for heat.
The user can set the heating periods to suit his lifestyle.
Energy can be saved by making adequate use of the heating program.

Description

The time switch program consists of the switching times to be entered for the weekdays or the 7-day block. The controller has 3 time switch programs that function independently of one another.
Time switch program 2 is always used with heating circuit 2 or the d.h.w. circulating pump.

3.12 Preselection of weekday for time switch program 2

Description

This is a preselection of the weekdays or the 7-day block to set the switching times for time switch program 2.
The heating program thus set becomes active with automatic mode Auto.

Setting

12

Setting range	*Unit*
1-7	7-day block
1…7	Individual days

Important

- This setting must be made before the switching times are entered!
- For every day on which other switching times shall apply, preselection of the individual day with subsequent entry of the switching times must be repeated

Effect

This setting is used to select either the whole week (1-7) or individual days (1...7).
Entry:

1-7 7-day block:
Entry of switching times on lines 13 through 18 is identical for every day from Monday through Sunday.

1…7 Individual days:
Entry of switching times on lines 13 through 18 is made **only** for the individual day selected here.

Example:

For an example, refer to the graph in the previous section “Time switch program 1".

3.13 Switching times of time switch program 2

Description

This is the setting of the switching times for time switch program 2 at which the temperature setpoints for heating circuit 2 will change.
The heating program thus set becomes active with automatic mode Auto.

Setting

13 ... 18

Setting range	*Unit*	*Factory setting*
- -:- -...24:00	h : min	See "Program overview" below

Important

First, select the weekday for which the switching times shall be entered!

Note

The controller then makes a check to ensure the entries have been made in the correct order.

Effect

At the times entered, the program will switch to the respective temperature setpoints. The table below shows at what times the setpoints will be activated.

Entry:
– – : – – Switching point inactive.

00:00...24:00 At the time entered, heating to the respective temperature is ensured.

Program overview

Line	*Switching point*	*Temperature setpoint*	*Standard*
13	Switch-on time period 1	Setpoint of knob	06:00
14	Switch-off time period 1	Reduced setpoint 27	22:00
15	Switch-on time period 2	Setpoint of knob	– – : – –
16	Switch-off time period 2	Reduced setpoint 27	– – : – –
17	Switch-on time period 3	Setpoint of knob	– – : – –
18	Switch-off time period 3	Reduced setpoint 27	– – : – –

Effect of room unit

When using a QAA70 room unit, the heating program will be overwritten. However, this works only if automatic mode is selected on the controller. Also refer to "room unit values" in Index.

Benefits

D.h.w. is heated only if required.
The user can set the d.h.w. heating times to suit his lifestyle.
Energy can be saved by making adequate use of the time switch program.

Description

The time switch program consists of the switching times to be entered for the weekdays or the 7-day block. The controller has 3 time switch programs that function independently of one another.
The d.h.w. time switch program is always used for d.h.w. heating.

3.14 Preselection of weekday for time switch program 3 (d.h.w.)

Description

This is a pre-selection of the weekdays or the 7-day block used for the switching time settings of the d.h.w. time switch program.
The time switch program thus set is activated by pressing the d.h.w. operating mode button.

Setting

Setting range	*Unit*
1-7	7-day block
1…7	Individual days

Important

- This setting must be made before the switching times are entered!
- For every day on which other switching times shall apply, the preselection of the individual day with subsequent entry of the switching times must be repeated

Effect

This setting is used to select either the whole week (1-7) or individual days (1...7).

Entry:

1-7 7-day block:
Entry of the switching times on lines 20 through 25 is identical for every day from Monday through Sunday.

1…7 Individual days:
Entry of the switching times on lines 20 through 25 is made **only** for the individual day selected here.

Example:

For an example, refer to the graph in the previous section “Time switch program 1".

3.15 Switching times of time switch program 3 (d.h.w.)

Description

This is the setting of the switching times for d.h.w. time switch program at which the d.h.w. temperature setpoint will change.
The time switch program thus set is activated by pressing the d.h.w. operating mode button .

Setting 20 ... 25

Setting range	*Unit*	*Factory setting*
- -:- -...24:00	h : min	See "Program overview" below

Important

First, select the weekday for which the switching times shall be entered!

Note

The controller then makes a check to ensure the entries have been made in the correct order.

Effect

At the times entered, the program will switch to the respective temperature setpoints.
The table below shows at what times the setpoints will be activated.
Entry:

– – : – – Switching point inactive.

00:00...24:00 At the time entered, heating to the respective temperature is ensured.

Program overview

Line	*Switching point*	*D.h.w temperature setpoint*		*Standard*
20	Switch-on time period 1	Nominal setpoint	26	06:00
21	Switch-off time period 1	Reduced setpoint	120	22:00
22	Switch-on time period 2	Nominal setpoint	26	– – : – –
23	Switch-off time period 2	Reduced setpoint	120	– – : – –
24	Switch-on time period 3	Nominal setpoint	26	– – : – –
25	Switch-off time period 3	Reduced setpoint	120	– – : – –

3.16 Nominal setpoint of d.h.w. temperature (TBWw)

Benefits

D.h.w. heating only if there is demand for it.
Possibility of using 2 different d.h.w. temperature setpoints.

Setting

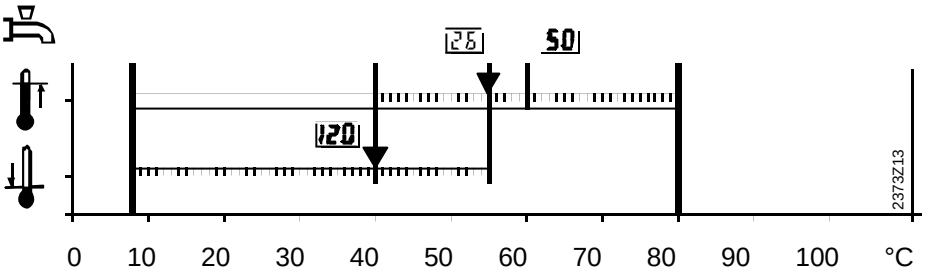
26

Setting range	*Unit*	*Factory setting*
TBWR...TBWmax	°C	55

TBWR Reduced setpoint of d.h.w. temperature (setting on line 120)
TBWmax Maximum nominal setpoint of d.h.w. temperature (setting on line 50 $_{OEM}$)

Effect

The temperature setpoint during normal d.h.w. operation will be changed.



26 Setting "Nominal setpoint of d.h.w. temperature"
120 Setting "Reduced setpoint of d.h.w. temperature"
50 $_{OEM}$ Setting "Maximum nominal setpoint of d.h.w. temperature"

D.h.w. temperature setpoints

D.h.w. heating has 2 different setpoints that can be used:

Nominal setpoint of the d.h.w. temperature: It ensures d.h.w. temperature required during main occupancy times.

Reduced setpoint of d.h.w. temperature (setting on line 120): It ensures the d.h.w. temperature required outside main occupancy times.

D.h.w. program

The times at which these d.h.w. setpoints shall apply can be set with the d.h.w. program on line 121.

3.17 Reduced setpoint of room temperature (TRRw)

Benefits

Lower room temperatures during non-occupancy times, e.g. during the night.
Energy savings.

Description

The heating system has 3 different setpoints that can be adjusted:
The reduced room temperature setpoint described here.
The nominal room temperature setpoint (to be adjusted with the setpoint knob).
The frost protection setpoint of the room temperature (setting on line 28).

Setting

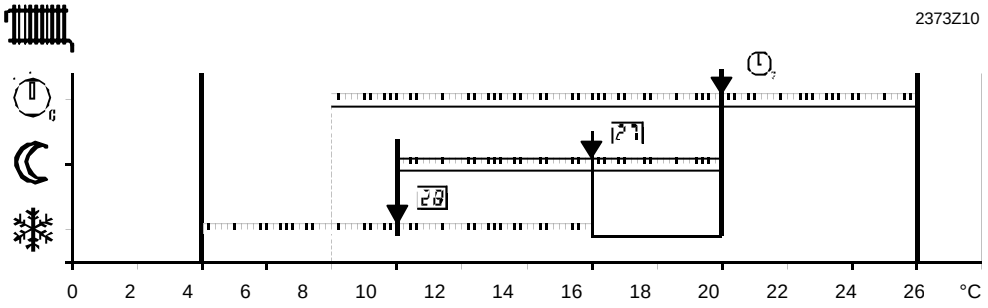
27

Setting range	*Unit*	*Factory setting*
TRF...TRN	°C	16

TRF Room temperature for frost protection (setting on line 28)
TRN Nominal room temperature setpoint (to be adjusted with the setpoint knob)

Note

If the required temperature level cannot be set, the adjustment made with the setpoint knob may be too low. It is not possible to set a value above the adjustment made with the setpoint knob.



Room temperature setpoint setting ranges

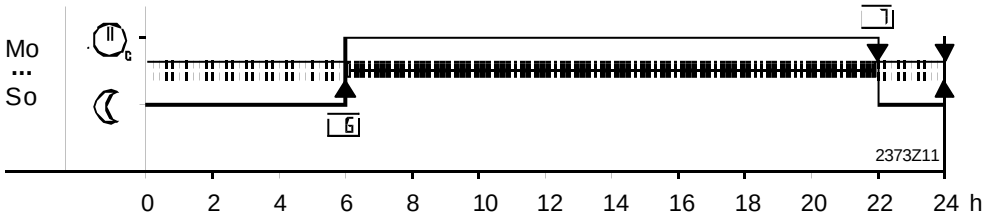
27 Setting "Reduced room temperature setpoint "
28 Setting "Frost protection setpoint of the room temperature"

Effect

With this setting, the reduced room temperature setpoint will change to the level required outside the heating periods .

Example:

The heating periods are in accordance with the settings made on lines 6 through 11.



3.18 Frost protection setpoint of room temperature (TRF)

Benefit

Protection of building against frost.

⚠

Caution
This function is ensured only when the heating plant operates properly!

Description

Frost protection is an automatic switching on function which is activated when the outside temperature falls below freezing.

Setting

28

Setting range	*Unit*	*Factory setting*
4...TRRw	°C	10

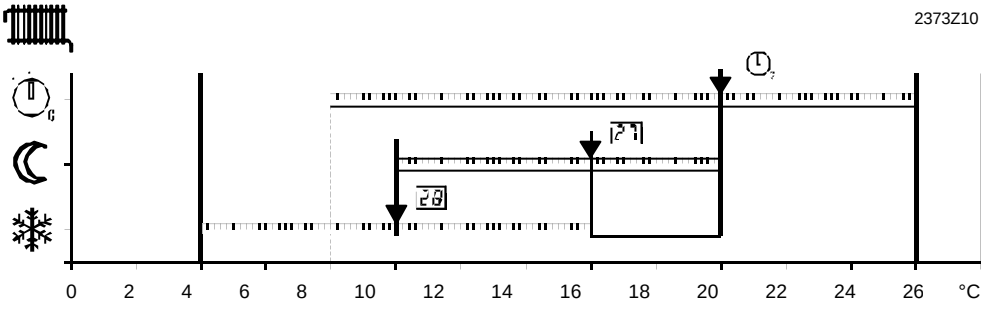
TRRw Reduced room temperature setpoint (setting one line 27)

Effect

This setting will change the frost protection setpoint of the room temperature.

Frost protection for the building

In operating mode ⏻, the room temperature is prevented from falling below a certain level. This means that the frost protection setpoint of the room temperature ❄ will be maintained.



Room temperature setpoint setting ranges

27 Setting "Reduced room temperature setpoint"
28 Setting "Frost protection setpoint of room temperature"

3.19 Summer / winter changeover temperature heating circuit 1 (THG1)

Benefits

Fully automatic operation throughout the year.
The heating will not be switched on when the outside temperature drops for short periods of time.
Additional savings function.
Separate changeover of the heating circuits.

Description

The summer / winter changeover temperature is the criterion for automatic summer / winter changeover of the heating plant.

Setting

29

Setting range	*Unit*	*Factory setting*
8...30.0	°C	17

Effect

By changing the setting, the respective periods of time will be shortened or extended.

Entry:

Increase: Winter operation will start *earlier*
Summer operation will start *later*

Decrease: Winter operation will start *later*
Summer operation will start *earlier*

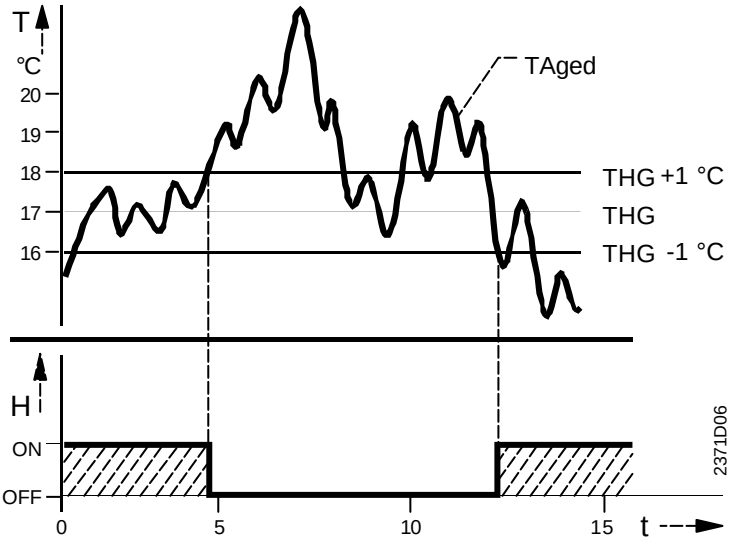
Notes

- The summer / winter changeover temperature can act either locally or on other devices in the system (also refer to section "Effect of summer / winter changeover temperature") Also refer to "effect of summer / winter changeover function" in Index.
- This function only acts in automatic mode Auto
- The display will show "ECO“

Changeover

To determine changeover, the setting of the summer / winter changeover temperature (± a fixed switching differential) is compared with the attenuated outside temperature. Also refer to “attenuated outside temperature” in Index.

Heating **OFF** (from winter to summer)	TAged > THG + 1 °C
Heating **ON** (from summer to winter)	TAged < THG – 1 °C



Changeover between summer and winter operation

TAged	Attenuated outside temperature
THG	Summer / winter changeover temperature
T	Temperature
t	Time
H	Heating

3.20 Heating curve slope heating circuit 1 (S1)

Benefit

Constant room temperature in spite of outside temperature variations.

Description

The controller generates the flow temperature setpoint only for heating circuit 1, based on the selected heating curve.

Setting

30

Setting range	*Unit*	*Factory setting*
– – : – / 2.5...40.0	Increment	15.0

Effect

By changing the setting, the slope of the heating curve will be increased or decreased.

Entry:

– – : –	All functions of heating circuit 1 are deactivated Frost protection for the building and the plant **will not be** active (frost protection for the boiler and d.h.w. remains active).
2,5...40,0	All functions of heating circuit 1 will be activated
Increase:	The flow temperature will be **raised** when the outside temperature drops
Decrease:	The flow temperature will be **raised less** when the outside temperature drops

Note

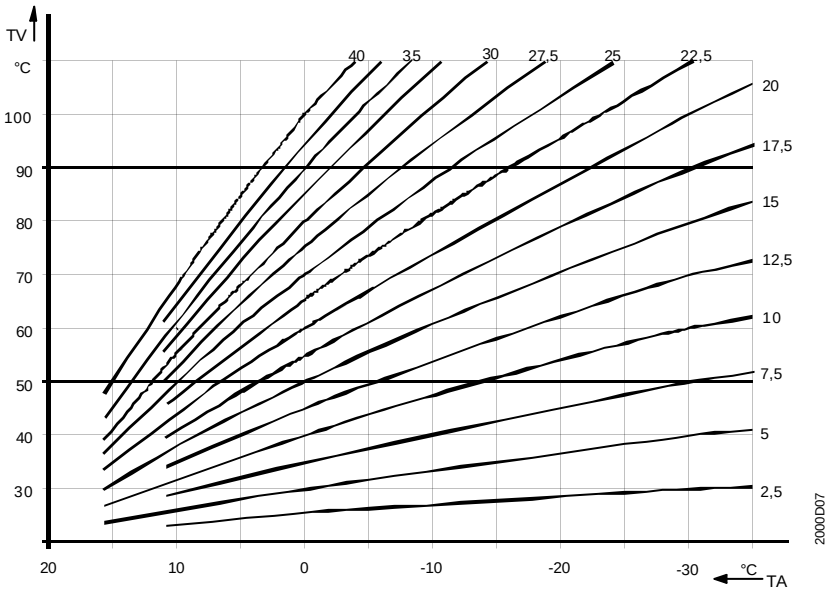
This setting also has an effect on the generation of the type of plant displayed on line 53. The switching on and off of the heating circuit through the setting – : – – or a value changes the plant configuration accordingly.

The heating curve

Using the heating curve, the controller generates the flow temperature setpoint, enabling the system to maintain a constant room temperature even without using a room sensor.
The steeper the slope of the heating curve, the higher the flow temperature setpoint at low outside temperatures.

Note

Comfort is considerably enhanced when using a room sensor.



Heating circuit diagram

TV Flow temperature
TA Composite outside temperature

Flow temperature setpoint

The flow temperature setpoint determined in this way serves as a setpoint request for generating the boiler temperature setpoint. Also refer to "generation of boiler temperature setpoint" in Index.

3.21 Summer / winter changeover temperature of heating circuit 2 (THG2)

Setting

Setting range	*Unit*	*Factory setting*
8...30.0	°C	17

For detailed information about changeover, refer to “Summer / winter changeover temperature heating circuit 1" (THG1).

3.22 Heating curve slope heating circuit 2 (S2)

Benefit

Constant room temperature in spite of outside temperature variations.

Description

The controller generates the flow temperature setpoint only for heating circuit 2, based on the selected heating curve.

Setting

Setting range	*Unit*	*Factory setting*
– – : – / 2.5...40.0	Increment	15.0

Effect

By changing the setting, the slope of the heating curve will be increased or decreased.

Entry:

– : – –	All functions of heating circuit 2 are deactivated Frost protection for the building and the plant **will not be** active (frost protection for the boiler and d.h.w. remains active).
2.5...40.0	All functions of heating circuit 2 will be activated
Increase:	The flow temperature will be **raised** when the outside temperature drops
Decrease:	The flow temperature will be **raised less** when the outside temperature drops

Note

This setting also has an effect on the generation of the type of plant displayed on line 53. The switching on and off of the heating circuit through the setting – : – – or a value changes the plant configuration accordingly.

The heating curve

For detailed information about the heating curve, refer to “Slope of heating curve heating circuit 1 " (S1).

Flow temperature setpoint

The flow temperature setpoint determined in this way serves as a setpoint request for generating the boiler temperature setpoint. Also refer to "generation of boiler temperature setpoint" in Index.

3.23 Actual value of room temperature (TRx)

Setting

Display	*Unit*
0..0.50 °C	°C

Effect

The temperature measured with the room unit will automatically be displayed on this line.

Special displays

– – –	No valid room sensor connected

3.24 Actual value of outside temperature (TAx)

Setting

Display	Unit
- 50.0 ... + 50.0	°C

Effect

The temperature measured with the outside sensor will automatically be displayed on this line.

Special displays

0.0 °C	Sensor with open-circuit or no sensor connected
0.0 °C	Sensor with short-circuit

Note
For more detailed information about resetting the attenuated outside temperature to the actual room temperature, refer to "attenuated outside temperature" in Index.

Benefits

Useful information for service and maintenance staff.
No additional mechanical counters required.

3.25 Burner hours run stage 1 (tBR1)

Description

Auxiliary value for ascertaining the amount of energy consumed.

Setting

Display	*Unit*
0...65535	Hours

Effect

The current number of hours run of burner stage 1 or of a BMU will automatically be displayed on this line.

3.25.1 Counting the hours run

With multistage burner

The hours run of burner stage 1 are counted using the signal received from output E1 (e.g. the fuel valve). The input signal voltage must be AC 230 V.
Each time 2 full operating hours are registered, the new value will be written to non-volatile memory. Only full hours are displayed, and no minutes.

Note

This means that if the display is checked again after a short period of time, it may still show the previous reading, if the burner has not yet completed another 2 operating hours.

With BMU

When using a BMU, the value transmitted will be displayed via PPS.

3.25.2 Average burner running time

Together with the display of the number of burner starts (line 37), it is possible to ascertain the average burner running time.
This information makes it possible to determine if:

- the plant is correctly sized
- the burner has become dirty

3.26 Burner hours run stage 2 (tBR2)

Description

Auxiliary value for ascertaining the average load on the boiler.

Setting

Display	*Unit*
0...65535	Hours

Effect

The actual number of hours run of burner stage 2 will automatically be displayed on this line.

3.26.1 Counting the hours run

The hours run of burner stage 2 are counted with the signal received from output K5. But this is the case only when voltage is present at E1.
Each time 2 full operating hours are registered, the new value will be written to non-volatile memory. Only full hours are displayed, and no minutes.

Note

This means that if the display is checked again after a short period of time, it may still show the previous reading, if the second burner stage has not yet completed another 2 operating hours.

3.27 Number of burner starts stage 1

Description

Auxiliary value for ascertaining the average burner hours run.

Setting

Display	*Unit*
0...65535	Number

Effect

The number of starts of burner stage 1 will automatically be displayed on this line.

Counting

The number of starts of burner stage 1 are counted using the signal received from output E1 (e.g. the fuel valve). The input signal voltage must be AC 230 V. Display of the number of burner starts is updated each time the burner is started up.
The number of burner starts is written to non-volatile memory at 2-hour intervals or whenever there is a power failure.

3.28 Number of burner starts stage 2

Description

Auxiliary value for ascertaining the average burner running time.

Setting

Display	*Unit*
0...65535	Number

Effect

The number of starts of burner stage 2 will automatically be displayed on this line.

Counting

The number of starts of burner stage 2 are counted with the signal received from output K5. But this is the case only when voltage is present at E1. Display of the number of burner starts is updated each time the burner is started up.
The number of burner starts is written to non-volatile memory at 2-hour intervals or whenever there is a power failure.

3.29 Standard times

Benefit

Straightforward resetting of all time switch programs to their standard values.

Description

The standard time program resets the time settings of all time switch programs. For this purpose, the controller is supplied with non-volatile factory settings.

Setting

The standard time program is activated as soon as the display changes to 1.

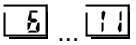
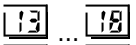
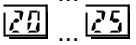
Display	*Unit*
0 / 1	-

Caution

In that case, the individual settings will be lost!

Effect

The time settings for the time switch programs will be overwritten with standard values. This applies to the following settings:

- Switching times of time switch program 1 
- Switching times of time switch program 2 
- Switching times of time switch program 3 (d.h.w.) 

Standard values

Switching point	*Setting line*			*Standard time*
Period 1 ON	6	13	20	06 : 00
Period 1 OFF	7	14	21	22 : 00
Period 2 ON	8	15	22	– – : – –
Period 2 OFF	9	16	23	– – : – –
Period 3 ON	10	17	24	– – : – –
Period 3 OFF	11	18	25	– – : – –
	Time switch program			
	1	*2*	*3*	

Holidays

Benefit

Automatic operating mode changeover during the holiday period.

Description

The holiday function includes 3 settings. There are 8 holiday periods per year available for which, if used, the start and end dates must be entered.

Setting

First, the required holiday period must be selected for which the 2 dates are to be entered.

Reset

The holiday period can be cleared by pressing simultaneously on the + and – buttons for 3 seconds on the operating line for start or end of the holiday period. Then, the display will show - -.- -.

Important

The holiday program is only active in automatic mode Auto.

The dates entered apply as follows:

Activation	00:00 hrs of the first day of the holiday period
Deactivation	24:00 hrs of the last day of the holiday period

Manual deactivation

When selecting operating mode ⊗ or ⏻, the holiday function no longer acts on space heating and d.h.w. heating. But the holiday function remains activated in the background. This means that if automatic mode Auto is selected again, the holiday function will be resumed.
The d.h.w. mode can be changed while the holiday function is active.

Display

When the holiday period is activated, Auto flashes. The d.h.w. operating mode button flashes depending on the setting made on line 123 and when d.h.w. mode is activated.

Note

The dates of the holiday period will be cleared as soon as the holiday period is over.

Effect

During the selected holiday periods, the heating circuits will be switched off or a change to the frost protection setpoint is made.

D.h.w.

D.h.w. heating is always switched in accordance with its assignment to the heating circuits (also refer to “d.h.w. assignment” in Index). This means that d.h.w. heating is also switched to holiday mode as soon as all assigned heating circuits are in holiday mode.

Room unit

Effect with room unit:
The holiday function of the room unit is taken into consideration but the entries made on the controller have priority.

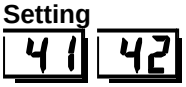
3.30 Holiday period heating circuits 1 and 2

Setting

Display	*Unit*
1…8	–

3.31 Start and end of holiday period heating circuits 1 and 2

Setting



Display	*Unit*
01.01...31.12	Day.Month

3.32 Indication of BMU error code

Benefits

Straightforward checking of plant.
Fault tracing is made easier.

Description

The controller can register and store a fault message with the error code. The faults are indicated on this operating line.

Setting

Display	*Unit*
49	
0...255	Error code

Effect

The fault entry will automatically be displayed on this operating line.

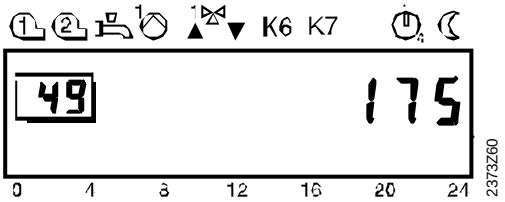
Note

Fault messages cannot be acknowledged. They disappear only if the fault has been rectified.

Display

The display shows the error code. If there is no fault message, or if no BMU is connected, there will be no display.
The meaning of the different error codes depends of the make of BMU used. For this reason, no overview of all the different error codes can be given here. For details, please refer to the technical documentation of the relevant product.

Example



The BMU displays error code 175.

Note

If there is a BMU error code, operating line 50 also displays a general BMU fault (error code 150).

3.33 Indication of faults

Benefits

Straightforward checking of plant.
Fault tracing is made easier.

Description

The controller indicates faults that may have occurred in the controller itself or in the system.
In normal operation, the display shows "Er" if a fault has occurred.

Setting

Display	*Unit*
0...255	–

Effect

The first entry in the fault list will automatically be displayed on this line.

Note

By pressing - +, it is possible to switch between fault messages.

Fault messages

The controller can store a maximum of 2 fault messages. The faults message will be cleared only after the cause of the fault has been removed. If additional faults are present, they will be stored as soon as storage capacity becomes available.

Device faults

Faults that can occur on the controller:

Display	*Description of fault*
Blank	No fault
10	Outside sensor
20	Boiler temperature sensor
28	Flue gas temperature sensor
30	Flow temperature sensor
40	Return temperature sensor
50	D.h.w. temperature sensor connected to B3
52	D.h.w. temperature sensor connected to B31
58	D.h.w. thermostat
61	Fault room unit
62	Wrong room unit
70	Buffer storage tank temperature sensor B4
71	Buffer storage tank temperature sensor B41
73	Collector temperature sensor
81	Short-circuit LPB
82	Address collision on LPB (same address several times)
86	Short-circuit PPS
100	2 clock masters present
140	Inadmissible LPB device or segment number
146	Inadmissible plant configuration
150	General BMU fault
162	Fault contact H2

Faulty devices

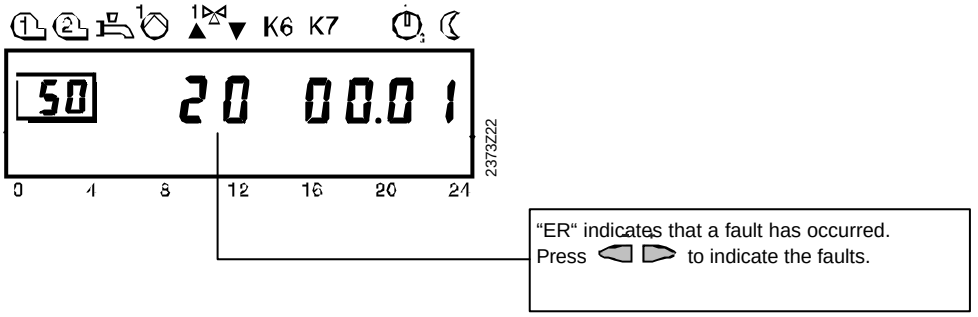
Other devices that may develop faults and whose faults are communicated:

Display	*Description of fault*
20 00.01	Fault with address of the faulty device

The first 2 digits give the error code (20).
The next 2 digits indicate the segment address of the faulty device (00.).
The last 2 digits indicate the device address of the faulty device (.01).

Display

Example of a display after a fault has occurred:



4 Description of heating engineer settings

Service values

4.1 Output test

Benefits

Connections can be checked prior to commissioning.
Faults can be pinpointed faster.

Description

Also termed relay test, which is used to check the wiring and the configuration.

Setting

Setting range	*Unit*	*Factory setting*
0…9	Increment	0

Effect

The output test will automatically become available on this line.
With each test step, the respective output will be activated so that it can be checked.

Test sequence

The test sequence is arranged in the form of a ring counter. This means it can be run through either forward or backward by pressing the + / - buttons.

Note

For more information, refer to "commissioning" in Index.

Test step 0	All outputs are switched according to normal control operation
Test step 1	All outputs are deactivated
Test step 2	Burner stage 1 (K4) is activated
Test step 3	Burner stages 1 and 2 (K4 + K5) are activated
Test step 4	D.h.w. charging pump / diverting valve (Q3 / Y3) is activated
Test step 5	Mixing heating circuit / boiler pump (Q2) is activated
Test step 6	Mixing valve OPEN (Y1) is activated
Test step 7	Mixing valve CLOSED (Y2) is activated
Test step 8	Multifunctional output (K6) is activated
Test step 9	Multifunctional output (K7) is activated

4.2 Input test

Benefits

Commissioning is facilitated.
Faults can be pinpointed faster.

Description

Also termed sensor test, which is used to check the wiring and the configuration.

Setting

Setting range	*Unit*	*Factory setting*
0...10	Increment	0

Effect

The input test will automatically become available on this line.
With each test step, the respective input will be displayed so that it can be checked.

Test sequence

The test sequence is arranged in the form of a ring counter. This means it can be run through either forward or backward by pressing the + / - buttons.

Note

For more information, refer to "commissioning" in Index.

Test step 0	Display of boiler temperature acquired with sensor B2
Test step 1	Display of d.h.w. temperature acquired with sensor B3
Test step 2	Display of input B31/H2/B41 according to the function selected on line 174 [°C or ooo or ---].
Test step 3	Display of flow temperature acquired with sensor HK1 B1
Test step 4	Display of outside temperature acquired with sensor B9
Test step 5	Display of room temperature acquired with sensor A6
Test step 6	Display of return temperature acquired with sensor B7
Test step 7	Display of flue temperature acquired with sensor B8
Test step 8	Buffer temperature 1 acquired with sensor B4
Test step 9	Display of input H1 according to the function selected on line 170 [°C / 000 / - - -]
Test step 10	Display switching state input E1

4.3 Display of plant type

Benefits

Plant structure is easy to understand.
Straightforward checking of configuration.

Description

Displays the plant type used.

Setting

Display	*Unit*
0...151	–

Effect

The number of the current plant type will automatically be displayed on this operating line.

Display:

0	Invalid plant configurations
1...151	Valid plant configurations (refer to section “Plant types”)

Plant type

Based on the connected peripheral devices and parameter settings, the controller ascertains the current plant type.
The plant type is displayed in the form of a number which corresponds to the plant diagram.
Refer to section "Application examples" for the various types of plant with the required peripheral devices.

The following factors have an impact on the generation of the type of plant:

- Connecting a d.h.w. temperature sensor to B31/H2/B41
- Connecting a d.h.w. temperature sensor or thermostat to B3
- Setting operating line “d.h.w. controlling element” (line 128)
- Setting operating line “Output K6” (line 95) or output K7 (line 96)
- Input signal at B1
- Setting operating line “Heating curve slope HK1” (line 30) - or value between 2.5 and 40)
- Setting operating line “Heating curve slope HK2” (line 32) - or value between 2.5 and 40)
- Setting the type of heat source (line 80)

Benefit

Display of the actual temperatures acquired with the sensors.

Sensor value

Each sensor acquires 2 sensor values. The physical sensor value is the value measured at the controller's terminals. The logic sensor value is the value finally selected from the various sensor sources (physically or via communication) based on certain criteria. Under certain circumstances, the source of the logic sensor value cannot be immediately identified.
The logic sensor values are displayed on the operating lines of the actual values. The physical values appear on the operating line of the input test.

Effect

The temperature measured will automatically be displayed on this operating line. In general, no setting can be made with the setting buttons, but in certain cases they can be used for making a reset.

Special displays

– – – No valid sensor connected

4.4 Actual value of flow temperature (B1)

Description

Temperature acquired with sensor B1 in the flow of the mixing heating circuit is a criterion for the control of the mixing valve.

Setting

Display	*Unit*
0...140	°C

4.5 Actual value of boiler temperature

Description

Temperature acquired with sensor B2 in the boiler or by the BMU.

Setting

Display	*Unit*
0...140	°C

4.6 Actual value of common flow temperature

Description

The common flow temperature is the flow temperature delivered by the relevant heat source. When used as a heat generation controller, it is the flow temperature from the boiler or from the buffer storage, depending on the type of plant. If the controller is used in a zone, it is the actual value delivered via LPB.

Setting

Display	*Unit*
0...140	°C

4.7 Actual value of return temperature (B7)

Description

Temperature acquired by sensor B7 in the return is used to ensure maintained boiler return temperature.

Setting

Display	*Unit*
0...140	°C

4.8 Actual value 1 (top) of buffer storage tank temperature

Description

When including alternative heat sources, buffer storage tank temperature 1 is used as a control criterion for the release of additional heat sources.

Setting

Display	*Unit*
0...140	°C

Note

Buffer storage tank temperature 1 corresponds to the value of the sensor connected to terminal B4. If there is no valid value at that terminal, the value of terminal B31/H2/B41 will be adopted, if available.

4.9 Actual value 2 (bottom) of buffer storage tank temperature

Description

Buffer storage tank temperature 2 is used as a criterion for charging with solar energy.

Setting

Display	*Unit*
0...140	°C

Important

To be used as buffer storage tank temperature sensor 2, input B31/H2/B41 must be appropriately defined.

Note

Buffer storage tank temperature 2 corresponds to the value of the sensor connected to terminal B31/H2/B41. If there is no valid value at that terminal, the value of terminal B4 will be adopted, if available.

4.10 Actual value 1 of d.h.w. temperature (TBWx)

Description

The higher d.h.w. temperature acquired with the d.h.w. temperature sensor will automatically be displayed on this line.

Setting

Display	*Unit*
0...140	°C

Note

If only one d.h.w. temperature sensor is connected, lines 61 and 62 will show the same value.

4.11 Actual value 2 of d.h.w. temperature

Description

The lower d.h.w. temperature acquired with the d.h.w. temperature sensor will automatically be displayed on this line.

Setting

Display	*Unit*
0...140	°C

Note

If only one d.h.w. temperature sensor is connected, lines 61 and 62 will show the same value.
For information about d.h.w. heating with 2 sensors, refer to "input B31" in Index.

4.12 Display of maximum flue gas temperature (TGxmax)

Description

This display shows the highest flue gas temperature acquired since the last reset.

Setting

Display	*Unit*
0...350	°C

Using the + / - buttons, the display can be reset to the current value. For that purpose, both buttons must be pressed together for 3 seconds. The value is reset as soon as the display stops flashing.

Note

In the event of an open-circuit or short-circuit of the sensor, the display maintains the maximum temperature value last measured. This value can be reset after rectification of the fault.

Important

To be used as a flue gas temperature sensor, input B8/B6 must be appropriately defined (operating line 99).

4.13 Actual value of collector temperature (B6)

Description

Temperature at the collector acquired with sensor B6. This value is used as a criterion for charging d.h.w. or buffer storage tanks with solar energy.

Important

To be used as a collector temperature sensor, input B8/B6 must be appropriately defined (line 99).

Setting

Display	*Unit*
0...350 (Pt 1000) 0...230 (Ni 1000)	°C

4.14 Attenuated outside temperature (TAged)

Description

Also refer to "composite outside temperature" in Index.

Setting

Display	*Unit*
-50...+50	°C

4.15 Composite outside temperature (TAgem)

Description

Also refer to "attenuated outside temperature" in Index.

Setting

Display	*Unit*
-50...+50	°C

4.16 Outside temperature source

Benefit

Display and location of actual outside temperature measurement.

Description

When interconnecting several controllers, only one outside sensor is required. It can be connected to any of the controllers to deliver its signal via the bus system.
The controllers to which no sensor is connected adopt the outside temperature signal via the bus system, from a controller to which a sensor is connected.

Setting

Display	*Unit*
– – . – –	No signal
00.01...14.16	Segment and device address

Effect

The address of the outside sensor that currently delivers the outside temperature signal will automatically be displayed on this line.

Display

– – . – –	No outside sensor signal
01.02	Address of outside sensor The first 2 digits represent the segment number (01.) The second 2 digits represent the device number (.02)

4.17 Display of boiler temperature setpoint

Benefits

Indication of boiler temperature setpoint.
Better overview of the plant's operating state.

Description

The current boiler temperature setpoint will automatically be displayed on this line.

Setting

Display	*Unit*
0...140	°C

The setpoint can only be displayed, but not changed. The function helps better understand the control sequences taking place in the controller.
No setpoint is displayed (---) when there is no heat demand from the consumers.

4.18 Display of common flow temperature setpoint

Benefit

Display of common flow temperature setpoint.
Better overview of the plant's operating state.

Description

The current common flow temperature setpoint will automatically be displayed on this line.

Setting

Display	*Unit*
0...140	°C

The setpoint can only be displayed, but not changed. The function helps better understand the control sequences taking place in the controller.
No setpoint is displayed (---) when there is no heat demand from the consumers.

4.19 Display of d.h.w temperature setpoint

Benefits

Indication of d.h.w. temperature setpoint.
Better overview of the plant's operating state.

Description

The current d.h.w. temperature setpoint will automatically be displayed on this line.

Setting

Display	*Unit*
0...140	°C

The setpoint can only be displayed, but not changed.

Generation of setpoint

The value displayed depends on the following parameters:
- Current time of day (operating line 1)
- Time switch program d.h.w. heating (operating lines 19...35)
- Nominal setpoint of d.h.w. temperature (operating line 26)
- Reduced setpoint of d.h.w. temperature (operating line 120)
- Release of d.h.w. heating (operating line 121)
- Assignment of d.h.w. (operating line 123)
- Number of d.h.w. heating cycles per day (operating line 124)
- Legionella function ON / OFF (operating line 52_{OEM})
- Legionella setpoint (operating line 53_{OEM})

Note

No value (---) is displayed in the following situations:
- No d.h.w. heating available
- D.h.w. heating is switched off (button for d.h.w. heating OFF or holidays)

4.20 Display of nominal room temperature setpoint HK1

Benefit

Information about the nominal room temperature setpoint.

Description

Displays the current nominal room temperature setpoint. The nominal room temperature setpoint is the temperature adjusted on the controller that is aimed for in the rooms in normal operation.

Setting

Display	*Unit*
0.0...35.0	°C

Effect

The nominal room temperature setpoint will automatically be displayed on this line.

Nominal room temperature setpoint

The resulting nominal room temperature setpoint is made up of the adjusted setpoint and a readjustment that may have been made on the room unit:
Also refer to "nominal room temperature setpoint" in Index.

4.21 Display of nominal room temperature setpoint HK2

Description

Function and effect of this setting are basically the same as with setting 71 described above.

Setting

Display	*Unit*
0.0...35.0	°C

4.22 Display of room temperature setpoint HK1 (TRw)

Benefit

Information about the room temperature setpoint in the various operating modes.

Description

Displays the current room temperature setpoint during the respective heating period (normal operation / reduced operation).

Setting

Display	*Unit*
0...35	°C

When selecting the operating line, the current room temperature setpoint is displayed, depending on the operating mode and the time switch program, that is, a selection / combination of the following parameters:

- Room temperature setpoint knob
- Reduced setpoint of room temperature (operating line 27)
- Frost protection setpoint of room temperature (operating line 28)
- Readjustments made on the room unit (QAA50 / QAA 70)

Note

If there is no heating circuit, the display shows "---".

4.23 Display of room temperature setpoint HK2 (TRw)

Description

Function and effect of this setting are basically the same as with setting 73 described above.

Setting

Range	*Unit*
0...35	°C

4.24 Display of flow temperature setpoint HK1 (TRw)

Benefit

Displays the current flow temperature setpoint of the heating circuit.

Description

When selecting this operating line, the current flow temperature setpoint of the controller's internal heating circuit is displayed.

Setting

75

Display	*Unit*
0...140	°C

The value displayed corresponds to the flow temperature of the heating circuit that is required for satisfying the demand for heat.

Note

The display shows "---" in the following situations:
- No heating circuit available
- ECO function active (summer / winter changeover, automatic 24-hour heating limit)
- Quick setback active
- Room temperature limitation active

4.25 Display of flow temperature setpoint HK2 (TVw)

Description

Function and effect of this setting are basically the same as with setting 75 described above.

Setting

76

Display	*Unit*
0...140	°C

4.26 Floor curing data HK1

Benefit

Information about the current state of floor curing.

Description

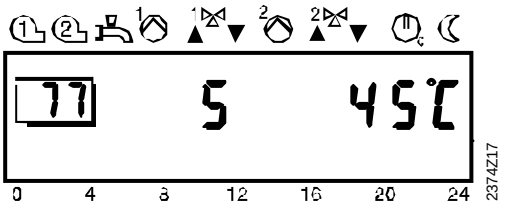
The floor curing function has a fixed profile according to which the rooms are heated to allow curing. The current values of the floor curing function are displayed here. The function itself is activated under setting 116.

Setting

77

Display		*Unit*	
- -	- -	(Inactive)	
0...32	0...95	Day	TVw

Example



4.27 Type of heat source

Description

This controller supports different types of heat sources. The type of burner used is to be considered when planning the heating plant.

Setting

Setting range	*Unit*	*Factory setting*
0…5	Increment	1

Effect

Entry:

0 No heat source (zone controller) or BMU

1 Single-stage: The heat source is equipped with a single-stage burner

2 2-stage: The heat source is equipped with a 2-stage burner

3 Modulating burner 3-position air damper actuator
The air damper actuator is controlled in PID mode

4 Modulating burner 2-position air damper actuator
Continuous on / off control of air damper actuator

5 Cascade with 2 single-stage burners

4.27.1 No heat generation or BMU

If the controller is used in combination with a BMU, only a certain part of the heat source functions are active, such as protective boiler start-up. In that case, boiler temperature control by the burner must be fully ensured by the BMU.
If no BMU is connected, the heat source functions are no longer active.

4.27.2 Multi-stage burners

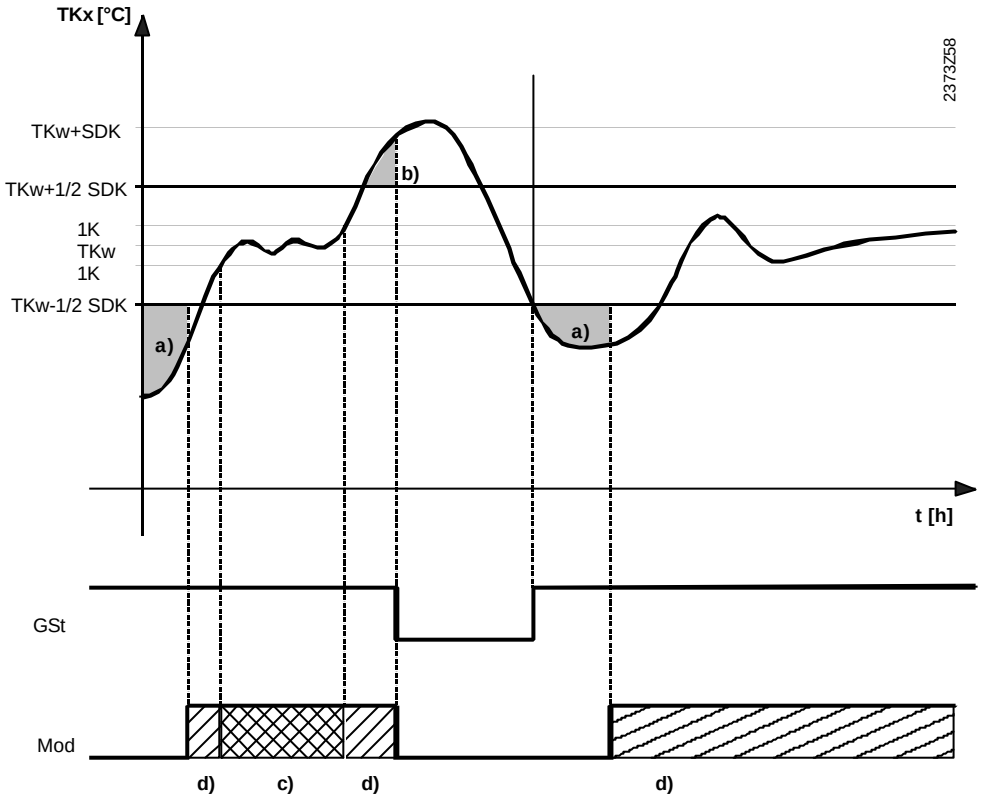
Boiler temperature control

Generation of the boiler temperature setpoint is accomplished based on maximum selection. Also refer to "generation of boiler temperature setpoint" in Index.
With multi-stage burners, the basic load is covered by cycling the first stage. For that purpose, the boiler's switching differential can be adjusted.
The second stage is activated and deactivated via the release and reset integral, which is used until full load is reached.
For burner control, minimum limitation of the burner running time is considered to ensure no unnecessary cycling takes place in part load operation.

4.27.3 Modulating burner

Boiler temperature control

The functioning and activation and deactivation of the first stage corresponds to that of 2-stage burner operation. Release of modulation is analogous to the release of the second burner stage.
Deactivation or locking of modulation takes place at the same time the change from the first burner stage to cycling occurs.
Maximum limitation of the boiler temperature, minimum burner running time, cascade operation and d.h.w. separation circuit are handled analogous to 2-stage burner operation.



Release integral for boiler sequence

a) Release integral modulation (release integral second stage “2-stage burner”)
b) Reset integral modulation (reset integral second stage “2-stage burner”)
c) Neutral zone
d) On / off pulses
GSt Basic stage
Mod Modulating stage
SDK Switching differential boiler
TKw Boiler temperature setpoint

Burner control

2-position control

For the air damper actuator, a switching differential must be set. When the switching threshold is reached, the air damper actuator is driven be a continuous on or off signal.

Note

It must be made certain that the switching differential for modulation is set small than or equal to the boiler's switching differential.

3-position control

The air damper actuator is controlled in PID mode. By setting the proportional band (Xp), the integral action time (Tn) and the derivative action time (Tv), the controller can be matched to the type of plant (controlled system). Also, the air damper actuator running time is to be set.

Neutral zone

For control operation, a neutral zone is used which is at +/- 1K about the current boiler temperature setpoint. If the boiler temperature stays in the neutral zone for more than 16 seconds, the neutral zone becomes active and positioning pulses are no longer delivered. As soon as the boiler temperature leaves the neutral zone again, control is resumed. If the boiler temperature does not stay long enough in the neutral zone, positioning pulses will also be delivered within the neutral zone.

4.27.4 Cascade with 2 single-stage burners

A cascade is a number of heat sources connected in sequence that, together, deliver the heat demanded by the heating system. The controller's cascade is possible with two single-stage burners.
The burners are connected to burner stage 1 (K4) and burner stage 2 (K5) of the controller. Multifunctional outputs K6 and K7 are switched as boiler pumps, independent of their parameterization.

Important

Note assignment: K4?K6
K5?K7

The functioning for switching the first and second boiler corresponds to that of 2-stage burner operation.

4.28 Minimum limitation of the boiler temperature (TKmin)

Benefit

Prevents the boiler temperature from falling below a certain level.

Description

Minimum limitation of the boiler temperature setpoint is a protective function for the boiler. In addition, minimum limitation of the setting range can be provided with setting 01_{OEM}.

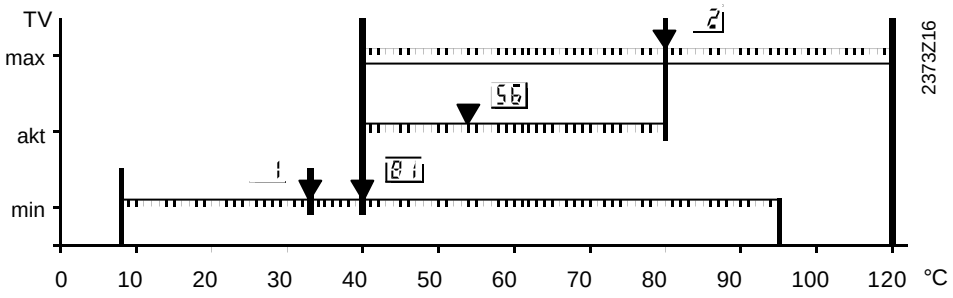
Setting

Setting range	*Unit*	*Factory setting*
TKmin OEM...TKmax	°C	40

TKmin OEM Minimum limitation of the boiler temperature setpoint (setting on line 01_{OEM})
Tkmax Maximum limitation of the boiler temperature setpoint (setting on line 02_{OEM})

Effect

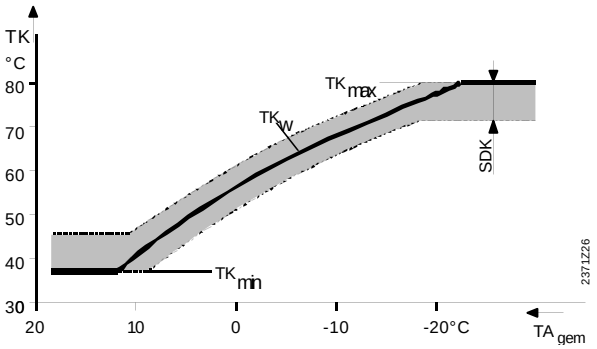
The setting ensures that the boiler temperature will not fall below the adjusted minimum level.



56 Actual value of the boiler temperature
81 Minimum limitation of the boiler temperature setpoint
2 OEM Maximum limitation of the boiler temperature setpoint
1 OEM Lowest minimum limitation of the boiler temperature setpoint

Limitation

If the boiler temperature setpoint reaches the limit value and the demand for heat continues to drop, the boiler temperature will be maintained at the adjusted minimum level.



Legend
TK Boiler temperature
TKw Boiler temperature setpoint
Tkmin Minimum limitation of the boiler temperature
SDK Switching differential
TAgem Composite outside temperature

4.29 Extra heating for the bathroom

Benefit

Heating the bathroom by making use of the surplus heat obtained after d.h.w. heating.

Description

This ancillary heating is provided in addition to normal bathroom heating. It is used especially during intermediate seasons by supplying surplus heat to the bathroom on completion of d.h.w. heating.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	0

Effect

The setting ensures that both the d.h.w. charging pump and heating circuit pump 2 will overrun.

Entry:

0 OFF: D.h.w. pump overrun acts exclusively on the d.h.w. charging pump (Q3)

1 ON: D.h.w. pump overrun acts on both the d.h.w. charging pump (Q3) and heating circuit pump 2 (Q6)

4.29.1 Extra heating for the bathroom

Extra heating for the bathroom makes use of the d.h.w. pump overrun. It is used especially during intermediate seasons by supplying surplus heat to the bathroom, in addition to normal bathroom heating.
Surplus boiler heat after a d.h.w. heating cycle is supplied to the pump heating circuit via overrun of heating circuit pump 2. The pump overrun is fixed at 30 minutes.
This function is an uncontrolled fixed process, parallel to the actual operation of the pump heating circuit.
When automatic summer / winter changeover of the pump heating circuit has responded, extra heating for the bathroom will also be switched off.

4.30 Pump function output K6

Benefit

Use of the pump for different types of plant.

Description

This parameter defines the function provided by the circulating pump connected to terminal K6.

Note

Setting of this function has an impact on automatic generation of the type of plant. The different parameters that have an impact on the operation of the pumps are given in chapter "Overview of pump operation".

Setting

95

Setting range	*Unit*	*Factory setting*
0...11	–	0

Effect

The pump provides one of the following functions, depending on the setting made:

0 No function

1 Heating circuit pump 2

2 System pump for heating circuits only (located after the d.h.w. storage tank).

3 System pump for the heating circuits and for d.h.w. (located before the d.h.w. storage tank).

4 System pump with external demand for heat

5 D.h.w. circulating pump

6 Electric immersion heater for d.h.w.

7 Solar pump

8 Pump H1

9 Boiler pump

10 Boiler bypass pump

11 Alarm signal

Note

Pump overrun is active with all settings, with the exception of settings 5 and 7. The pump has an overrun time of 1 minute which, in the case of overtemperature protection, is extended by the setting “Pump overrun”.

Important

With the cascade “2 times single-stage”, this setting line is inactive since in this application K6 is controlled fix as the boiler pump.

4.30.1 Heating circuit pump 2

The pump connected serves as a second heating circuit pump, which can be used for a pump heating circuit.

Time switch program

For the second heating circuit, there is only time switch program 2 available, which has the same structure as time switch program 1. Also refer to “time switch program 2" in Index.

Effect of room unit

Only one room unit can be used for the 2 heating circuits. It is possible to assign the effect of the room unit to both heating circuits. For details, refer to "room unit operating mode" and "room unit values" in Index.

Extra heating for the bathroom

If the second heating circuit is used as extra heating for the bathroom, also refer to setting line “extra heating for the bathroom” in Index.

4.30.2 System pump heating circuits

The pump connected to terminal K6 serves as a system pump, which can be used as a heat supplier for other heating circuits. Hydraulically, it must be located after the d.h.w. storage tank.
The system pump is activated as soon as one of the heating circuits calls for heat. If there is no demand for heat, the pump will be deactivated followed by overrun.

4.30.3 System pump heating circuits and d.h.w.

The pump connected to terminal K6 serves as a system pump, which can be used as a heat supplier for other heating circuits and for the d.h.w. storage tank. Hydraulically, it must be located after the d.h.w. storage tank.
The system pump is activated as soon as one of the heating circuit or d.h.w. calls for heat. If there is no demand for heat, the pump will be deactivated.

4.30.4 System pump with external demand for heat

The system pump considers demand for heat from heat consumers in the system that are delivered via both inputs H1 and H2 and the LPB.
The system pump is activated as soon as there is demand for heat via inputs H1 and H2 or the LPB. If there is no demand for heat, the pump will be deactivated.

4.30.5 D.h.w. circulating pump

The pump connected serves as the d.h.w. circulating pump.
The pump’s time schedule for operation can be selected either according to the “D.h.w. program” or according to “Time switch program 2”.

Pump operation

The setting for this function must be made on line 122. Also refer to "switching program selection circulating pump" in Index.

4.30.6 Electric immersion heater for d.h.w. water

The connected electric immersion heater is used to heat the d.h.w. during the summer months (automatic summer / winter changeover).
When both heating circuits change to summer operation (THG1 and THG2), automatic changeover to d.h.w. heating will then take place, provided d.h.w. heating has been switched on with the operating mode button.

Operating modes of heating circuit

Since the function depends on automatic summer / winter changeover, changeover to d.h.w. heating with the electric immersion heater takes place only in heating circuit operating mode “Automatic operation” and in “Standby”.

In heating circuit operating mode “Continuous operation”, the boiler continues to deliver the amount of heat required. Hence, this operating mode may not be selected for the summer if the d.h.w. shall be heated with the electric immersion heater.

Operating mode of d.h.w. heating

Switching on / off with the d.h.w. operating mode button remains fully active. Hence, for the d.h.w. to be heated during that period of time, the operating mode button for d.h.w. must be pressed.

Note

To ensure a smooth transition of d.h.w. heating when changing to summer operation, the boiler charges the d.h.w. storage tank until 24.00 hrs on the day of change to avoid potential interruptions caused by utility locking periods.

4.30.7 Solar pump

When using a solar collector, a circulating pump for the collector circuit is required. Depending on the hydraulic circuit and the selection of solar heat usage, it can be used for d.h.w. heating or the buffer storage tank.

4.30.8 Pump H1

Pump H1 can be used for an additional consumer. Together with an external demand for heat at input H1, it is possible to serve an air heater or similar. The pump has an overrun time of one minute which, in the case of overtemperature protection, is extended by the setting “Pump overrun time”.

4.30.9 Boiler pump

The pump connected to terminal K6 serves as a boiler bypass pump which is used for circulating the water in the primary circuit. It is possible to select different modes of control for the boiler pump. Also refer to "control of boiler pump" in Index.

4.30.10 Boiler bypass pump

The pump connected serves as a boiler bypass pump for maintaining the boiler return temperature.
Control of the bypass pump can be selected, either parallel with the burner or according to the measured return temperature. Also refer to "control of the bypass pump" in Index.

4.30.11 Alarm signal

If an error occurs, either locally or in the system, leading to a display on error line 50, the alarm relay will signal it.
The contact is closed with a delay of 2 minutes.
When the error is corrected, that is, which means that the error message is no longer present, the contact will open with no delay.

4.31 Pump function output K7

Benefit

Use of pump for different types of plant.

Description

This parameter setting defines the function of the circulating pump connected to terminal K7.

Note

Setting of this function has an impact on the automatic generation of the type of plant. The different parameters that have an impact on the operation of the pumps are given in section "Overview of pump operation".

Setting

Setting range	*Unit*	*Factory setting*
0…7	–	1

Effect

The pump provides one of the following functions, depending on the setting made:

0 No function

1 Heating circuit pump 2

2 D.h.w. circulating pump

3 Electric immersion heater for d.h.w.

4 Solar pump

5 Pump H2

6 Boiler bypass pump

7 Alarm signal

Note

Pump overrun is active with all settings, with the exception of settings 2 and 4. The pump has an overrun time of one minute which, in the case of overtemperature protection, is extended by the setting “Pump overrun time”.

Important!

With cascade “2 x single-stage” and a modulating burner, this setting line is inactive since in this application K7 is fixed and controlled as the “boiler pump” or as “air damper fully closed”.

4.31.1 Heating circuit pump 2

The pump connected serves as a second heating circuit pump, which can be used for a pump heating circuit.

Time switch program

For the second heating circuit, there is only time switch program 2 available, which has the same structure as time switch program 1. Also refer to “time switch program 2" in Index.

Effect of room unit

Only one room unit can be used for the 2 heating circuits. It is possible to assign the effect of the room unit to both heating circuits. For details, refer to "room unit operating mode" and "room unit values" in Index.

Extra heating for the bathroom

If the second heating circuit is used for extra heating for the bathroom, also refer to setting line “extra heating for the bathroom” in Index.

4.31.2 D.h.w. circulating pump

The pump connected serves as the d.h.w. circulating pump.
The pump's time schedule for operation can be selected either according to the "D.h.w. program" or according to "Time switch program 2".

Pump operation

The setting for this function must be made on line 122. Also refer to "switching program selection circulating pump" in Index.

4.31.3 Electric immersion heater for d.h.w.

The connected electric immersion heater is used to heat the d.h.w. during the summer months (automatic summer / winter changeover).
When both heating circuits change to summer operation (THG1 and THG2), automatic changeover to d.h.w. heating will then take place, provided d.h.w. heating has been switched on with the operating mode button.

Operating modes of heating circuit

Since the function depends on automatic summer / winter changeover, changeover to d.h.w. heating with the electric immersion heater takes place only in heating circuit operating mode "Automatic operation" and in "Stand-by".

In heating circuit operating mode "Continuous operation", the boiler continues to deliver the amount of heat required. Hence, this operating mode may not be selected for the summer if the d.h.w. shall be heated with the electric immersion heater.

Operating mode of d.h.w. heating

Switching on / off with the d.h.w. operating mode button remains fully active. Hence, for the d.h.w. to be heated during that period of time, the operating mode button for d.h.w. must be pressed.

Note

To ensure a smooth transition of d.h.w. heating when changing to summer operation, the boiler charges the d.h.w. storage tank until 24.00 hrs on the day of change to avoid potential interruptions caused by utility locking periods.

4.31.4 Solar pump

When using a solar collector, a circulating pump for the collector circuit is required. Depending on the hydraulic circuit and the selection of solar heat usage, it can be used for d.h.w. heating or the buffer storage tank.

4.31.5 Pump H2

Pump H2 can be used for an additional consumer. Together with an external demand for heat at input H1, it is possible to serve an air heater or similar.

4.31.6 Boiler bypass pump

The pump connected serves as a boiler bypass pump for maintaining the boiler return temperature.
Control of the bypass pump can be selected, either parallel with the burner or according to the measured return temperature. Also refer to "control of the bypass pump" in Index.

4.31.7 Alarm signal

If an error occurs, either locally or in the system, leading to a display on error line 50, the alarm relay will signal it.
Switching on takes place with a delay of two minutes.
When the fault is corrected, that is, when the fault status is no longer present, the relay will be deenergized with no delay.

4.32 Solar application

Benefit

D.h.w. storage tank or buffer storage tank charging by solar collector.

Description

The heat generated by the solar collector can be delivered either to the d.h.w. storage tank or the buffer storage tank.

Setting

98

Setting range	*Unit*	*Factory setting*
0…2	-	0

Effect

Depending on the setting, either the d.h.w. or buffer storage tank is charged.

Entry:

0 No solar collector
1 Solar in d.h.w. storage tank
2 Solar in buffer storage tank

Important!

To ensure proper functioning, the location of the sensors in the storage tank must be observed:

Solar for d.h.w.	B3 at the top in the d.h.w. storage tank B31 at the bottom in the d.h.w. storage tank
Solar for buffer storage tank	B4 at the top in the buffer storage tank B41 at the bottom in the buffer storage tank

4.33 Sensor input B8/B6

Benefit

Selectable use of sensor.

Description

Sensor input B8 / B6 is used for a flue gas temperature sensor or, in connection with solar heating, for a sensor on the collector.

Setting

99

Setting range	Unit	Factory setting
0…2	–	0

Effect

0 Flue gas temperature sensor Pt 1000

1 Collector temperature sensor Ni 1000

2 Collector temperature sensor Pt 1000

4.34 Parallel displacement of heating curve

Benefit

Readjustment of room temperature setting, especially in plants without room sensor.

Description

Produces a parallel displacement of the heating curve in order to achieve a better match of heat generation and heat consumption.

Setting

100

Setting range	*Unit*	*Factory setting*
-4.5...+4.5	°C (K)	0.0

Effect

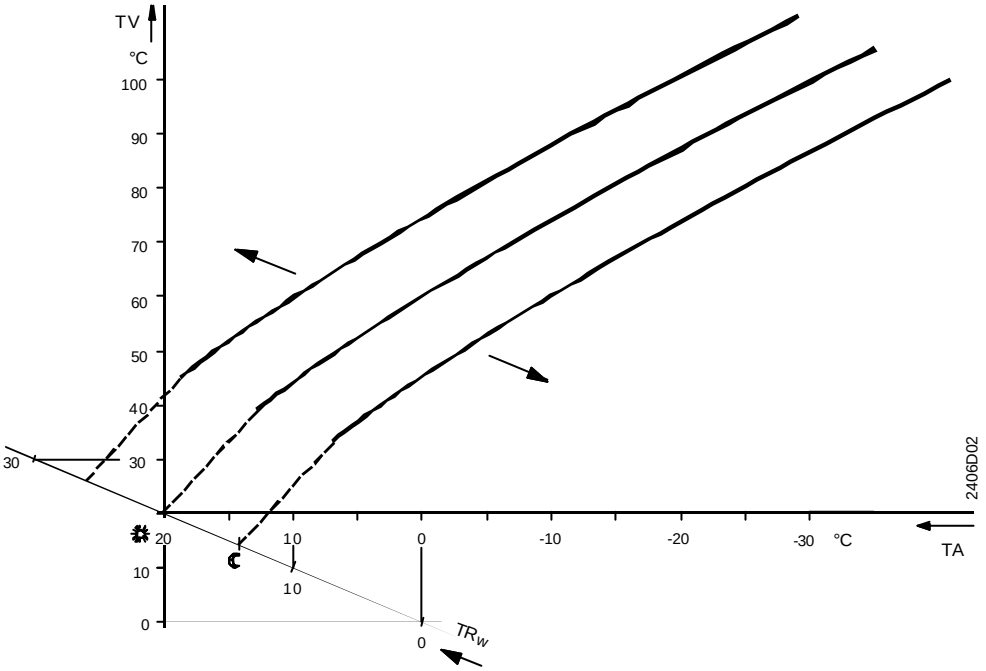
By changing the value entered, all room temperature setpoints will be appropriately raised or lowered. This allows the room temperature setpoints to be matched to the effective room temperatures.

Example

If a nominal room temperature setpoint of 20 °C adjusted on the controller always produces a room temperature of 22 °C, displace the heating curve downward by 2 °C.

Parallel displacement

Each setpoint readjustment, be it via the setting value or the operational level, is a parallel displacement of the heating curve.



TV Flow temperature
TA Composite outside temperature
TRw Room temperature setpoint

4.35 Room influence

Benefits

More accurate room temperature control due to temperature checkback signal from the space.
Use of heat gains.
Possibility of boost heating and quick setback.

Description

Defines the impact of room temperature deviations on the controlled system.
Room temperature deviation is the temperature differential between the actual room temperature and the room temperature setpoint.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

The setting will activate or deactivate the effect of room temperature deviations on the temperature control.
Entry:

0 Room influence inactive: The measured room temperature will not affect temperature control

1 Room influence active: The measured room temperature will affect the temperature control

Room influence

Room influence means:
Deviations of the actual room temperature from the setpoint are acquired and taken into account by temperature control.

To use the control variant "Weather compensation with room influence", the following conditions must be satisfied:

- Outside sensor must be connected
- Setting "Room influence" must be active.
- Respective room unit must be connected
- There may be no controlled thermostatic radiator valves in the reference room. (If such valves are present, they must be set to their fully open position).

4.36 Switching differential of the room temperature (SDR)

Benefits

Temperature control with pump heating circuits.
Prevents overtemperatures in the rooms in the case of a pump heating circuit.

Description

Serves as a room temperature limitation with pump heating circuits

Setting

102

Setting range	*Unit*	*Factory setting*
– . – / 0.5...4.0	°C	– . –

Effect

The switching differential for two-position control will be changed.
Entry:

– . – Switching differential is inactive

- The pump always remains activated

Decrease: Switching differential will become smaller

- Pumps are switched on and off **more often**
- Room temperature varies within a **narrower** band

Increase: Switching differential will become greater

- Pumps are switched on and off **less often**
- Room temperature varies within a **wider** band

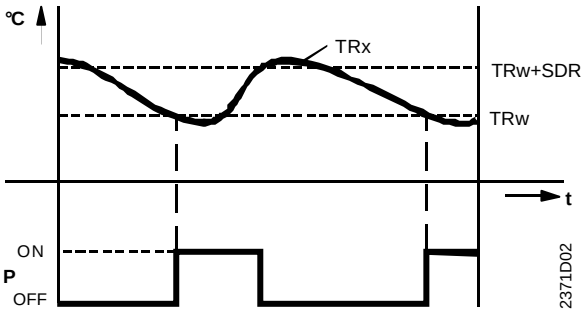
Note

The room temperature sensor must be active

- This function only acts in automatic mode Auto
- The display will show "ECO"

Room temperature control

With pump heating circuits, the amount of heat supplied is controlled by switching the pumps on and off. This is accomplished with 2-position control by means of the room temperature's switching differential.
Functioning:

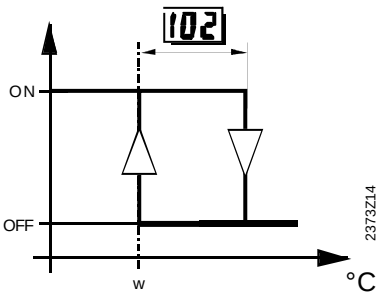


Legend

TRx	Actual value of the room temperature
TRw	Room temperature setpoint
SDR	Switching differential of the room temperature
P	Pump
ON	Switch-on point
OFF	Switch-off point
t	Time

Switching differential

Pump ON TRw
Pump OFF TRw =TRw + SDR



TRx	Actual value of the room temperature
TRw	Room temperature setpoint
SDR	Switching differential of room temperature
w	Setpoint
102	Switching differential of the room temperature
△	Switch-on point
▽	Switch-off point

4.37 Operating mode of room unit

Benefits

The setting offers the possibility of assigning the action of the room unit operating modes and the holiday function to one of the heating circuits.

Description

Assignment of the transmitted room unit values to one of the two heating circuits: Operating modes are:

- Automatic mode, continuous operation, or stand-by
- Holiday function

Note

Room unit values can be assigned in the same way, using setting line 104.

Setting

Setting range	*Unit*	*Factory setting*
0…2	–	0

Effect

The operating mode and holiday function of the room unit affect the selected heating circuits, depending on the settings made.

Entry:

0 Impact on **heating circuit 1**
Changing the operating mode or activating the holiday function on the room unit affects exclusively heating circuit 1.

1 Impact on **heating circuit 2**
Changing the operating mode or activating the holiday function on the room unit affects exclusively heating circuit 2.

2 Impact on **heating circuits 1 and 2**
Changing the operating mode or activating the holiday function on the room unit affects heating circuits 1 and 2.

Prerequisite

To ensure the room unit operating modes have an effect on the control, the controller must be set to automatic mode. Otherwise, the settings made on the room unit will be inactive.

Display

As soon as the operating mode on the room unit is changed, the controller's automatic button will flash.

4.38 Room unit values

Benefit

This setting offers the possibility of assigning the action of the room unit values to one of the heating circuits.

Description

Assignment of the transmitted room unit values to one of the two heating circuits:
Heating circuit values are:
- Actual value
- Actual value of the room temperature

Note

Room unit operating modes can be assigned in the same way, using setting line 103.

Setting

Setting range	*Unit*	*Factory setting*
0…2	–	0

Effect

The room unit values affect the selected heating circuits, depending on the setting made.

Entry:

0 Impact on **heating circuit 1**
The room unit values affect exclusively heating circuit 1.

1 Impact on **heating circuit 2**
The room unit values affect exclusively heating circuit 2.

2 Impact on **heating circuits 1 and 2**
The room unit values affect exclusively heating circuits 1 and 2.

Reference room

It should be considered that the room in which the room unit is installed also is the reference room for the room temperature influence.

4.38.1 Examples of room unit assignments

Introduction

In the case of plants with two heating circuits and one room unit, it may be advisable to choose a separate assignment of the room unit functions. The listing below shows some typical applications with the respective settings of the room unit operating mode (line 103) and the room unit values (line 104).

Separate flat

The heating circuits are in separate, independent flats or apartments. This represents the "normal application ".

Plant type	*Location of heating circuits*	*Line 103*	*Line 104*
21/22/23/24	**Not** in the same space	0	0

Bathroom heating

The heating circuits are located in partly separate spaces or flats.

Plant type	*Location of heating circuits*	*Line 103*	*Line 104*
21/22/23/24	**Not** in the same space	2	0

Staircase heating

- The heating circuits are always separate.

Plant type	*Location of heating circuits*	*Line 103*	*Line 104*
21/22/23/24	**Not** in the same space	0	0

- Simultaneous change of the operating mode is possible, however.

Plant type	*Location of heating circuits*	*Line 103*	*Line 104*
21/22/23/24	**Not** in the same space	2	0

Underfloor or radiator heating system

The heating circuits are located in the same space. Comfort control is provided by the faster-reacting radiators. This means that the room unit values shall only act on heating circuit 2.

Plant type	*Location of heating circuits*	*Line 103*	*Line 104*
21/22/23/24	In the same space	2	1

4.39 Minimum limitation of flow temperature setpoint HK1 (TVmin)

Benefit

Prevents too low flow temperatures.

Description

Minimum and maximum limitation define the range within which the flow temperature setpoint may vary.

Setting

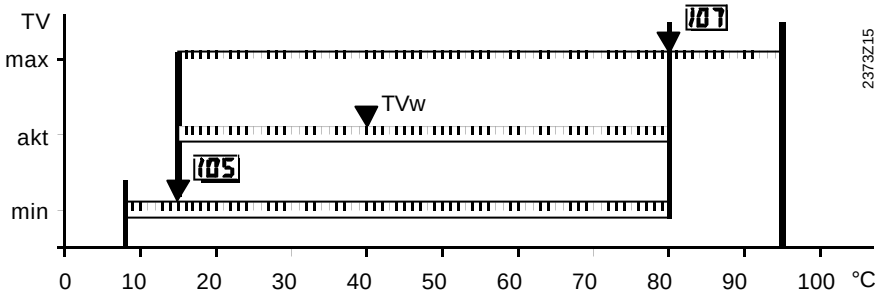
105

Setting range	*Unit*	*Factory setting*
8...TVmax	°C	8

TVmax Maximum limitation of flow temperature setpoint (setting on line 107)

Effect

The setting will make certain that the flow temperature setpoint will not fall below a minimum level.



TVw Current flow temperature setpoint
65 Minimum limitation of the flow temperature setpoint
70 Maximum limitation of the flow temperature setpoint

Limitation

If the flow temperature setpoint demanded by the heating circuit reaches the minimum limit and the outside temperature rises, the flow temperature setpoint will be maintained at that limit, in other words, it will not be allowed to fall below it.

4.40 Minimum limitation of flow temperature setpoint HK2 (TVmin)

Description

Function and action of this setting are basically the same as with setting 105 described above. The associated maximum limitation of the flow temperature setpoint is line 108.

Setting

106

Setting range	*Unit*	*Factory setting*
8...TVmax	°C	8

4.41 Maximum limitation of flow temperature setpoint HK1 (TVmax)

Benefit

Prevents too high flow temperatures.

Description

Minimum and maximum limitation define the range within which the flow temperature setpoint may vary.

Setting

107

Setting range	*Unit*	*Factory setting*
TVmin...95	°C	80

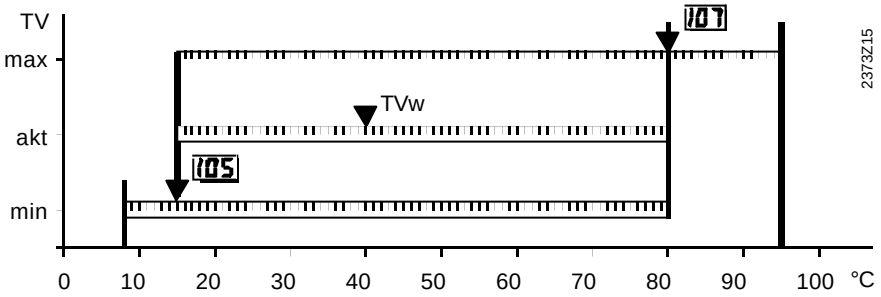
Tvmin Minimum limitation of flow temperature setpoint (setting on line 105)

Effect

The setting will ensure that the flow temperature setpoint will not exceed a maximum level.

Important

Maximum limitation is **not** to be regarded as a safety function as required with underfloor heating systems, for example.



TVw Current flow temperature setpoint
105 Minimum limitation of the flow temperature setpoint
107 Maximum limitation of the flow temperature setpoint

Limitation

If the flow temperature setpoint demanded by the heating circuit reaches the maximum limit and the outside temperature falls, the flow temperature setpoint will be maintained at that limit, in other words, it will not be allowed to exceed it.

4.42 Maximum limitation of flow temperature setpoint (TVmax) HK2

Description

Function and action of this setting are basically the same as with setting 107 described above.

Setting

108

Setting range	*Unit*	*Factory setting*
TVmin...95	°C	80

4.43 Maximum forward shift of optimum start control

Benefit

Maximum forward shift of optimum start control.

Description

Maximum forward shift is a limit function that defines the range of optimum start control.

Setting

109

Setting range	*Unit*	*Factory setting*
00:00...06:00	hh:mm	00:00

Effect

00:00	Optimum start control switched off
00:10...06:00	Optimum start control switched on

4.43.1 Optimum start control

Optimum start control acts with or without room influence.
The maximum forward shift can be set with parameter “Maximum forward shift with optimum start control” (range 0…6 h). This parameter can also be used to switch optimum start control off (setting 0).

During non-occupancy hours, the heating is maintained at the reduced level. Towards the end of the non-occupancy time, optimization switches the control back to the normal level.

Optimization calculates the changeover time such that, at the start of occupancy, the room temperature will have reached the nominal setpoint.

4.43.2 Without room influence

The composite outside temperature is used as the compensating variable. In the case of floor heating systems, the maximum forward shift should be longer than with radiator systems.

Using the parameter for the constant of quick setback and optimum start control (KON), the forward shift can be matched the building dynamics.

Forward shift tE in hours and minutes with optimum start control without room influence:

TAgem	KON					
	0	4	8	12	16	20
-20	0	1h20	2h40	4h00	5h20	6h00
-10	0	0h50	1h50	2h40	3h40	4h30
0	0	0h30	1h00	1h30	2h00	2h30
+10	0	0	0h10	0h10	0h20	0h20
	tE					

TAgem Composite outside temperature
tE Forward shift
KON Parameter for quick setback and optimum start control without room influence

Parameter KON:

KON = 0: Function deactivated
Note: KON also acts on quick setback

Small KON: For light building structures that can be heated up fairly quickly

Large KON: For heavy, well insulated building structures whose heating up time is fairly long

4.43.3 With room influence

Optimum start control acts only when room influence is active.

The switch-on time for the heating (change to nominal level) is selected such that, at the beginning of the occupancy time according to the heating program, the room temperature reached will be the room temperature setpoint - 0.25 K.
The correct switch-on time is determined by adaption.

4.44 Maximum forward shift of optimum stop control

Benefit

Maximum forward shift of optimum stop control.

Description

Maximum forward shift is a limit function that defines the range of optimum stop control.

Setting

Setting range	*Unit*	*Factory setting*
00:00...06:00	hh:mm	00:00

Effect

00:00	Optimum stop control deactivated
00:10...06:00	Optimum stop control activated

4.44.1 Optimum stop control

Optimum stop control acts only when a room sensor is used and when room influence is active.
The maximum forward shift can be set with parameter “Maximum forward shift with optimum stop control” (range is 0…6 h). This parameter can also be used to switch optimum stop control off (setting = 0).

During occupancy hours, the heating is maintained at the nominal level. Towards the end of the occupancy time, the control switches to the reduced level.
Optimization calculates the changeover time such that, at the end of occupancy time, the room temperature will be 0.5 °C below the nominal setpoint (early shut-down).

Adaption takes place only with the first occupancy period per day. The switch-off point is adapted in steps of 10 minutes. If the 0.25 K are not reached, the switch-off point is shifted forward by 10 minutes (earlier shut-down). In the other case, the switch-off point is shifted backward by 10 minutes (later shut-down).

4.45 Type of building construction

Benefit

The building's thermal dynamics are taken into consideration.

Description

The type of building construction affects the control. By considering the type of construction, a disturbance variable (z) within the controlled system is taken into account.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

When the outside temperature varies, the room temperature changes at different rates, depending on the building's thermal storage capacity.
The above setting ensures that the generation of the composite outside temperature will be matched to the type of building construction. Also refer to "Composite outside temperature“ in section "Functions without settings".

Entry:

0 Heavy building structures: The room temperature will respond *slower* to outside temperature variations

1 Light building structures: The room temperature will respond *quicker* to outside temperature variations

Building construction

Heavy building structures: Buildings with thick walls or with external insulation
Light building structures: Buildings with a light envelope

4.46 Adaption of heating curve

Benefits

No heating curve adjustments required.
Automatic adaption of heating curve.

Description

The adaptation facility learns from the different heating situations and matches the control to the heating circuit at regular. For details, refer to “adaptation sensitivities” in Index.

Setting

114

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

The setting will switch automatic adaption of the heating curve on or off.

Entry:

0 Automatic adaption inactive: The heating curve maintains the settings made

1 Automatic adaption *active:* In automatic mode (nominal room temperature setpoint), the heating curve will automatically and continuously be adapted

Note

Prerequisite for this function is the use of a room temperature sensor.

4.46.1 Adaption

The adaption facility automatically matches the heating curve to the type of building construction and the heating requirements. Adaption gives consideration to room temperature deviations, outside temperature characteristics and adaption sensitivity.

Note

To achieve optimum adaption, the following situations should occur as rarely as possible - especially after commissioning - since this would reset certain calculations required for the adaption:

- Manual readjustment of heating curve (press plus / minus buttons)
- Power failure
- Heating curve set to -- –
- Changes to the room temperature setpoint

Process

Every day at midnight, the room temperature control differential of the previous day is evaluated. This evaluation leads to an automatic readjustment of the heating curve.

- Simple adaption (range ③):
  At attenuated outside temperatures below 4 °C, it is only the slope of the heating curve that is adapted.
  In this temperature range, the readjustment is weighted with factor f2 and adaption sensitivity 2.

- Combined adaption (range ②):
  At attenuated outside temperatures of between 4 and 12 °C, it is partly the slope and partly the parallel displacement which are adapted.

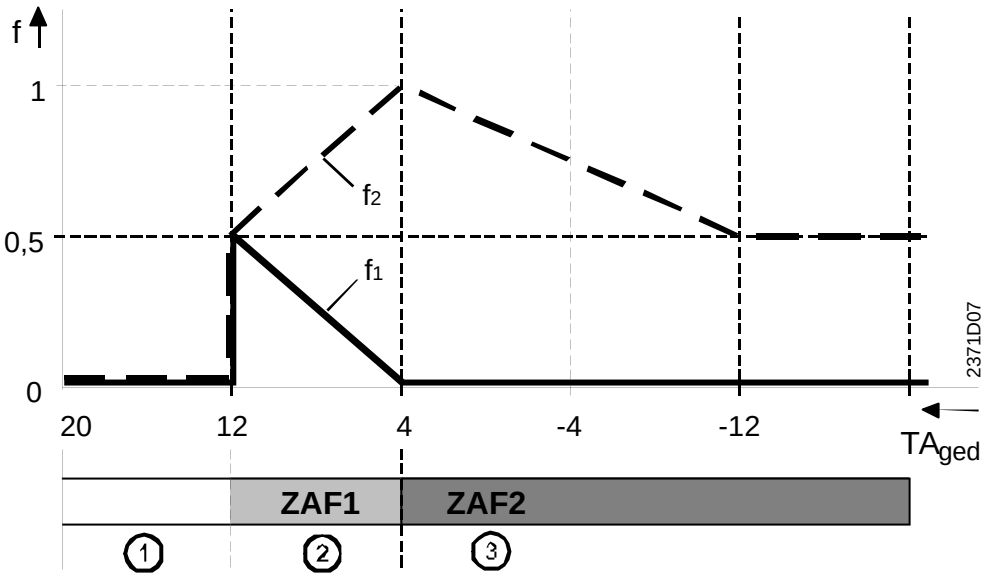
  In this temperature range, the readjustment of the parallel displacement is weighed with factor f1 and adaption sensitivity 1.

  In this temperature range, the readjustment of the slope is weighted with factor f2 and adaption sensitivity 1.

- No adaption (range ①):
  At attenuated outside temperatures above 12 °C, the heating curve will not be adapted.

Diagram

Example using a nominal room temperature setpoint of 20 °C.



f	Factor
f1	Factor for parallel displacement
f2	Factor for slope
TAged	Attenuated outside temperature
ZAF1	Adaption sensitivity 1 (line 39_{OEM})
ZAF2	Adaption sensitivity 2 (line 40_{OEM})

4.47 Locking signal gain

Benefit

Matching the system to different types of boilers and plant conditions.

Description

The locking signal gain is a final adjustment of the locking signal which leads to a restriction of the mixing valve. It is the result of a number of integrals such as shifting d.h.w. priority.

Setting

115

Setting range	*Unit*	*Factory setting*
0...200	%	100

Effect

The gain is adjustable between 0 % and 200 %. The setting changes the response of the mixing heating circuits to restrictions imposed by locking signals, but not that of the other consumers. Also refer to "mixing valve restriction" in Index.

Example

Setting	*Response*
0 %	Locking signal will be ignored
1...99 %	Locking signal will be considered as a reduced signal
100 %	Locking signal will be adopted unchanged
101...200 %	Locking signal will be considered up to twice the normal signal

4.48 Floor curing HK1

Benefit

The floor curing function ensures controlled drying of the floor.

Important

- Observe the relevant standards and regulations of the floor manufacturer!
- Proper functioning is ensured only when the plant is correctly installed (hydraulic system, electrical installation, settings)!
  If not observed, the floor might get damaged!

Description

The floor curing function maintains the flow temperature at a predefined temperature profile with the help of the mixing valve.

Setting

116

Setting range	*Unit*	*Factory setting*
0…3	–	0

Effect

Selection of a temperature profile activates the floor curing function and the heating circuit ensures the preset flow temperatures.

0 Inactive

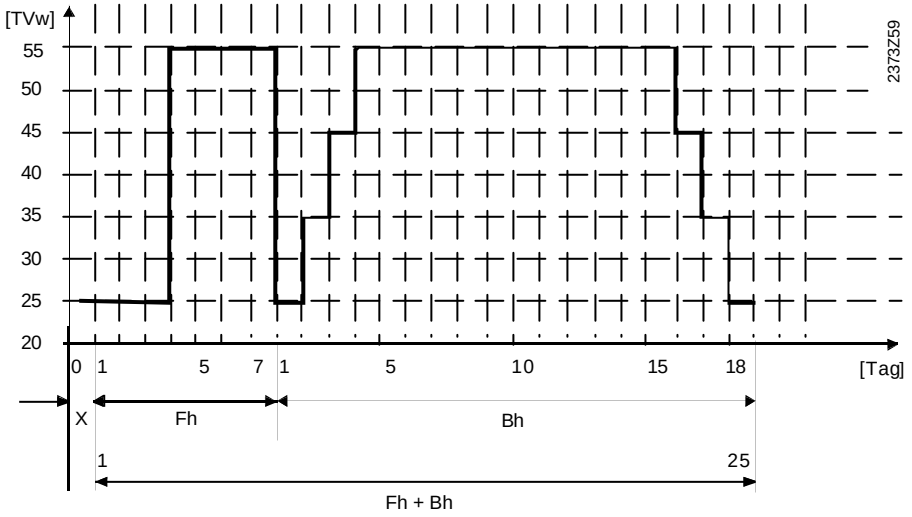
1 Functional heating

2 Floor curing heating

3 Functional and floor curing heating

4.48.1 Temperature profile

The following graph shows the temperature profile of the selected floor curing function.



TVw Flow temperature setpoint
x Start day
Fh Functional heating
Bh Floor curing heating

4.48.2 Activating the function

If setting 1), 2) or 3) is made via the setting parameter, the respective floor curing function will be carried out.
The floor curing function can be activated only with applications using a mixing heating circuit.
With the pump heating circuit application, this function cannot be activated.

4.48.3 Function

When the floor curing function is activated, parameter “Maximum limitation of floor temperature Tvmax” will automatically be set to 55 °C. This value will then be used as the maximum value for the floor curing function and will be maintained when the floor curing function is terminated.

Temperature profile

The starting day, that is, the period of time from activation until midnight, is not considered day 1 of the selected temperature profile. The starting day is called day 0 and adopts the flow temperature value of day 1.
The flow temperature changes dictated by the temperature profile always take place at midnight.
When the floor curing function is activated, the mixing valve ensures that the flow temperature dictated by the temperature profile will be maintained. This means that protective boiler start-up or d.h.w. heating with absolute or shifting priority have no impact on the floor curing function.

Particularities

In the event of a power failure, the function will be resumed where operation was stopped.
Manual operation is given priority over the floor curing function. When manual operation is activated, the mixing valve will be de-energized (relay contacts open). As a result, the floor curing function does not affect the mixing valve.

4.48.4 Display

When the floor curing function is activated, the LED of the current heating circuit operating mode flashes.

4.48.5 Aborting the function

The following events cause abortion of the floor curing function:

The selected floor curing function is completed.
Setting parameter “Floor curing function” is set to active.

4.49 Reduced setpoint of d.h.w. temperature (TBWR)

Benefits

High d.h.w. temperature level only if required.
Energy savings due to lower temperatures in the remaining time.

Note

If the d.h.w. is heated by means of a control thermostat connected to terminal B3, reduced setpoint operation will not be possible.

Description

Reduction of d.h.w. temperatures outside main occupancy times. The time switch integrated in the controller auotmatically switches between main and secondary occupancy times. Also refer to "d.h.w. program" in Index.

Setting

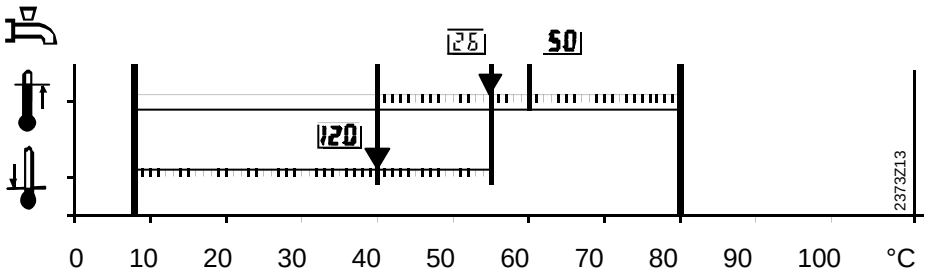
120

Setting range	*Unit*	*Factory setting*
8...TBWw	°C	40

TBWw Nominal setpoint of the d.h.w. temperature (setting on line 26)

Effect

The temperature setpoint during reduced d.h.w. operation will be changed.



26 Setting "Nominal setpoint of the d.h.w. temperature"
120 Setting "Reduced setpoint of the d.h.w. temperature"
50 $_{OEM}$ Setting "Maximum nominal setpoint of d.h.w. temperature"

D.h.w. temperature setpoints

D.h.w. heating has 2 different setpoints that can be used:

- Nominal setpoint of d.h.w. temperature: It ensures the d.h.w. temperature required during main occupancy times
- Reduced setpoint of d.h.w. temperature: It ensures the d.h.w. temperature required during secondary occupancy times

Switching times

The periods of time during which these d.h.w. temperature setpoints shall be used can be set in the d.h.w. program.

4.50 D.h.w. heating program

Benefits

Release of d.h.w. heating at the nominal setpoint as demanded by the consumers.
Release of d.h.w. heating can be matched to the plant's load curve.

Description

Possibility of changing over between two different d.h.w. setpoints aimed at matching optimally the demand for d.h.w.
In addition, d.h.w. heating can be switched on and off with the operating mode button .

Setting

121

Setting range	*Unit*	*Factory setting*
0…2	Increment	1

Effect

The setting defines the period of time during which d.h.w. heating at the nominal setpoint is released. Outside this period of time, the reduced d.h.w. setpoint applies. There is one exception, function “d.h.w. push“.

Release of d.h.w. heating at the nominal setpoint takes place when using the following settings:

0 24 hours per day

1 According to the time switch program with forward shift (heating circuit)

2 According to the local time switch program 3 (d.h.w.)

Note

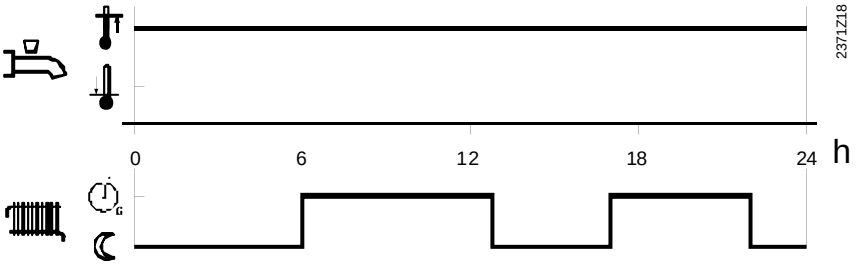
The frost protection temperature for d.h.w. is fixed at 5 °C and is always active.
D.h.w. heating can be suppressed in spite of this setting, due to the holiday function (also refer to "assignment of d.h.w. heating" in Index).

4.50.1 24-hour operation

Setting 0

The d.h.w. temperature is continuously maintained at the nominal d.h.w. temperature setpoint, independent of any time switch programs.

Example:



4.50.2 Operation according to the time switch programs with forward shift (d.h.w.)

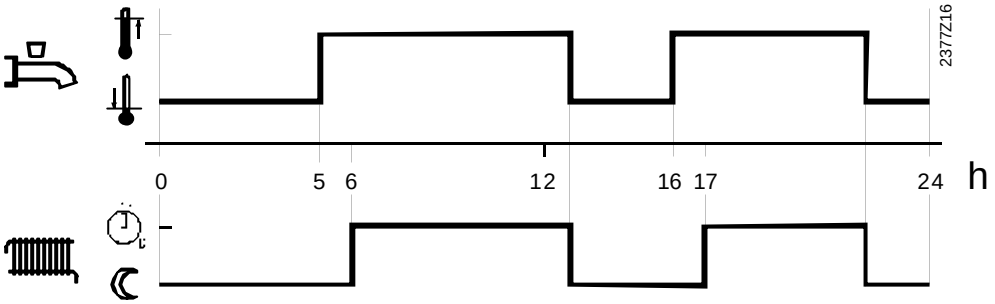
Setting 1

For d.h.w. operation, the heating cricuits will be considered according to the setting “D.h.w. assignment”.
The switching times of the time switch programs are then used to change over between the nominal d.h.w. setpoint and the reduced d.h.w. setpoint. The first switch-on point of each period will be shifted forward in time by one hour.

Number of charging cycles

With this d.h.w. heating program, it is also possible to select the number of charging cycles per day. This also includes the forward shift of the switch-on times. Also refer to "d.h.w. heating" in Index.

Example:



4.50.3 Operation according to the local time switch program 3 (d.h.w.)

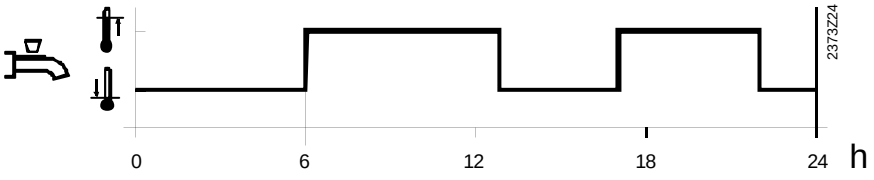
Setting 2

For d.h.w. heating, time switch program 3 (d.h.w.) of the local controller is taken into account. The set switching times of that program are then used to change over between the nominal d.h.w. setpoint and the reduced d.h.w. setpoint. In that way, d.h.w. is heated independent of the heating circuits.

Heating periods

With this d.h.w. heating program, it is possible to have a maximum of three heating periods per day. There is no forward shift of the switch-on times.

Example:



4.51 Switching program selection circulating pump

Benefit

Efficient d.h.w. heating.

Description

This selection permits operation of the d.h.w. circulating pump. D.h.w. circulation prevents the d.h.w. from cooling down by the time it reaches the consumer.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

The setting changes the times the d.h.w. circulating pump operates.

Entry:

0 According to time switch program 2

1 According to the d.h.w. program (line 121)

4.51.1 According to time switch program 2, setting 0

The d.h.w. circulating pump (K6/K7) is switched at the times of “Time switch program 2” (lines 12...18).
It is thus possible to operate the circulating pump only during individually set times of usage.

4.51.2 According to d.h.w. program (line 121) setting 1

The d.h.w. circulating pump (K7) is switched according to the charging times of the selected d.h.w. program (line 81).
It is thus possible to operate the circulating pump parallel to d.h.w. heating. This means that the circulating pump is activated as soon as the d.h.w. is heated up to its nominal temperature, independent of whether d.h.w. heating takes place according to local or system-wide switching times.

Forward shift

The circulating pump does not follow any forward shift. This means it is operated in accordance with the times of usage.

4.52 Assignment of d.h.w. heating

Benefits

Assignment of d.h.w. heating to the respective consumers.
All relevant time switch programs are taken into consideration.

Description

In normal heating operation, d.h.w. heating can be assigned to the time switch programs of the various zones. In a system, it is thus possible to have either decentral or central d.h.w. heating which takes into account the switching times of the local, the segment or system heating circuits.

Important

This is active only when the setting on line 121 reads 1, unless holiday mode is activated (also refer to "Holiday mode" below).

Setting

Setting range	*Unit*	*Factory setting*
0…2	–	2

Effect

Through this setting, the time switch programs of the respective heating circuits will be considered for d.h.w. heating.

0 Local heating circuit:
D.h.w. heating according to the time switch program of the local heating circuit

1 All heating circuits in the segment:
D.h.w. heating according to the time switch programs of the segment heating circuits

2 All heating circuits in the LPB system:
D.h.w. heating according to the time switch programs of the system heating circuits

Holiday mode

If a room unit triggers holiday mode, the effect will be the following, independent of the d.h.w. heating program (line 121):

Setting on line 123	*Effect*
0 Local heating circuit	No d.h.w. heating when the local heating circuit is in holiday mode
1 All heating circuits in the segment	No d.h.w. heating when all heating circuits in the segment are in holiday mode
2 All heating circuits in the system	No d.h.w. heating when all heating circuits in the system are in holiday mode

This means that even if the d.h.w. would have to be heated according to the d.h.w. program (line 121), the holiday function may lock d.h.w. heating. Only the frost protection function will remain active.

4.53 D.h.w. charging

Benefit

The number of d.h.w. charging cycles can be selected while giving consideration to the size of the storage tank.

Description

When using a d.h.w. storage tank, the number of charging cycles can be matched to the type of tank.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

With this setting, the number of d.h.w. charging cycles can be limited. The setting also produces a forward shift of the switching on action.

Note

This setting is active only if the d.h.w. is heated via heating circuit time switch programs (setting line 121, selection 1). Also refer to section ""D.h.w. heating program" in Index.

Entry:

0 Once per day with a forward shift of 2.5 hours

1 Several times per day with a forward shift of 1 hour

4.53.1 Once per day with a forward shift of 2.5 hours

Setting 0

The number of d.h.w. charging cycles at the nominal temperature is limited to one per day, in which case the switch-on point is shifted forward by 2.5 hours. With this setting, the switch-on point is shifted forward by 2.5 hour (against the heating circuit's on times).

On the days the nominal d.h.w. temperature setpoint is maintained for 24 hours, d.h.w. charging is automatically released at 00:00 hours with a forward shift of 2.5 hours.

4.53.2 Several times per day with a forward shift of 1 hour

Setting 1

The number of d.h.w. charging cycles will not be limited. With this setting, the switch-on point is shifted forward by 1 hour (against the heating circuit's on times).

4.54 Type of d.h.w. demand

Benefits

Use of different d.h.w. heating modes.
Use of d.h.w. storage tanks with control thermostats.

Description

Defines the type of d.h.w. control (via d.h.w. sensor or control thermostat).

Note

Setting of this function has an impact on the automatic generation of the type of plant (also refer to “plant types” in index.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	0

Effect

By making this setting, the controller takes into account the signal fed to it by the d.h.w. sensor conected to terminal B3.

Entry:

0 Sensor: The temperature measured with the sensor is used for the control of the d.h.w. temperature

1 Control thermostat: The switching status of the control thermostat connected to terminal B3 is used for the control of the d.h.w. temperature

Important

The contacts of the control thermostat must be suited for extra low voltage (gold-plated)!

Difference

- When using a d.h.w. temperature sensor:
  The controller calculates the switching points with the respective switching differential as a function of the d.h.w. temperature setpoint entered.

Sensor / line with a short-circuit	=	Fault status signal
Measuring signal present	=	d.h.w. according to setpoint
Sensor / line with a short-circuit	=	no d.h.w.

- When using a d.h.w. control thermostat:
  The **controller** takes into consideration the switching statuses of the control thermostat.

Contact closed	=	d.h.w. heating ON
Contact open	=	d.h.w. heating OFF
Contact resistance too high	=	fault status signal from thermostat

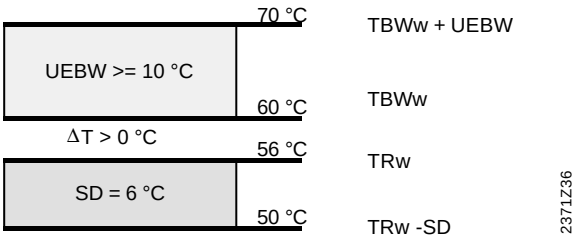
Note

When using a d.h.w. control thermostat, reduced operation is not possible. D.h., wenn gemäss Brauchwasserprogramm (Zeile 121) Reduziertbetrieb aktiv ist, dann ist die BW-Bereitung mit Thermostat gesperrt.

Important when using a d.h.w. control thermostat

- The nominal d.h.w. temperature setpoint must be equal to or higher than the setpoint adjusted on the control thermostat (thermostat is calibrated at the switch-off point).
- The boost of the flow temperature setpoint of d.h.w. must be a minimum of 10 °C (has an impact on the charging time).
- In that case, frost protection for d.h.w. is not ensured

D.h.w. control thermostat (example)



UEBW	=	boost of the flow temperature setpoint
TBWw	=	nominal setpoint of the d.h.w. temperature
TR_W - SD	=	setpoint of the control thermostat minus the switching differential
TRw	=	setpoint of control thermostat (point of calibration)

4.55 Boost of the flow temperature setpoint for d.h.w. heating (UEBW)

Benefit

Efficient d.h.w. heating.

Description

To allow the d.h.w. to be heated up, the boiler temperature must be higher than the d.h.w. setpoint.

Setting

126

Setting range	*Unit*	*Factory setting*
0...30	°C (K)	16

Effect

The setting will raise the boiler temperature setpoint when there is demand for d.h.w.

Increase: Heating up time will become shorter
More overshoot

Decrease: Heating up time will become longer
Less overshoot

Boiler boost

Using the two settings, the controller generates the boiler temperature setpoint for d.h.w. heating.

Setting on line 26	Reduced setpoint of d.h.w. temperature
Setting on line 126	Boost
Total	Boiler temperature setpoint

Note

For d.h.w. control, refer to “switching differential of d.h.w.” in index.

4.56 D.h.w. priority

Benefit

Optimum distribution of heat.

Setting

Setting range	*Unit*	*Factory setting*
0…3	Increment	1

Effect

During d.h.w. heating, space heating will be restricted, depending on the setting made.

0 **Absolute priority**
Mixing and pump heating circuit remain locked until the d.h.w. is heated up, the system pump remains activated.

1 **Shifting priority**
If the capacity of the heat source is no longer sufficient, mixing and pump heating circuit will be restricted until the d.h.w. is heated up.

2 **No priority**
D.h.w. heating and space heating at the same time.

In the case of tightly sized boilers and mixing heating circuits, the setpoint may not be reached if the heating load is great, since too much heat is required for space heating.

3 **Mixing heating circuit shifting, pump heating circuit absolute**
The pump heating circuits remain locked until the d.h.w. storage tank is heated up. If the capacity of the heat source is no longer sufficient, the mixing heating circuits will also be restricted.

4.56.1 Frost protection for the plant

Frost protection for the plant is fully active only in the case of setting 2. With setting 0 or 1, it will be partly or fully restricted. If the boiler is correctly sized, frost protection for the plant is also ensured when using setting 1. In the case of plants where there is a considerable risk of frost (e.g. plants with outdoor heating), setting 0 should not be used.

4.56.2 Shifting priority

The purpose of this function is to achieve optimum d.h.w. heating and, at the same time, to deliver superfluous heat to the heating circuits. This means that during d.h.w. heating, the actual value of the boiler temperature should be as close as possible to the boiler temperature setpoint without shutting down the burner. To achieve this, it may be necessary to restrict the heating circuits by means of a locking signal. This locking signal is generated with the help of a temperature-time integral.
Depending on the consumer, the locking signal will lead to switching on / off or a setpoint reduction.

Effect on 2-position loads

Due to deactivation of the pumps, heat consumption will be reduced. The heating up time for d.h.w. will thus be considerably shorter.

- Heating circuit pump:

Status	*Effect*
Locking signal = 20 %	Normal pump operation
Locking signal = 20 %	Heating circuit pump cycles
Locking signal = 93 %	Heating circuit pump OFF

- D.h.w. pump / system pump or boiler pump:
  - No effect

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of the boiler temperature's undershoot. This means that if the crossing is significant, the pumps will be deactivated earlier.

Effect on modulating loads

Due to the lowering of the setpoint, heat consumption will be reduced, which means that the d.h.w. will be heated up much quicker with minimum impact on the heating circuit. This reduces considerably the heating up time for d.h.w., with a minimum impact on the heating circuits.

- Mixing valve:

Status	*Effect*
Locking signal > 0 %	Flow temperature setpoint will be lowered. The extent of lowering is dependent on the magnitude and the period of time of the boiler temperature's undershoot.
Locking signal reduced to 0 %	Setpoint according to the normal control condition

Lowering of setpoint

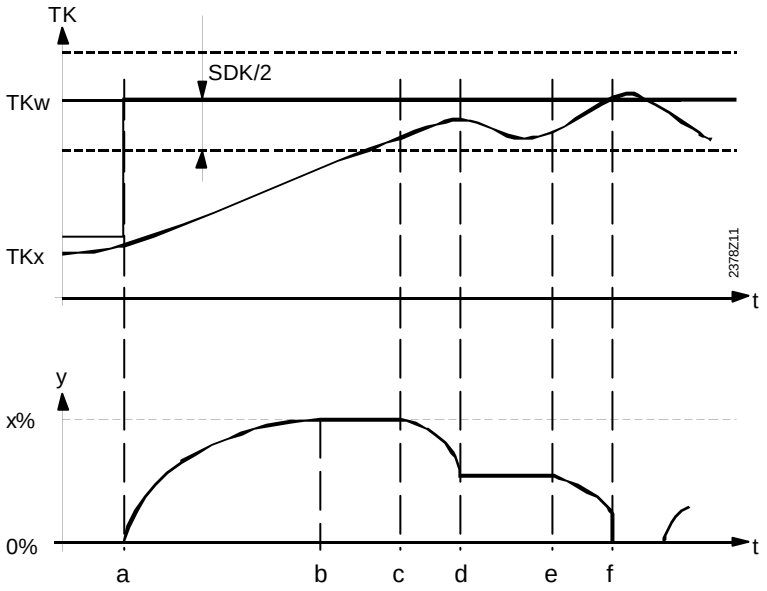
Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of the boiler temperature's undershoot. This means that if the undershoot is significant, the setpoint reduction will be greater.

4.56.3 Temperature-time integral

This temperature-time integral generates the locking signal for restricting the heating circuits.

Diagram	*Procedure*
a to b	Within a foreseeable period of time, the actual boiler temperature (TKx) will **not** lie within half the switching differential of the boiler temperature setpoint. ➔ **Locking signal will be built up**
b to c, d to e	Within a foreseeable period of time, the actual boiler temperature (TKx) will lie within half the switching differential of the boiler temperature setpoint. ➔ **Locking signal will remain at a constant level**
c to d, e to f	Within a foreseeable period of time, the actual boiler temperature (TKx) will lie **above** TKw. ➔ **Locking signal will be decreased**
f	The actual boiler temperature (TKx) **exceeds** the boiler temperature setpoint. ➔ **Locking signal will be set to 0 %.**

Diagram



a	Start of d.h.w. heating
TK	boiler temperature
TKw	Boiler temperature setpoint
TKx	Actual value of the boiler temperature
SDK	Switching differential of the boiler
t	Time
Y	Locking signal

4.57 Controlling element for d.h.w.

Benefit

Meeting the requirements of various plant configurations.

Description

Selection of controlling element.

Setting

128

Setting range	*Unit*	*Factory setting*
0 / 1	–	0

Effect

The setting will produce different displays and allows to determine the plant diagram. Since this has an impact on internal control sequences, the setting must be made correctly.

Entry:

0 Charging pump: D.h.w. will be heated up with a charging pump connected to terminal Q3/Y3

1 Diverting valve: D.h.w. will be heated up with a diverting valve connected to terminal Q3/Y3

With charging pump

The charging pump operates as a function of the d.h.w. switching differential (setting 51_{OEM}), depending on the current setpoints, which are activated by the d.h.w. program (setting 121). Also refer to "plant diagram 1" in Index.
When using a charging pump, d.h.w. heating is also ensured in manual operation.

With changeover valve

The diverting valve opens or closes as a function of the d.h.w. switching differential (setting 51_{OEM}), depending on the current setpoints, which are activated by the d.h.w. program (setting 121). Also refer to "plant diagram 3" in Index.
D.h.w. heating is **not** possible in manual operation since the diverting valve used is not controlled to provide space heating.

4.58 Separate d.h.w. circuit

Benefit

Type of d.h.w. heating in a cascaded system can be selected (charging pump / diverting valve).

Description

This function is used to switch the separate d.h.w. circuit on or off.

Setting

129

Setting range	*Unit*	*Factory setting*
0 / 1	–	0

Effect

The separate d.h.w. circuit can be switched on or off:

- OFF
  The separate d.h.w. circuit is switched off. If d.h.w. heating is required, the d.h.w. charging pump will be activated.
  (A pump or nothing is connected to terminal Q3/Y3).
- ON
  The separate d.h.w. circuit is switched on.
  D.h.w. heating is provided via a diverting valve.
  (A diverting valve is connected to terminal Q3/Y3).

In the case of d.h.w. heating with a diverting valve, one boiler of the cascade is used for d.h.w. heating. It is only that boiler which satisfies the demand for d.h.w. During the time the d.h.w. is heated, that boiler does not give consideration to any heat demand from the consumers.

Note

For the correct functioning of the separate d.h.w. circuit in a cascaded system, the following conditions must be met:

- The device must be parameterized as a cascade slave (device no. >1).
- Parameter "Pump function output K6" must be set to boiler pump.
- Parameter "Separate d.h.w. circuit" must be set to ON.
- Paramter "D.h.w. controlling element" must be set to diverting valve.

4.59 Changeover of boiler sequence in a cascade 2 x single-stage

Benefits

Even load on the boilers of a cascade or fixed switching of boiler sequence can be selected.
Different time intervals for changeover of boiler sequence can be set.

Description

The parameter determines whether or not the switching on / off sequence of the boilers shall be changed after an adjustable period of time.

Setting

130

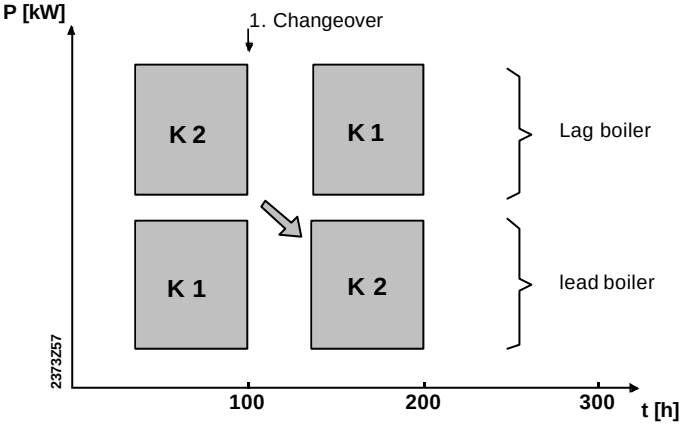
Setting range	*Unit*	*Factory setting*
--- / 10...990	– / hours	500

Effect

---	Fixed switching on / off sequence of the boilers in the cascade.
10...990	On completion of the number of operating hours set here, the switching sequence of the boilers in the cascade will change. The other boiler will then become the lead boiler.

Example

Example of 2 single-stage boilers with a set differential of 100 operating hours.



t Total number of operating hours of all lead boilers [h]
P Total output of cascade [kW]

4.60 Release integral for boiler sequence

Benefit

Variant for switching on the heat sources in the cascade.

Description

Setting of the heat deficit for releasing an additional boiler.

Setting

131

Setting range	*Unit*	*Factory setting*
0...500	°C (K) min	200

Effect

The setting defines the heat deficit required to on switch an additional boiler.

Increasing the value: An additional boiler will be switched on less quickly. Release will take place only when the heat deficit is greater.

Decreasing the value: An additional boiler will be switched on more quickly. Release will already take place when the heat deficit is smaller.

Switching on

When, with the boilers currently in operation, the amount of heat produced falls short of demand by the release integral set here, another boiler will be switched on.

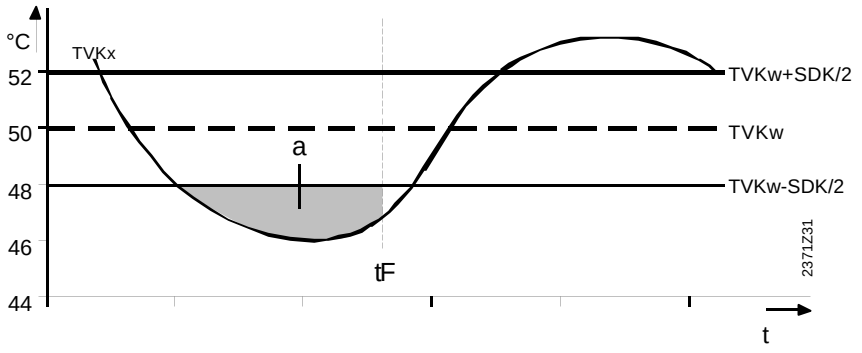
4.60.1 Temperature-time integral

The temperature-time integral is a continuous summation of the temperature differential over the time. In this case, the decisive criterion is the difference by which the temperature falls below the cascade flow temperature TVKw-(SDK/2-TVKx).

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of the undershoot. This means that when the crossing is significant, another boiler will be released earlier.
When the release integral (area "a“ in the diagram below) has reached the value set (point in time tF), another boiler will be released.

Example:



a	Release integral for boiler sequence
TVKw	Flow temperature setpoint of cascade
TVKx	Actual value of cascade flow temperature
t	Time
tF	Time of release
SDK	Switching differential of the boiler

4.61 Reset integral of boiler sequence

Benefit

Optimum switching off of the heat sources in cascaded systems.

Description

Setting the amount of surplus heat required for switching off a heat source.

Setting

132

Setting range	*Unit*	*Factory setting*
0...500	°C (K) min	50

Effect

The setting will change the switch off behaviour of the heat sources.

Increase: Heat source will be locked when surplus heat is greater

Decrease: Heat source will be locked when surplus heat is smaller

Switching on / off

When, with the amount of heat currently generated, the required energy is exceeded by the reset integral set here, the master will switch off one of the heat sources.

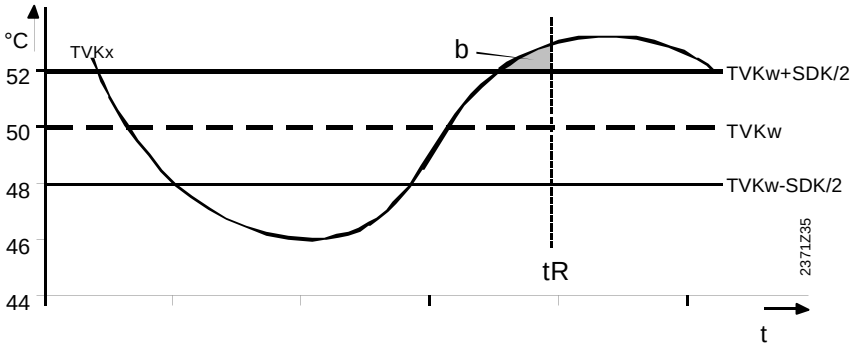
4.61.1 Temperature-time integral

The temperature-time integral is a continuous summation of the temperature differential over time. In this case, the decisive criterion is the cascade flow temperature being exceeded TVKx-(TKw+SDK/2).

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of overshoot. This means that when the crossing is significant, the second heat source will be locked earlier.
When the release integral (area "b“ in the diagram below) has reached the value set (point in time tR), the second heat source will be locked.

Example



b	Reset integral for boiler sequence
TVKw	Flow temperature setpoint of the cascade
TVKx	Actual value of cascade flow temperature
t	Time
tR	Time to reset

Benefits

Creation of systems.
Wide field of use with a smaller number of unit versions.
Plants can be extended in a straightforward manner.

4.62 LPB device address

Description

The device address and the segment address are used as destinations in the bus system. To ensure communication, each device must be correctly addressed.

Setting

Setting range	*Unit*	*Factory setting*
0...16	Increment	0

Effect

Entry of the device address is especially important when using combinations of units, or in a system. The addresses classify the controllers within a segment.

Address	Effect	Example
0	Standalone	Single controllers
1	Master (LPB)	Controllers with master function – Heat generation master – Consumer master in the respective segment
2...16	Slave (LPB)	Controllers with slave functions – Cascade slave – Zone controller (slave)

Device address

The device addresses should be assigned in consecutive order in accordance with the controllers connected. It is not permitted to assign an address several times within a bus segment, since this would lead to communication errors. Each segment must have a device as a master (address 1).

Note

Addressing is part of engineering. For detailed information, refer to LPB System Engineering, Basic Documentation (reference number CE1P2370E).

4.63 LPB segment address

Description

The segment address and the device address are used as destinations in the bus system. To ensure communication, each device must be correctly addressed.

Setting

141

Setting range	*Unit*	*Factory setting*
0...14	Increment	0

Effect

Entry of the segment address is especially important when used in a system. With this setting, the system can be subdivided into a number of segments.

0 Heat generation segment

1...14 Heat consumer segment

Segment number

A bus segment is comprised of a number of devices that are used in the same place of application. All devices in a segment must carry the same segment address.

Note

Addressing is part of engineering. For detailed information, refer to LPB System Engineering, Basic Documentation (reference number CE1P2370E).

4.64 LPB power supply

Benefits

A central bus power supply is not required in systems with up to 16 devices. Straightforward extension of systems.

Description

The controller ensures a direct power supply to the bus system.

Setting

142

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

Entry:

0 Off: No power supply from the controller to the bus

1 Automatically: The power supply from the controller to the bus will automatically be switched on and off, depending on the requirements of the LPB

Note

The actual status of the power supply is shown on line 143.

Bus power supply

Depending on the design of the system, the bus is powered either via the connected devices or by a central bus power supply.

Note

The design of the bus system is part of engineering. For detailed information, refer to LPB System Engineering, Basic Documentation (reference number CE1P2370E).

4.65 Display of LPB power supply

Benefit

Overview of operating state of the controller-bus power supply.

Description

The display shows whether the controller currently powers the bus (LPB).

Setting

Display	*Unit*
ON / OFF	–

Effect

The status of the controller-bus power supply will automatically be shown on this line.

Display:

ON	Bus power supply currently active The controller supplies power to the bus system
OFF	Bus power supply currently inactive

Bus power supply

Power supply to the bus can be accomplished in different ways. The respective setting is made on line 142.

4.66 Range of action of central changeover

Benefit

The range of action of central changeover can be defined.

Description

Function for defining the range of action of central changeover.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

The range of action can be defined for central changeover “Changeover of operating mode” (HCs + d.h.w., HCs), “Summer / winter changeover” and “Stand-by”. The range of action can be defined by making the following settings:

0 Changeover takes place with all controllers in the same segment.

1 Changeover takes place with all controllers in the entire system (LPB).

Note

The setting is of importance only if the controller is defined as the master and located in segment 0 (address 0/1). With any other addressing, it has no effect.

4.67 Automatic summer / winter changeover

Benefit

Common changeover of all heating circuits in the selected range of action.

Description

Summer / winter changeover of the selected range of action takes place when the set changeover temperature is reached (line 29/31).

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	0

Important

This setting can only be made on the master controller (device with setting on line 140 = 1)!

Effect

The setting will change the action of summer / winter changeover:

0 Local action: Automatic summer / winter changeover switches the local heating circuits 1 and 2 on and off. With the local action, the changeover temperatures can be set separately for each of the two heating circuits.

1 Central action: Automatic summer / winter changeover switches the connected heating circuits in the system on and off, depending on the segment address and the setting made on line 145. With the central action, the changeover temperature of heating circuit 1 is used for all heating circuits.

Segment address	*Effect*
0	According to the setting made on line 145
1...14	Throughout the segment

4.68 Central stand-by switch

Benefit

Central operation in the selected range of action.

Description

From the master controller, the heating system can be switched to stand-by in the selected range of action.

Setting

147

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	0

Important

This setting can only be made on the master controller (device with setting on line 140 = 1) and the setting line will only be displayed on this controller!

Effect

Entry:

0 Central stand-by circuit is switched off

1 Central stand-by circuit is activated

Segment address	*Effect*
0	According to the setting made on line 145
1...14	Throughout the segment

Important

If central stand-by on the master controller is switched on, it can only be switched off again from that controller!

D.h.w.

The central stand-by circuit does not affect d.h.w. heating. This means that the d.h.w. is heated according to the settings made.

Display

If the central stand-by circuit is activated, the stand-by button ⏻ on all controllers in the selected range of action flashes.

4.69 Clock mode

Benefit

Straightforward time synchronization of the controllers in the system.

Description

Clock operation is an important setting for time and date synchronization if several controllers are interconnected to form one system.

Setting

148

Setting range	*Unit*	*Factory setting*
0…3	Increment	0

Important

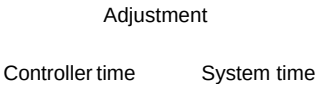
In each system, one of the controllers must be set as the **system clock** (setting 3).

Effect

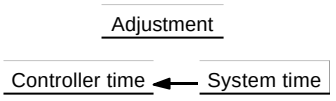
The setting will change the action of the system time on the controller's time setting (settings on lines 1 to 4).

Entry:

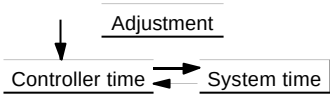
0 Autonomous clock
The time settings on the device can be adjusted.
The controller's time settings will **not** be matched to the system time.



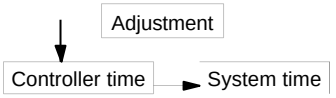
1 System time
The time settings on the device cannot be adjusted.
The controller's time settings will automatically and continuously be matched to the system time.



2 System time with adjustment
Time settings on the device can be adjusted and, at the same time, adjust the system time since the change will be adopted by the master.
The controller's time settings are still automatically and continuously matched to the system time.



3 System clock (master)
Time settings on the device can be adjusted and, at the same time, adjust the system time.
The controller's time settings are used for the system.



4.70 Winter- / summertime changeover

Benefit

Automatic changeover of the yearly clock to summertime.

International standards

In accordance with present international standards, the change from wintertime to summertime takes place on the last Sunday in March. The standard setting of the controller complies with this rule since that Sunday lies between the standard setting and the last day of the relevant month. With this setting, the day of changeover can be matched to changing standards.

Description

On the Sunday following that date, the controller's time of day will switch over to summertime.
For that purpose, the time of day is shifted forward by one hour.

Setting

Setting range	*Unit*	*Factory setting*
01.01...31.12.	tt.MM	25.03.

4.71 Summer- / wintertime changeover

Benefit

Automatic changeover of the yearly clock to wintertime.

International standard

In accordance with present international standards, the change from summertime to wintertime takes place on the last Sunday in October. The standard setting of the controller complies with this rule since that Sunday lies between the standard setting and the last day of the relevant month. With this setting, the day of changeover can be matched to changing standards.

Description

On the Sunday following that date, the controller's time of day will switch over to wintertime.
For that purpose, the time of day is shifted backward by one hour.

Setting

Setting range	*Unit*	*Factory setting*
01.01...31.12.	tt.MM	25.10.

4.72 Display of PPS communication (A6)

Benefit

Checking the communication with the connected room unit.

Description

The display provides information about the communication status and the type of room unit connected. Prerequisite is that signal transmission is correct. Also refer to "input A…" in Index.

Setting

155

Display	*Unit*
- - -	No communication
0...255	Device identification
0 0 0	Communication line with a short-circuit

Effect

The status of the PPS communication will automatically be displayed on this line. If communication is error-free, the controller identifies the unit connected by displaying the identification number.

Displays

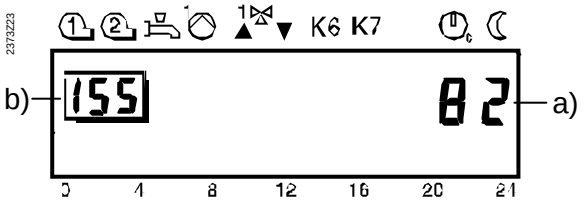
The connected device displays the identification. The list below shows the various digits with the associated types of units.

Identification codes

Only digital peripheral devices can be connected to the controller.

82	Digital room unit QAA50
83	Digital room unit QAA70
90	Digital room sensor QAA10
102	BMU (only with A6)

Example



a) Device identification (see list)
b) Selected setting line

Notes

- As soon as a device identification appears (digit), the communication is error-free
- If the digit displayed is not one of those listed above, the connected room unit is incompatible

PPS address

Within the PPS, a fixed address is assigned to some types of devices:

Room unit	1
BMU	4 (only with A6)

These peripheral devices can only be operated under the respective PPS address.

Important

When connecting a room unit type QAA10, the right polarity of the terminals must be observed.

4.73 Temperature differential solar ON (TSdEin)

Benefit

Collector pump's switch-on point.

Description

The setting defines the switch-on threshold for the collector pump.

Setting

160

Setting range	*Unit*	*Factory setting*
TSdAus...40	°C (K)	20

Effect

If the differential of collector temperature and storage tank temperature exceeds temperature differential (TsdEin), the collector pump will be activated.

4.74 Temperature differential solar OFF (TSdAus)

Benefit

Collector pump's switch-off point.

Description

The setting defines the switch-off threshold for the collector pump.

Setting

161

Setting range	*Unit*	*Factory setting*
0...TSdOn	°C (K)	8

Effect

If the differential of collector temperature and storage tank temperature is smaller than temperature differential (TsdAus), the collector pump will be deactivated.

4.75 Charging temperature level solar charging strategy

Benefit

Selectable charging strategy for storage tank charging.

Description

It is possible to select the temperature level from which the storage tank shall be charged by the solar collector.

Setting

Setting range	*Unit*	*Factory setting*
- - -	°C (K)	- - -
20...130		

Effect

Entry:

- - -	Inactive Energy-related charging strategy
20...130	Charging level: Level-related charging strategy

4.75.1 Differential temperature control (DT control)

If the solar collector generates sufficient heat, the collector will be activated to carry the heat into the storage tank (d.h.w. or buffer storage tank).
Depending on the charging strategy selected, charging can take place either energy- or level-related.

Energy-related
With energy-related storage tank charging, only the temperature differential (TSdEin) to the storage tank temperature is decisive.

Process

Switch-on point
The collector pump will be activated as soon as the following conditions are met:
- The differential of collector and storage tank temperature has exceeded temperature differential (TSdEin).
- The maximum storage tank temperature is not reached.

Switch-off point
The collector pump will be deactivated as soon as at least one of the following conditions is met:
- The differential of collector and storage tank temperature has dropped below temperature differential (TSdAus).
- The storage tank temperatures at the bottom and at the top have reached the maximum storage tank temperature.

Level-related
With level-related storage tank charging, a minimum temperature level can be present, in addition to the temperature differential. This enables the storage tank to be charged only from a certain collector temperature (temperature level for solar plus TSdEin).

Process

Switch-on point

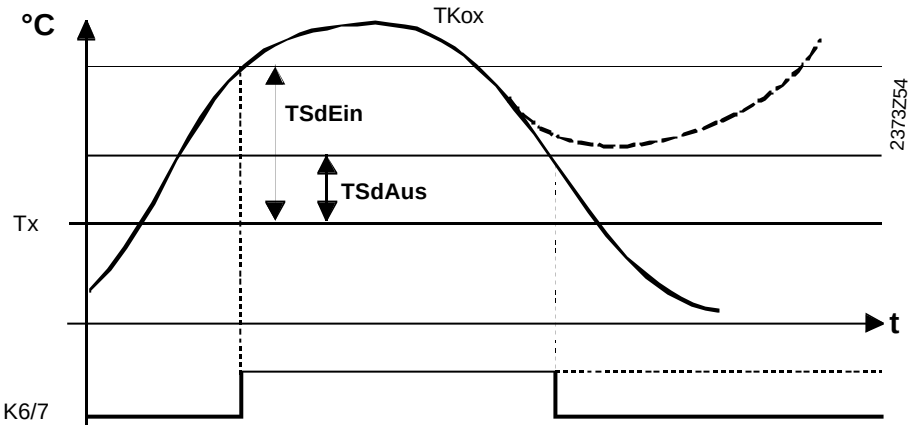
The collector pump will be activated as soon as the following conditions are met:

- The differential of collector and storage tank temperature is greater than temperature differential (TSdEin) and the temperature level is reached
- The maximum storage tank temperature is not reached

Switch-off point

The collector pump will be deactivated as soon as at least one of the following conditions is met:

- The differential of collector and storage tank temperature is smaller than temperature differential (TSdAus) or the collector temperature drops below the switch-off temperature level (temperature level for solar + TSdAus)
- The storage tank temperatures at the bottom and at the top have reached the maximum storage tank temperature



Tx MaximumSelection of actual storage tank temperature and line 162
TKox Actual value of collector temperature
TSdEin Switching differential solar on (line 160)
TSdAus Switching differential solar off (line 161)

Following points must be considered for solar applications:

- Solar setting line 98
- Sensor setting line 99
- Line 160 to 164

4.76 Maximum solar charging temperature

Description

The maximum storage tank charging temperature is limited by operation parameter “Maximum charging temperature”.

Setting

163

Setting range	*Unit*	*Factory setting*
20...130	°C (K)	80

Effect

The charging pump will be deactivated when the storage tank temperatures at the bottom and at the top have exceeded the maximum charging temperature (line 163).

4.77 Demand for heat with reduced d.h.w. setpoint

Benefit

Selectable type of heat demand with reduced d.h.w. setpoint.

Description

In connection with alternative sources of energy, an early release of heat generation (boilers) for d.h.w. heating outside the main occupancy times is often undesirable. A choice of 2 different procedures is available releasing the boiler earlier or later.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

The setting determines whether or not heat generation will be released for maintaining the reduced d.h.w. setpoint:

0 Application with buffer storage tank and alternative heat source:
Outside the main occupancy hours, an attempt is made to bring the d.h.w. temperature to the reduced setpoint level using energy from the buffer storage tank. This means that the d.h.w. charging pump runs but the demand for heat will be suppressed.
The boiler for d.h.w. heating will be released only (charging to the nominal d.h.w. setpoint) when the d.h.w. temperature has dropped below the reduced setpoint by twice the amount of the d.h.w. switching differential (51_{OEM}).

1 Standard procedure:
Outside the main occupancy hours, the d.h.w. temperature is raised to the level of the reduced setpoint. This is accomplished by sending a heat demand signal to the heat source (single boiler or cascade).

4.78 Input H1

Benefits

Remote control of space heating and d.h.w.
Changeover of operating mode via telephone (e.g. in holiday houses).

Description

Contact H1 is a multi-functional signal input that, depending on the selected setting, can be used to provide a number of functions through opening or closing its contact or by accepting a DC 0…10 V signal.

Important

The relay contacts must be suited for use with extra low voltage (gold-plated)

Setting

Setting range	*Unit*	*Factory setting*
0…4	Increment	0

Effect

With this setting, the function of terminal H1 can be changed. This has different effects on the control as soon as a potential-free contact or a DC 0…10 V signal is connected to terminal H1.

0 **Changeover of operating mode HC, d.h.w. (remote telephone switch)**
The operating mode of all heating circuits and of the d.h.w. circuit changes when the contact is closed.

1 **Changeover of operating mode HC (remote telephone switch)**
The operating mode of all heating circuits changes when contact is closed. The d.h.w. circuit remains unchanged.

2 **Minimum flow temperature setpoint (TVHw)**
The set "Minimum flow temperature setpoint contact H" of setting line 171 is activated when the contact is closed.

3 **Heat demand DC 0…10 V**
Handling of an analog voltage signal.

4 **Heat demand DC 0…10 V**
Handling of an analog voltage signal.

Note

With all settings (exception setting 4) several controllers of other manufacture can be connected in parallel to input H1. The function will be activated when one or several contacts close(s), depending on the selected setting.
When using terminal H1 as a voltage input (setting 4), it is **not** possible to connect several signals in parallel**.**

4.78.1 Changeover of operating mode

(Setting 0/1)

A remote telephone switch is a potential-free relay contact, e.g. in the form of a modem, which can be switched by making a phone call plus dialing a code.
The operating modes of heating circuit and d.h.w. change when the contact connected to terminal H1 (e.g. a remote telephone switch) closes. In that case, the LEDs in the operating mode buttons and will flash.

D.h.w.

Whether or not d.h.w. heating can take place when the remote telephone switch is activated depends on the following setting:

Setting 0: D.h.w. heating is locked when changeover is activated.

Setting 1: D.h.w. heating remains released when changeover is activated.

Effect on the system

Depending on the type of unit to which operating mode changeover in a heating system is connected, an activation produces different changeover statuses:

Changeover of system

Changeover of all controllers in the system (line 145 = 1)	
Prerequisite:	The contact must be connected to the master controller in segment 0 *Possible address:* *Device address 1 (line 140)* *Segment address 0 (line 141)*
Effect:	– All controllers in the system switch to operating mode – With setting 0, d.h.w. heating is switched off in the entire system; with setting 1, it is released in the entire system – With all controllers, operating mode changeover with the buttons is no longer possible – When the contact of the remote telephone switch opens, all controllers will return to the operating mode selected last
Check	Buttons or + flash on all controllers in the system [1)]

[1)] With setting 0 as selected above (d.h.w. heating locked), the 2 buttons and will flash.
With setting 1 as selected above (d.h.w. heating remains released), only operating mode button will flash.

Changeover of segment

Changeover of all controllers in the same segment (line 145 = 0)	
Prerequisite:	The contact must be connected to the master controller in segments 0 to 14 *Possible address:* *Device address 1 (line 140)* *Segment address 0...14 (line 141)*
Effect:	– All controllers in the same segment switch to operating mode – With setting 0, d.h.w. heating is switched off in the entire segment; with setting 1, it is released in the entire segment – With all controllers in the same segment, operating mode changeover with the buttons is no longer possible – When the contact of the remote telephone switch opens, all controllers will return to the operating mode selected last
Check	Buttons or + flash on all controllers in the same segment [1)]

4.78.2 Minimum flow temperature setpoint TVHw

The adjusted minimum flow temperature setpoint of setting line 171 will be activated when a switch connected to terminal H1 (e.g. an air heater function for a warm air curtain) closes its contact. During this switching status, the LED of the respective heating circuit operating mode button flashes. For details, also refer to "flow temperature setpoint contact H" (setting line 171) in Index.

D.h.w. When the minimum flow temperature setpoint is activated, d.h.w. is still being heated, if required.

Note If desired, this function can also be accomplished with the help of terminal H2 and setting line 174.

4.78.3 Heat generation lock

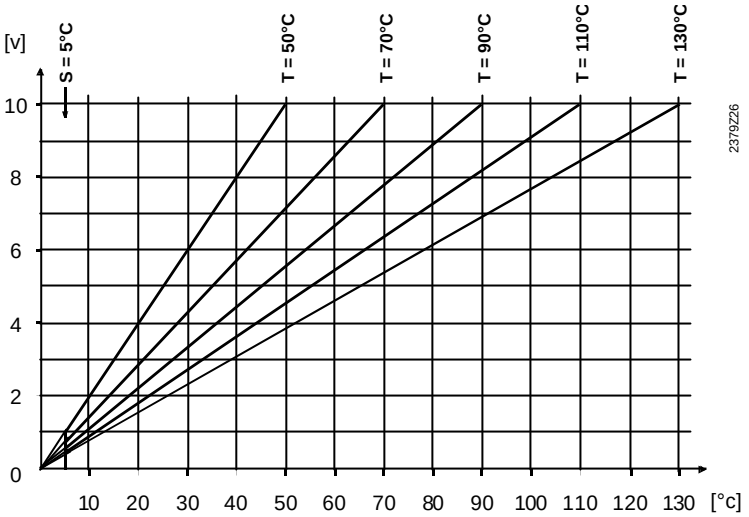
Heat generation will be locked when a switch connected to terminal H1 (e.g. peak load shaving via ripple control) closes its contact.
All heat demands of the heating circuits and of d.h.w. heating will be ignored. Frost protection for the boiler will remain ensured.

Chimney sweep function The chimney sweep function can be activated although the heat generation lock is switched on.

Notes Optimally, this function can also be accomplished with the help of terminal H2 and setting line 174.

4.78.4 Heat demand DC 0...10 V

External consumers can transmit a demand for heat in the form of an analog signal of DC 0...10 V. The controller converts this voltage signal to a temperature setpoint of 0...130 °C and considers this value when generating the setpoint of boiler temperature control.



T = maximum value of heat demand
S = minimum limitation of heat demand = 5 °C
The setpoint for 10 V can be set with parameter “Maximum value of heat demand” (operating line 172, setting range 5...130 °C). The voltage corresponding to the displayed temperature can then be calculated as follows:

$$[V] = \frac{10\,[V] * \text{"actual temperature"}\,[°C]}{\text{"Maximum value of heat demand"}\,[°C]}$$

4.79 Minimum flow temperature setpoint contact H (TVHw)

Benefits

Temporary start-up of boiler via switching contact.
Handling of heat demand signals from devices incompatible with LPB.

Description

Setting of temperature demand the boiler maintains when contact H is closed. Also refer to "input H1 and input H2" in Index.

Setting

171

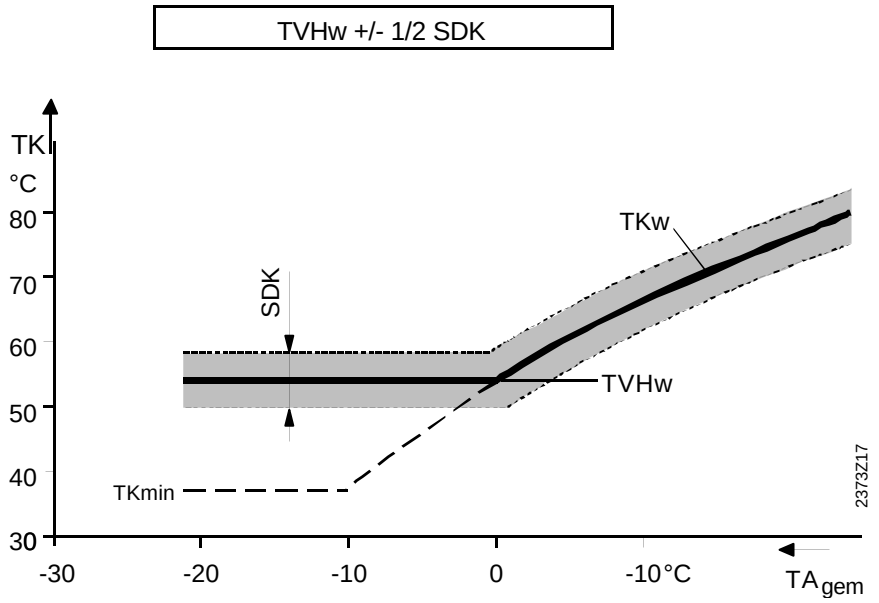
Setting range	*Unit*	*Factory setting*
8...TKmax	°C	70

TKmax Maximum limitation of boiler temperature

Effect

The level of the minimum flow temperature setpoint will be adjusted.

Prerequisite:
This setting is used only if one of the inputs H1 or H2 (setting line 170 or 174) is set to "Minimum flow temperature setpoint".
The boiler temperature is maintained at least at this minimum level, even if the demand for heat continues to drop. The switching differential in that case is the same as that with a normal temperature demand:



TKw Boiler temperature setpoint
TKmin Minimum limitation of boiler temperature setpoint (setting on line 81)
TVHw Minimum setpoint of flow temperature, contact H, (setting on line 171)
SDK Switching differential of the boiler temperature (setting on line 3_{OEM})

4.80 Maximum value of heat demand signal (DC 0...10 V) H1

Benefits

Adjustable temperature range for heat demand signal via input H1.
Can be matched to the voltage outputs of devices of other manufacture.

Description

The parameter determines which temperature the maximum voltage of the setting "Heat demand via H1" (operating line 170, setting 4) corresponds to.

Important

This setting is active only if on operating line 170 (input H1) setting 4 "Heat demand DC 0…10 V" has been selected.

Setting

172

Setting range	*Unit*	*Factory setting*
5...130	°C	100

Effect

This setting defines the temperature corresponding to 10 V of the setting "Heat demand via H1" (operating line 170, setting 4).
Based on this temperature, the controller converts the heat demand voltage signal to a temperature.

4.81 Operating action contact H1 and H2

Benefits

The operating action of the contact can be matched to the type of output signal delivered by a device of other manufacture.
More flexibility when using non-Landis & Staefa products (both operating actions can be considered).

Description

This function enables the operating action of contact H1 or H2 to be matched to the operating action of a device of other manufacture.

Setting

173

Setting range	*Unit*	*Factory setting*
0...1	–	1

Entry:

0 The contact is a N.C. contact, which means that it is normally closed and opened only when the third party device delivers a signal.

1 The contact is a N.O. contact, which means that it is normally open and closed only when the third party device delivers a signal.

Note

This setting has no impact when:

- Input H1 is used for a heat demand signal DC 0…10 V (line 170, setting 4).
- Input H2 is used for d.h.w. sensor 2 (B41) or buffer storage tank sensor 2 (B41).

4.82 Input B31 / H2 / B41

Benefits

Second d.h.w. sensor or buffer storage tank sensor, minimum temperature demand, heat generation lock.

Description

Multi-functional signal input which, with this setting, can be used for different purposes.

Important

The relay contacts must be suited for use with extra low voltage (gold-plated).

Setting

Setting range	*Unit*	*Factory setting*
0…3	Increment	0

Effect

With this setting, the function of terminal H2 can be changed. This will have different impacts on the controlled system, depending on the sensor signal received or depending on the switching status of a potential-free contact.

0 **D.h.w. sensor 2**
Connection facility for a second d.h.w. sensor.

1 **Minimum flow temperature setpoint (TVHw)**
The set "Minimum flow temperature setpoint contact H" of setting line 171 is activated when the contact is closed.

2 **Heat generation lock**
Heat generation is locked when the contact is closed.

3 **Buffer storage tank sensor 2**
Connection facility for a second buffer storage tank sensor.

Note

Am Eingang H2 können bei den Einstellungen 1 und 2 mehrere Fremdregler parallel angeschlossen werden. The function will be activated when one or several contacts close(s), depending on the selected setting.
When used as a sensor input (settings 0 and 3) no parallel connection is possible.

4.82.1 D.h.w. sensor 2

When choosing this setting, this terminal can only be used with the second d.h.w. detector.
The d.h.w. storage tank temperature can be acquired with one sensor located at the bottom and one at the top of the tank, providing more efficient utilization of the tank. This will ensure better storage tank efficiency.

Note

For more detailed descriptions about the control with 2 d.h.w. sensor, refer to "D.h.w. switching differential" in Index.
In the case of d.h.w. storage tank charging with solar energy, it is important to have sensor B3 is located at the top of the storage tank and sensor B31 at the bottom.

4.82.2 Minimum flow temperature setpoint (TVHw)

The adjusted minimum flow temperature setpoint of setting line 171 will be activated when a switch connected to the terminal (e.g. an air heater function for a warm air curtain) closes its contact. During this switching status, the LED of the respective heating circuit operating mode button flashes. For details, also refer to "minimum flow temperature setpoint contact H" (setting line 171) in Index.

D.h.w.

When the minimum flow temperature setpoint is activated, d.h.w. is still being heated, if required.

Note

If desired, this function can also be accomplished with the help of terminal H1 and setting line 171.

4.82.3 Heat generation lock

Heat generation will be locked when a switch connected to the terminal (e.g. peak load shaving via ripple control) closes its contact.
All temperature demands of the heating circuits and of d.h.w. heating will be ignored. Frost protection for the boiler will remain ensured.

Chimney sweep function

The chimney sweep function can be activated although the heat generation lock is switched on.

Note

If desired, this function can also be accomplished with the help of terminal H1 and setting line 170.

4.82.4 Buffer storage tank sensor 2 (bottom)

When choosing this setting, the terminal can only be used with the second buffer storage tank sensor. Die untere Pufferspeichertemperatur wird für Solaranbindungen benötigt.
The d.h.w. storage tank temperature can be acquired with one sensor located at the bottom and one at the top of the tank.

Notes

For more detailed descriptions about the control with 2 buffer storage tank sensors, refer to "ΔT control" in Index
In the case of buffer storage tank charging with solar energy, it is important to have sensor B4 located at the top of the storage tank and sensor B41 at the bottom.

5 Description of OEM settings

Heat generating equipment

5.1 Minimum limitation of boiler temperature ($TKmin_{OEM}$)

Benefit

Factory-set limitation.

Setting

Setting range	*Unit*	*Factory setting*
8... Tkmin	°C	40

Tkmin Minimum limitation of boiler temperature (setting on line 81)

Effect

The setting will ensure low limitation of the boiler temperature's minimum limitation set on line 81.

5.2 Maximum limitation of boiler temperature (TKmax)

Benefit

No damage to the boiler resulting from condensation.

Description

The boiler temperature limitations are protective functions for the boiler.

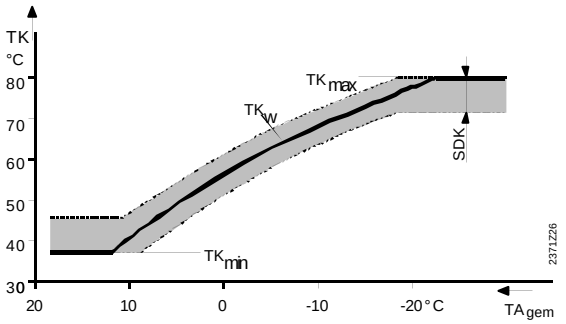
Setting

Setting range	*Unit*	*Factory setting*
TKmin...120	°C	80

Tkmin Minimum limitation of boiler temperature (setting on line 81)

Effect

The setting will change the boiler temperature's maximum limitation.
If the boiler temperature reaches the level set here, the burner will be switched off.



Legend

TK	Boiler temperature
TKw	Boiler temperature setpoint
Tkmin	Minimum limitation of boiler temperature
SDK	Switching differential
TAgem	Composite outside temperature

5.3 Switching differential of the boiler temperature

Benefit

Matching the burner to the type of boiler.

Description

The boiler temperature is controlled by a 2-position controller for which a switching differential can be set.

Setting

3

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	8

Effect

The setting changes the switching differential of the boiler temperature control.

Entry:

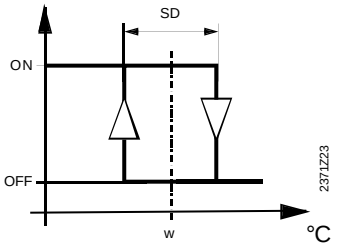
Increase: Switching differential will become wider
Fewer burner starts and longer burner running times

Decrease: Switching differential will become smaller
More burner starts and shorter burner running times

Boiler temperature control

With 2-position control, heat is produced at certain intervals. The period of time during which heat is delivered is dependent upon the boiler mass and the amount of water contained in the boiler.
The greater the demand for heat, the longer the burner runs at a time.

Switching differential



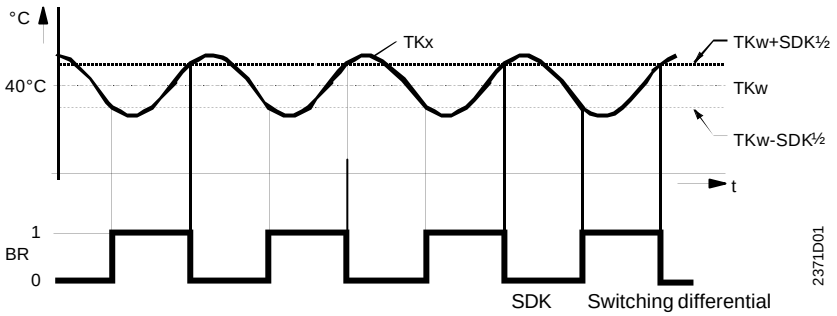
w	Setpoint
SD	Switching differential of the boiler
△	Switch-on point
▽	Switch-off point

5.3.1 Single-stage burner

- Setpoint for switching on: If the boiler temperature (TKx) falls by more than half the switching differential below the currently valid boiler temperature setpoint (TKw), the burner will be switched on
- Setpoint for switching off: If the boiler temperature (TKx) exceeds by more than half the switching differential the currently valid boiler temperature setpoint (TKw), the burner will be switched off

Note

The time switching off occurs can be delayed by the minimum burner running time. Also refer to setting 04_{OEM}.



BR	Burner	SDK	Switching differential
TKx	Actual value of boiler temperature	t	Time
TKw	Boiler temperature setpoint		

5.3.2 2-stage burner

The second burner stage will be activated and deactivated according to the following settings:

- Release integral Setting 05_{OEM}
- Reset integral Setting 06_{OEM}

5.4 Minimum limitation of the burner running time

Benefit

Reduction of burner switching frequency.

Note

Also termed "Burner cycling protection“.

Setting

4

Setting range	*Unit*	*Factory setting*
0...10	min	4

Effect

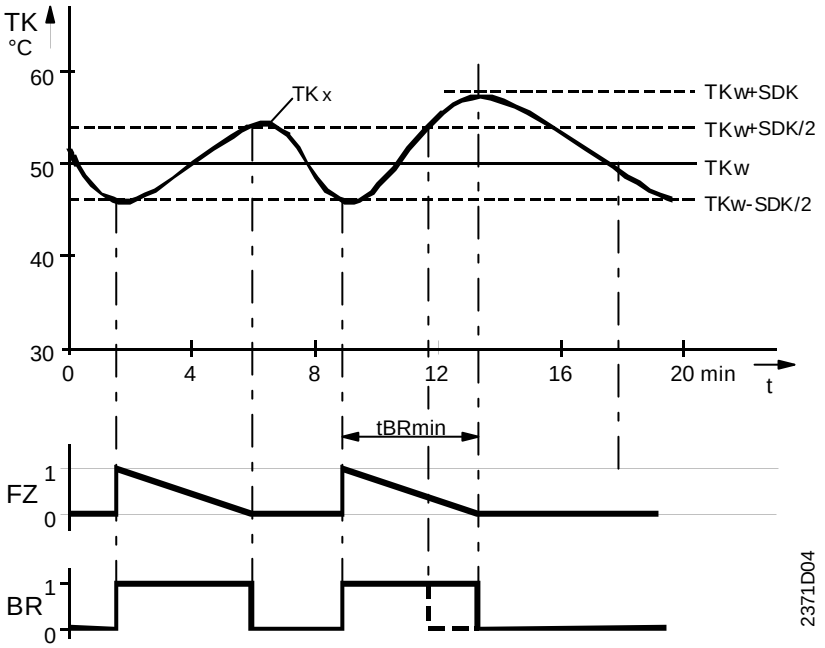
Once switched on, burner stage 1 will remain activated for at least the period of time set here.

Minimum burner running time

As soon as the burner is switched on, the minimum burner running time starts to make certain the burner will not be switched off before the set minimum time has elapsed. Each time the burner is switched off, the minimum burner running time will be reset if not yet elapsed.

Restriction

If the boiler temperature exceeds the setpoint by the amount of the entire switching differential, the minimum burner running time will be ignored for safety reasons



BR	Burner
FZ	Release counter
SDK	Switching differential of the boiler
tBRmin	Minimum burner running time
TKw	Boiler temperature setpoint
TKx	Actual value of boiler temperature

5.5 Release integral of burner stage 2

Benefit

Optimum switching on of burner stage 2.

Description

Adjustment of heat deficit for releasing burner stage 2.

Setting

5

Setting range	*Unit*	*Factory setting*
0...500	°C (K) min	50

Effect

The setting will change the switch-on point for burner stage 2.

Entry:

Increase: Burner stage 2 will be released when the heat deficit is greater

Decrease: Burner stage 2 will be released when the heat deficit is smaller

Burner stage 2

If, with burner stage 1, the boiler temperature falls below the switch-on setpoint (TKw - SDK/2) by the amount of the release integral set here, the controller will release the second burner stage.

Note

During the time burner stage 2 is released, the controller will activate and deactivate burner stage 2 according to the switching differential.

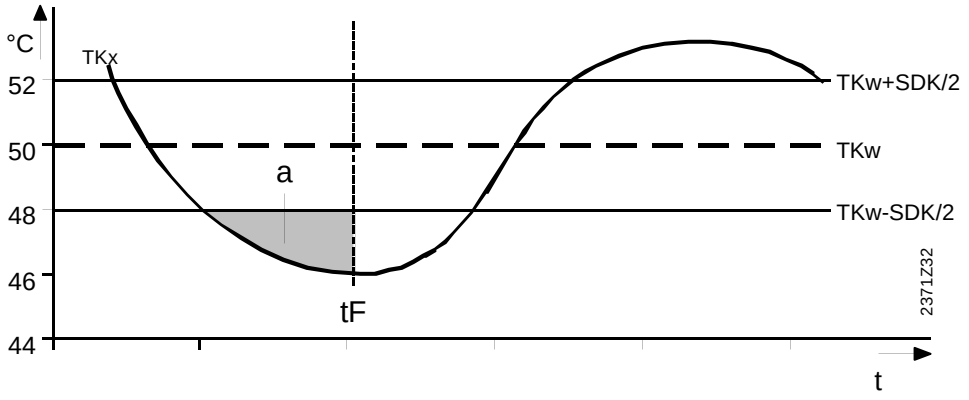
5.5.1 Temperature-time integral

The temperature-time integral is a continuous summation of the temperature differential over time. In this case, the decisive criterion is the difference by which the boiler temperature falls below the burner's switch-on setpoint (TKw-SDK/2-TKx).

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of the undershoot. This means that when the crossing is significant, burner stage 2 will be released earlier.
When the release integral (area "a" in the diagram below) has reached the value set (point in time tF), burner stage 2 will be released.

Example



a	Release limit
TKw	Boiler temperature setpoint
TKx	Actual value of the boiler temperature
SDK	Switching differential of the boiler
t	Time
tF	Time to release

5.6 Reset integral of burner stage 2

Benefit

Optimum switching off of burner stage 2.

Description

Adjustment of the amount of surplus heat for locking burner stage 2.

Setting

Setting range	*Unit*	*Factory setting*
0...500	°C (K) min	10

Effect

The setting will change the switch-off behaviour of burner stage 2.

Entry:

Increase: Burner stage 2 will be locked when surplus heat is greater

Decrease: Burner stage 2 will be locked when surplus heat is smaller

Burner stage 2

If, with burner stages 1 and 2, the switch-off setpoint (TKw + SDK/2) is exceeded by the amount of the reset integral set here, the controller will lock burner stage 2.

Note

When burner stage 2 is locked, the controller will activate and deactivate burner stage 1 according to the set switching differential.

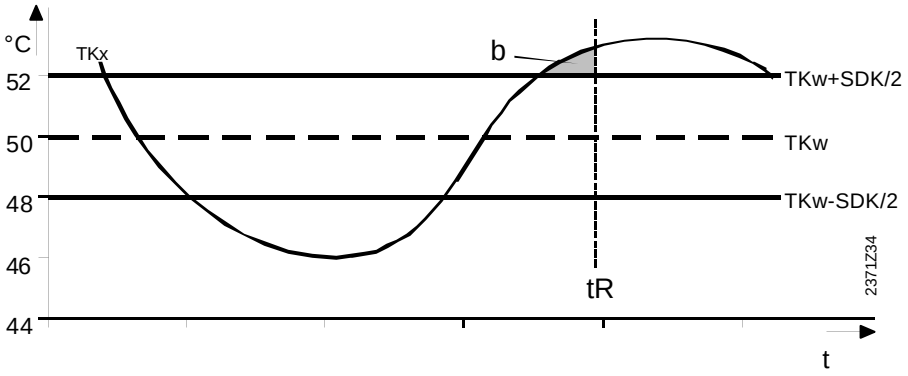
5.6.1 Temperature-time integral

The temperature-time integral is a continuous summation of the temperature differential over time. In this case, the decisive criterion is the difference by which the boiler temperature exceeds the burner's switch-off setpoint TKx- (TKw+SDK/2).

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of overshoot. This means that when the crossing is significant, burner stage 2 will be locked earlier.
When the release integral (area "b" in the diagram below) has reached the value set (point in time tR), burner stage 2 will be locked.

Example



b	Reset limit
TKw	Boiler temperature setpoint
TKx	Actual value of the boiler temperature
SDK	Switching differential of the boiler
t	Time
tR	Time to reset

5.7 Pump overrun time

Benefit

Protects the boiler against overtemperatures.

Description

Overrun of the pumps makes certain that residual heat will be carried away, thus preventing the manual safety limit thermostat from responding.

Setting

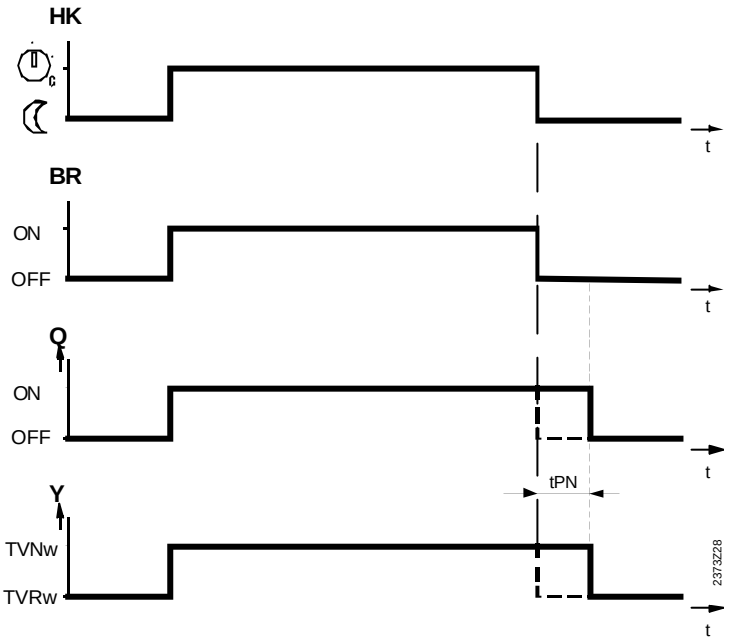
8

Setting range	*Unit*	*Factory setting*
0...20	min	5

Effect

All pumps that - at the time of burner shut-down - were operating, continue to run for the period of time set here. The behavior is the same as with burner shut-down when, with the burner deactivated, the boiler temperature demand becomes invalid. Also, the previous flow temperature setpoint is maintained to make certain the mixing valve will be open during the same period of time.

Example



HK	Operating mode
Q	Pumps
Y	Mixing valve
TVNw	Nominal flow temperature setpoint
TVRw	Reduced flow temperature setpoint
tPN	Pump overrun time
	Nominal operation
	Reduced operation

5.8 Operating mode of boiler

Benefit

A minimum boiler temperature is maintained only if required.

Description

The setting defines whether it is necessary or desirable to maintain a minimum boiler return temperature.

Setting

9

Setting range	*Unit*	*Factory setting*
0…2	–	2

Effect

The following settings are available:

0 **Continuous operation:**
The boiler operates at the minimum boiler temperature level (operating line 81), independent of whether or not the consumers currently call for heat. Exception Stand-by
Without extended burner running time.

1 **Automatic operation:**
The boiler is operated only when one of the consumers calls for heat. If the demand for heat drops below TKmin, the boiler is still maintained at the minimum boiler temperature level (operating line 81).
Without extended burner running time.

2 **Automatic operation:**
The boiler is operated only when one of the consumers calls for heat. The effective boiler temperature setpoint is used, even if it lies below TKmin (operating line 81).
If the boiler temperature drops below the setpoint by half the boiler's switching differential (SDK/2), the burner will be put into operation until the boiler temperature has exceeded TKmin by one switching differential (extended burner running time).
With extended burner running time.

Note

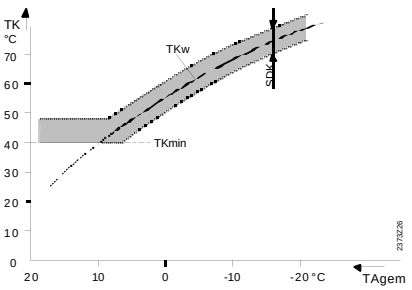
Of course, if the demand for heat by one of the consumers exceeds the minimum boiler temperature, the required setpoint will be maintained.

Standby

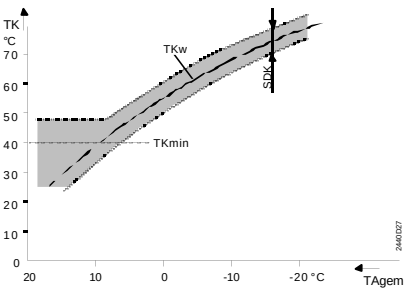
In stand-by mode ⏻ of all heating circuits, minimum limitation is deactivated. In that case, the controller must be in "standalone“ mode (device address 0). The boiler temperature is maintained at required level only when there is demand for heat. The protective functions will remain active, however.

5.8.1 Extended burner running time

Without extended burner running time



With extended burner running time



5.9 Protective boiler start-up

Benefits

The required boiler temperature setpoint will be reached quicker.
The condensation range will be passed quicker.

Description

During the boiler's heating up time, undesirable flue gas condensation occurs on the walls of the combustion chamber. The lower the boiler temperature, the more flue gas condensation occurs.
Protective boiler start-up shortens the boiler's heating up time by restricting the heat consumers. This means that the boiler passes the critical temperature range quicker, thus minimizing flue gas condensation.

Setting

10

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

The settings have the following meaning:

0 Protective boiler start-up is switched off

1 Protective boiler start-up is switched on

Process

Protective boiler start-up is triggered via a locking signal generated by the temperature / time integral.
Protective boiler start-up leads to switching on / off actions or setpoint reductions of the heating circuits, depending on the type of heat consumer.

5.9.1 Impact on 2-position loads

Due to the deactivation of the pumps, heat consumption will be reduced. This reduces considerably the boiler water's heating up time.

- Heating circuit pump

Status	*Effect*
Locking signal > 0 %	Heating circuit pump OFF
Locking signal = 0 %	Normal pump operation

- Boiler pump

Note

A response to the locking signals is given only if control of the boiler pump is selected “depending on temperature demand” (line 12 OEM = 0).

Status	*Effect*
Locking signal > 5 %	Boiler pump ON
Locking signal < 5 %	Normal pump operation

- D.h.w. pump

Status	*Effect*
Locking signal < 50 %	D.h.w. pump OFF
Locking signal < 50 %	Normal pump operation

- System pump

Status	*Effect*
Locking signal > 5 %	System pump OFF
Locking signal < 0 %	Normal pump operation

Switching point

Through the generation of the temperature-time integral, it is not only the period of time that is considered, but also the extent of boiler temperature undershoot. This means that when the crossing is significant, the pumps will be deactivated earlier.

5.9.2 Impact on modulating loads

Due to the lowering of the setpoint, heat consumption will be reduced. This reduces considerably the boiler water's heating up time.

- Mixing valve

Status	*Effect*
Sperrsignal > 0 %	Flow temperature setpoint will be lowered. The extent of lowering is dependent on the magnitude and the period of time of boiler temperature undershoot.
Locking signal reduced to 0 %	Setpoint according to the normal control condition

Setpoint reduction

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of boiler temperature undershoot. This means that when the undershoot is significant, the setpoint reduction will be greater.

Supervision

Protective boiler start-up can be interrupted to ensure that, in the event of a burner fault, for instance, frost protection for the plant will be provided.
In the case of protective boiler start-up and simultaneous frost protection for the plant, the boiler temperature gradient must turn positive within 15 minutes. Otherwise, the locking signal will become invalid for at least 15 minutes. On completion of the 15 minutes, protective boiler start-up will become active again as soon as the boiler temperature gradient turns positive.

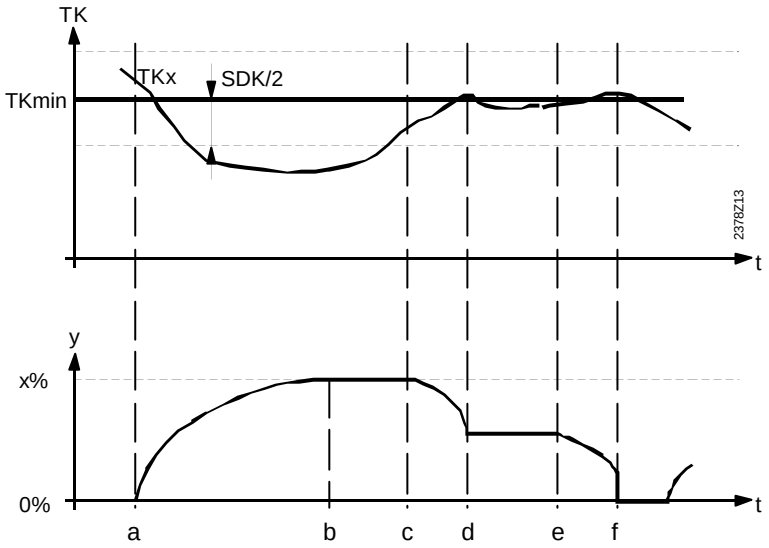
5.9.3 Temperature-time integral

Description

The temperature-time integral generates the locking signal for restricting the heating circuits.
During the generation of the locking signal, the following processes can take place:

Diagram	*Procedure*
a to b	Within a foreseeable period of time, the actual boiler temperature (TKx) will lie **below** the value of Tkmin-SDK/2. ➔ **Locking signal will be built up**
b to c and d to e	Within a foreseeable period of time, the actual boiler return temperature (TKx) will lie within half the switching differential of the boiler return temperature's minimum limitation. ➔ **Locking signal will remain at a constant level**
c to d and e to f	Within a foreseeable period of time, the actual boiler return temperature (TKx) will lie **above** TKw. ➔ **Locking signal will be decreased**

Diagram



TK	Boiler temperature
TKx	Actual value of boiler temperature
Tkmin	Minimum limitation of the boiler temperature
SDK	Boiler switching differential (factory setting = 8K)
t	Time
Y	Locking signal

5.10 Control of boiler pump

Benefit

Boiler pump control mode can be selected.

Description

The setting defines the criteria according to which the boiler pump shall be operated.

Setting

12

Setting range	*Unit*	*Factory setting*
0 / 1	–	0

Effect

The settings have the following meaning:

0 The boiler pump operates when there is a demand for heat.
In that case, the boiler pump responds to locking signals.

1 The boiler pump operates when there is a demand for heat or when the burner operates. In that case, the boiler pump does not respond to locking signals (protective boiler start-up).

5.11 Running time of damper actuator

Benefit

Setting the damper actuator running time for the modulating burner.

Description

To ensure optimum functioning of burner control, the damper actuator running time must be set.

Setting

13

Setting range	*Unit*	*Factory setting*
7.5...480	s	60

Note

It must be observed that the running time to be set only refers to the modulating range.

Example

Running time of damper actuator (90°) = 120 seconds

Minimum position of damper actuator = 20°

Maximum position of damper actuator = 80°

Hence, the damper actuator running time effective for the control is as follows:

$$\frac{120s*(80° - 20°)}{90°} = 80s$$

Positioning pulses

For control operation, running time-dependent minimum positioning pulses are active that are defined as follows:

Actuator running time TS	*Minimum pulse length*
7.5 s - 14.5 s	~ 200 ms
15 s - 29.5 s	~ 300 ms
30 s – 59.5 s	~ 500 ms
60 s – 119.5 s	~ 1.10 s
>120 s	~ 2.20 s

5.12 Proportional band (Xp)

Benefit

Adapting the control characteristic to the plant's behavior (controlled system).

Description

Setting the proportional band for control of the damper actuator of the modulating burner.

Setting

14

Setting range	*Unit*	*Factory setting*
1...200	°C (K)	20

Effect

Xp influences the controller's P-behavior.

Example

In the case of a setpoint / actual value deviation of 20 °C, a setting of Xp=20 produces a manipulated variable corresponding to the damper actuator running time (Tv = 0, Tn = maximum).

5.13 Integral action time (Tn)

Benefit

Adapting the control characteristic to the plant's behavior (controlled system).

Description

Setting the integral action time for control of the damper actuator of the modulating burner.

Setting

15

Setting range	*Unit*	*Factory setting*
10...500	s	150

Effect

Tn influences the controller's I-behavior.

5.14 Derivative action time (Tv)

Benefit

Adapting the control characteristic to the plant's behavior (controlled system).

Description

Setting the derivative action time for control of the damper actuator of the modulating burner.

Setting

16

Setting range	*Unit*	*Factory setting*
0...30	s	4.5

Effect

Tv influences the controller's D-behavior. If Tv = 0, the controller has no PI behavior.

Note

For setting rules concerning Xp, Tn and Tv, refer to section "Modulating burner control – setting rules"

5.15 Switching differential of damper actuator

Benefit

Setting the switching differential for 2-position control of the damper actuator.

Description

Adjustable switching differential for burner control.

Setting

17

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	2

Effect

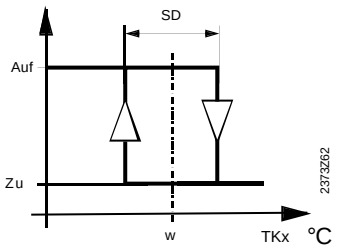
The setting changes the switching differential of air damper control.

Entry:

Increase: Switching differential becomes wider.
Fewer on / off pulses and longer intervals between full load and basic load.

Decrease: Switching differential becomes smaller.
More on / off pulses and shorter intervals between full load and basic load.

Switching differential



w	Setpoint
SD	Switching differential damper actuator
△	Switch-on point
▽	Switch-off point
TKx	Actual value of boiler temperature

5.16 Maintained boiler return temperature with mixing valve

Benefit

Optimum boiler return temperature.

Description

Maintained boiler return temperature is ensured with a 3-position mixing valve.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

The settings have the following meaning:

0 Maintained boiler return temperature is ensured without mixing valve.

1 Maintained boiler return temperature with mixing valve.

Note

This setting has an influence on the type of plant (line 53).

5.17 Maintained boiler return temperature with consumer influence

Benefit

The effect on the consumers can be adjusted.

Description

You can choose whether the maintained boiler return temperature shall have an effect on the consumers.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

The settings have the following meaning:

0 Maintained boiler return temperature does not affect the consumers.

1 Maintained boiler return temperature affects the consumers.
The action is comparable to that of the protective boiler start-up (operating line 10_{OEM}).
However, in place of minimum limitation of the boiler temperature (TKmin) minimum limitation of the boiler return temperature is used $_{(TKRmin),}$ and in place of the boiler temperature the return temperature is used.
This function necessitates a return sensor.

5.18 Minimum limitation of the boiler return temperature

Benefit

Control of the boiler return temperature.

Description

Minimum limitation of the boiler return temperature is a protective function for the boiler. It avoids flue gas condensation by preventing the boiler return temperature from falling below a certain level. The function acts in conjunction with maintained boiler return temperature.

Setting

22

Setting range	*Unit*	*Factory setting*
8...95	°C	8

Effect

Minimum limitation ensures that the boiler return temperature will not fall below a certain level.

Increase: Higher return temperatures

Decrease: Lower return temperatures

5.19 Switching differential of bypass pump

Benefit

Optimum control of the boiler bypass pump.

Description

Control of the bypass pump is in the form of 2-position control for which a switching differential must be set.

Note

The function is active only when controlling the bypass pump according to the boiler return temperature! Also refer to "control of the bypass pump" in Index.

Setting

23

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	6

Effect

2-position control provides mixing by the bypass pump in the form of pulses. The extent of mixing is dependent on the mass and the amount of water in the boiler circuit.

5.20 Control of the bypass pump

Benefits

Reduction of flue gas condensation.
More efficient adherence to the boiler return temperature's minimum limitation.

Description

The boiler bypass pump improves the circulation of water through the boiler, thus preventing the boiler temperature from falling below a certain level.

Setting

24

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	0

Prerequisite

For control of a boiler bypass pump, setting line 95 or 96 must be adapted first. Also refer to "bypass pump" in Index.

Effect

The selection changes the operating mode of the boiler bypass pump.

Entry:

0 **Parallel with the operation of the burner**
The boiler bypass pump is switched on / off according to the burner's on / off signals.

1 **According to the boiler return temperature**
The boiler bypass pump is switched on / off according to the minimum limitation of the boiler return temperature and the switching differential of the bypass pump.

5.20.1 Parallel with the burner

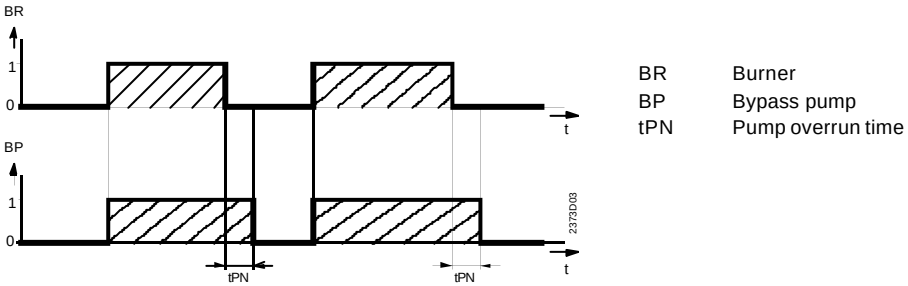
Setting 0

Operation of the boiler bypass pump according to the burner's on / off signal allows the bypass pump to be operated with no need for using a boiler return sensor.
In that case, the additional setting lines 23_{OEM} and 22_{OEM} for the bypass pump are deactivated.

In general:

Burner	*Bypass pump*
ON	ON
OFF	OFF (on completion of the pump overrun time)

Example:



5.20.2 According to the boiler return temperature

Setting 1

By operating the boiler bypass pump according to the boiler return temperature's minimum limitation and the switching differential of the bypass pump, the boiler return temperature can be maintained according to the return temperature acquired with sensor B7.

Process

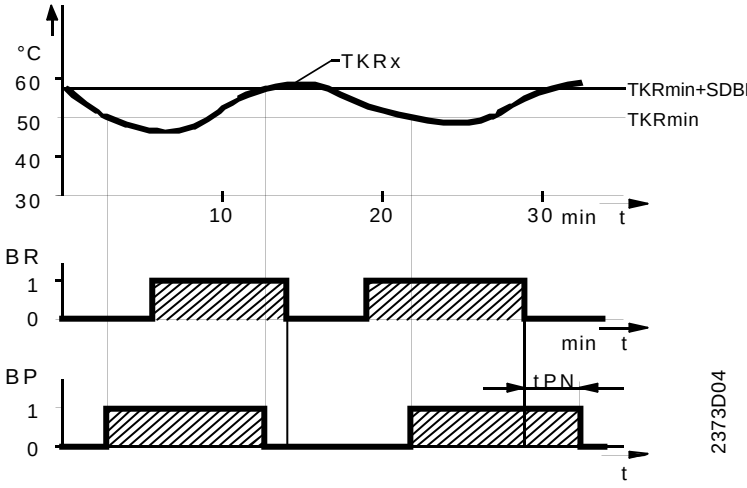
When the boiler return temperature reaches the set minimum limitation (line 22_{OEM}), the boiler bypass pump will be activated. This means that hot water will be fed from the flow directly to the return so that the boiler return temperatures rises.

Reset

When the boiler return temperature acquired with sensor B7 exceeds the set minimum limitation (setting line 23_{OEM}) by more than one switching differential of the bypass pump (setting line 22_{OEM}), the boiler bypass pump will be deactivated.
In general:

Prerequisite:	*Bypass pump*
TKRx < TKRmin	ON
TKRx > TKRmin + SDBP	OFF (on completion of the pump overrun time)

Example:



BR	Burner
BP	Bypass pump
tPN	Pump overrun time
TKRx	Actual boiler return temperature
TKRmin	Minimum limitation of boiler return temperature (setting line 22_{OEM})
SDBP	Switching differential of bypass pump (setting line 23_{OEM})

Impact on 2-position loads

Due to the deactivation of the pumps, heat consumption will be reduced. This reduces considerably the boiler water's heating up time.

- Heating circuit pump:

Status	*Effect*
Locking signal > 0 %	Heating circuit pump OFF
Locking signal = 0 %	Normal pump operation

- D.h.w. pump:

Status	*Effect*
Locking signal < 50 %	D.h.w. pump OFF
Locking signal < 50 %	Normal pump operation

- System pump

Status	*Effect*
Locking signal > 5 %	System pump OFF
Locking signal < 0 %	Normal pump operation

Switching point

Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of return temperature undershoot. This means that when the crossing is significant, the pumps will be deactivated earlier.

Impact on modulating loads

Due to the lowering of the setpoint, heat consumption will be reduced. This reduces considerably the boiler water's heating up time.

- Mixing valve:

Status	*Effect*
Locking signal > 0 %	Flow temperature setpoint will be lowered. The extent of lowering is dependent on the magnitude and the period of time of return temperature undershoot.
Locking signal reduced to 0 %	Setpoint according to the normal control condition

Lowering of setpoint

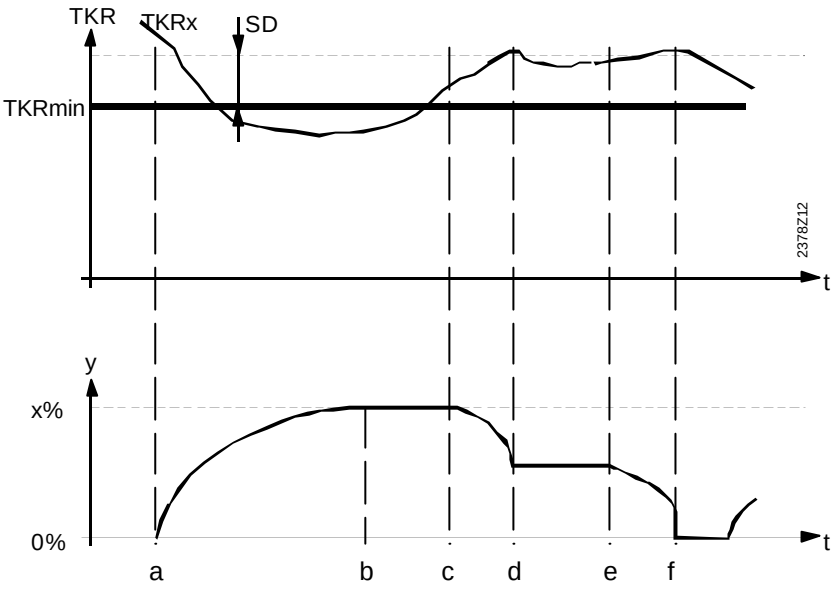
Through the generation of the temperature-time integral it is not only the period of time that is considered, but also the extent of return temperature undershoot. This means that when the undershoot is significant, the setpoint reduction will be greater.

5.20.3 Temperature-time integral

This temperature-time integral generates the locking signal for restricting the heating circuits.
When generating the locking signal, different procedures are used:

Diagram	*Procedure*
a to b	Within a foreseeable period of time, the actual boiler return temperature (TKRx) will lie **below** TKRmin. ➔ **Locking signal will be built up**
b to c, d to e	Within a foreseeable period of time, the actual boiler return temperature (TKRx) will lie within the switching differential (SD). ➔ **Locking signal will remain at a constant level**
c to d, e to f	Within a foreseeable period of time, the actual boiler return temperature (TKRx) will lie **above** the level of TKRmin+SD. ➔ **Locking signal will be decreased**

Diagram



TKR	Return temperature
TKRx	Actual boiler return temperature
TKRmin	Minimum limitation of boiler return temperature
SD	Switching differential fixed = 2 K
t	Time
Y	Locking signal

5.21 Boost of the flow temperature setpoint mixing valve (UEM)

Benefit

Efficient control of mixing heating circuits.

Description

By adding cooler return water to the water delivered by the boiler, boiler temperature variations will be smoothed out, enabling the mixing valve to produce more constant flow temperatures.
However, to achieve the desired mixing, the actual value of the boiler's flow temperature must be higher than the required mixing valve flow temperature setpoint. If this is not observed, the setpoint cannot be attained within the required period of time. Hence, this setting raises the mixing valve flow temperature setpoint.

Setting

30

Setting range	*Unit*	*Factory setting*
0...50	°C (K)	10

Effect

The setting raises the boiler temperature setpoint when the mixing heating circuit calls for heat.

Increase: Reduced risk of flow temperature undershoots

Decrease: Flow temperature undershoots possible

Boiler boost

The controller generates the boiler temperature setpoint based on the boost set here and the current flow temperature setpoint:
The greater the temperature differential between boiler flow and mixing heating circuit, the quicker the required setpoint can be reached.

TVw	Flow temperature setpoint
Setting on line 30_{OEM}	Boost
Total	Boiler temperature setpoint

Note

Also refer to "heating curve slope" in Index.

5.22 Gain factor of room influence (KORR)

Benefit

The influence of room temperature deviations on the controlled system can be adjusted.

Note

Room influence can be activated and deactivated (setting on line 101).

Setting

31

Setting range	*Unit*	*Factory setting*
0...20	–	4

Effect

This setting will change the authority of the room temperature influence.

Increase: Authority of room influence will increase

Decrease: Authority of room influence will decrease

Correction

One half of the setting made on line 31_{OEM} is multiplied by the deviation of the room temperature setpoint from the actual value.
The result is then added to the room temperature setpoint.

$$TRwk = TRw + \frac{31_{OEM}}{2}(TRw - TRx)$$

TRw Room temperature setpoint
TRx Actual value of the room temperature
TRwk Corrected room temperature setpoint

Note

The gain factor of room influence is only active when a room unit is connected.

5.23 Constant for quick setback and optimum start control (KON)

Benefit

Making use of the building's thermal storage capacity.

Description

Quick setback is dependent on whether or not a room sensor is used. Therefore, we speak of quick setback with or without room influence.

Important

This setting is active only if **no** room sensor is used.

Setting

32

Setting range	*Unit*	*Factory setting*
0...20	–	2

Effect

The duration of quick setback and the forward shift will be changed.

Entry:

Increase: Longer setback and forward shift times.
For heavy and well insulated buildings that cool down slowly and that require longer heating up times.

Decrease: Shorter setback and forward shift times.
For light and poorly insulated buildings that cool down quickly and that require shorter heating up times.

5.23.1 Quick setback without room influence

Quick setback is started as soon as a change to a lower room temperature setpoint takes place (e.g. switching times in automatic mode).
The heating circuit pump will be deactivated until the quick setback time has elapsed, which is generated from setting 32_{OEM}, the composite outside temperature and the room temperature setpoint change.

Example

The example applies to a setpoint step change of 4 °C (e.g. TRw from 20 to 16 °C):

	Setting on line 32 OEM					
TAgem	0	4	8	12	15	20
- 20	0	0	0	0	0	0
- 10	0	0.5	1	1.5	2	2.5
0	0	3	6	9	11	15
+10	0	5	11	15 (16.5)	15 (21)	15 (27)
	Values in hours					

Note

If a room sensor is connected, the quick setback time will not be generated from this setting. Also refer to *"quick setback with room temperature influence"* in Index.

5.23.2 Optimum start control without influence

Also refer to "optimum start control" in Index.

5.24 Boost of room temperature setpoint (DTRSA)

Benefit

Reduction of the building's heating up time.

Note

This setting is active only if a room sensor is used.

Setting

33

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	5

Effect

The duration of boost heating will be changed.

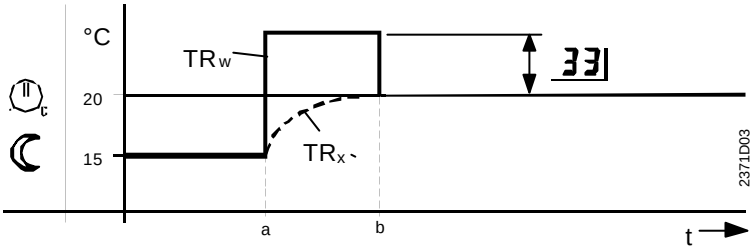
Entry:

Increase: More setpoint boost
Heating up time will become shorter

Decrease: Less setpoint boost
Heating up time will become longer

5.24.1 Boost heating

Boost heating is started as soon as switching to a higher room temperature setpoint occurs (e.g. switching times in automatic mode).
With the setting on line 33_{OEM}, the room temperature setpoint will be raised until the room is heated up (TRw - ¼ °C).
The boost produces an increase in the flow temperature setpoint.



TRx	Actual value of the room temperature
TRw	Room temperature setpoint
33_{OEM}	Setpoint boost
t	Time

5.25 Frost protection for the plant (HK1 and HK2)

Benefit

The plant is protected against freeze-ups.

Description

When the function is activated, the heating will automatically be switched on if there is a risk of frost, thus preventing freeze-ups.

Important

Prerequisite for this function is that the plant operates properly!

Setting

34

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

The plant will be protected by activating the pumps.

Entry:

0 Frost protection for the plant **OFF**
Function deactivated

1 Frost protection for the plant **ON**
Function activated

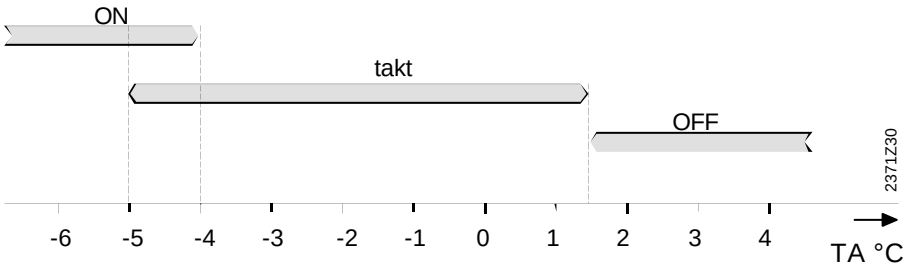
5.25.1 Frost protection for the plant

The heating circuit pump will be switched on as a function of the actual **outside temperature,** even if there is no demand for heat.

Outside temperature	Pump	Diagram
...-4 °C	Continuously ON	ON
-5...1.5 °C	ON for 10 minutes at 6-hour intervals	takt
1.5 °C...	Continuously OFF	OFF

Exception

Between -4...-5 °C, different statuses can occur. In that range, it is important which situation had existed before:
If the temperature was previously higher (in the range of "takt"), the pump is switched on / off also in the range -4 to -5 °C and is continuously running only when the outside temperature is lower
If the temperature was previously lower (in the range of "ON"), the pump is continuously running also in the range up to -4 °C and is switched on / off only when the outside temperature is higher



5.26 Control mode of actuator

Benefit

Use of 2- or 3-position mixing valve actuators.

Description

By selecting the control mode, the control is matched to the type of mixing valve actuator used in the mixing heating circuit.

Setting

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

0 2-position control

1 3-position control

2-position control

2-position control delivers on / off output signals that allow the motorized mixing valve to open and close.
For adequate control, a switching differential is required. When using a 2-position actuator, it is therefore important that the switching differential be matched to the type of plant. Also refer to "switching differential of actuator" in Index (setting line 36_{OEM}).

3-position control

3-position control delivers output signals that allow the actuator to open, close or stop in any position.
With this control mode, the switching differential need not be adjusted since the 3-position actuator can stop in any position.

5.27 Switching differential of actuator

Benefit

Optimum control of 2-position mixing valve.

Description

For a 2-position actuator, a switching differential can be adjusted, allowing the 2-position control to be optimally matched to the type of actuator used.

Important

The actuator's mode of control on setting line 35_{OEM} must be set to "2-position".

Setting

36

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	2

Effect

This setting changes the switching differential of mixing valve actuator Y1.

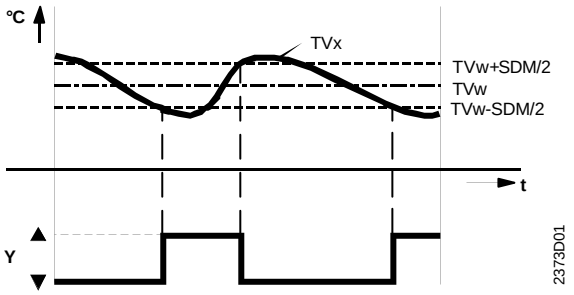
Entry:

Increase: Switching differential will become larger
Fewer and longer heating up times, larger temperature variations.
Greater temperature variations in the heating circuit.

Decrease: Switching differential will become smaller
More frequent and shorter heating up times, smaller temperature variations.
Smaller temperature variations in the heating circuit.

5.27.1 Control of mixing valve actuator

2-position control provides control of the motorized mixing valve by delivering pulses. Generally, this means: The greater the amount of heat needed, the longer the heating up time.

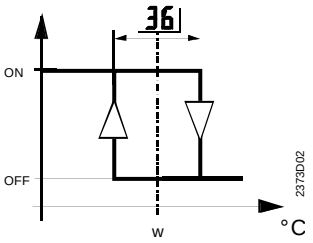


Legend

TVx	Actual value of the flow temperature
TVw	Flow temperature setpoint
SDM	Switching differential of actuator
Y	Mixing valve actuator OPENS
Y	Mixing valve actuator CLOSES

Switching differential

Mixing valve actuator OPENS	=	TVw - SDM/2
Mixing valve actuator CLOSES	=	TVw + SDM/2



w	Setpoint
36OEM	Switching differential of actuator
△	Switch-on point
▽	Switch-off point
ON	Mixing valve actuator OPENS
OFF	Mixing valve actuator CLOSES

5.28 Overtemperature protection for the pump heating circuit

Benefit

No overtemperatures in the pump heating circuit.

Description

The flow temperature can be higher than that called for by the pump heating circuit (e.g. in the case of a higher setpoint demand by another consumer). The controller offsets the surplus energy by letting the pump cycle, thus preventing the pump heating circuit from overheating.

Setting

37

Setting range	*Unit*	*Factory setting*
0 / 1	–	1

Effect

This setting switches overtemperature protection on or off:

0 Inactive:
The heating circuit pump is operated without overtemperature protection.

1 Active:
Overtemperature protection operates the heating circuit pump in a way that excessive flow temperatures will be compensated.

Protection against overtemperatures

When overtemperature protection is provided, the heating circuit pump cycles, thus reducing excessive flow temperatures that lie above the setpoint. The cycling period is fixed at 10 minutes.

On time ratio

$$\varepsilon = \frac{TVwGef - TRw}{TKxGed - TRw}$$

ε	On time ratio
TVwGef	Demanded flow temperature setpoint
TRw	Current room temperature setpoint
TKxGed	Attenuated boiler temperature
TKx	Actual value of the common flow temperature

Limitations

The pump's running time is set to a minimum of 3 minutes.
The pump's off time is set to a minimum of 2 minutes.
Also, the pump will be activated and deactivated at the following switching points:

Pump continuously ON	$TVxGed \leq TVwGef \quad (\varepsilon \geq 1)$
Pump continuously OFF	$T_{Kx} \leq T_{Rw}$

Notes

If a flow sensor is connected (mixing heating circuit), overtemperature protection for the heating circuit pump is inactive.

5.29 Heat gains (Tf)

Benefit

To save energy, heat gains are taken into consideration.

Description

This setting takes into account potential heat sources such as machines, pieces of equipment, intense solar radiation, or similar, that might adversely affect accurate control.

Setting

38

Setting range	*Unit*	*Factory setting*
-2...+4	°C	0

Note

Heat gains are automatically considered by the controller. This means that manual settings can be changed by the controller.

Effect

Compensation of potential constant heat sources.

Entry:

Increase: For more compensation
In the case of significant heat sources

Decrease: For less compensation
In the case of less significant heat sources

5.30 Adaption sensitivity 1 (ZAF1)

Benefit

Adaption of the heating curve as a function of the outside temperature.

Description

Adaption sensitivity 1 serves for calculating the adaption of the heating curve in the temperature range 4 to 12 °C. Also refer to "adaption of heating curve“ in Index.

Setting

39

Setting range	*Unit*	*Factory setting*
1...15	–	15

Note

The level of adaption sensitivity is automatically adapted by the controller and, therefore, need not be manually adjusted.

Effect

The heating curve in the temperature range 4 to 12 °C will be differently adapted, depending on the level of adaption sensitivity 1.

Increase: More adaption

Decrease: Less adaption

Reduction

Each time a significant adaption of the heating curve **between** 4 and 12 °C (ZAF1) has taken place, adaption sensitivity 1 will automatically be reduced by one step. This means that the extent of adaption and thus the readjustment of the slope and the heating curve’s parallel displacement will gradually be reduced .

Note

When readjusting the slope of the heating curve, the adaption sensitivity will automatically be reset to the factory setting.

Adaption of heating curve

The process of heating curve adaption is described in the relevant section. Also refer to "adaption of heating curve" in Index.

5.31 Adaption sensitivity 2 (ZAF2)

Benefit

Adaption of the heating curve as a function of the outside temperature.

Description

Adaption sensitivity 2 serves for adapting the heating curve in the temperature range **below** 4 °C. Also refer to "adaption of heating curve“ in Index.

Setting

Setting range	*Unit*	*Factory setting*
1...15	–	15

Note

The level of adaption sensitivity is automatically adapted by the controller and, therefore, need not be manually adjusted.

Effect

The heating curve in the temperature range below 4 °C will be adapted differently, depending on the level of adaption sensitivity 2.

Increase: More adaption

Decrease: Less adaption

Reduction

Each time a significant adaption of the heating curve **below** 4 °C (ZAF2) has taken place, adaption sensitivity 2 will automatically be reduced by one step. This means that the extent of adaptation and thus only the readjustment of the heating curve’s slope will gradually be reduced.

Note

When readjusting the slope of the heating curve, the adaption sensitivity will automatically be reset to the factory setting.

Adaption of heating curve

The process of heating curve adaption is described in the relevant section. Also refer to "adaption of heating curve" in Index.

5.32 P-band of mixing valve (Xp)

Benefit

Adapting the control characteristic to the plant's behavior (controlled system).

Description

Setting the proportional band for control of the mixing valve actuator Y1 that can be used for heating circuit 1 or for maintained return temperature control.

Setting

41

Setting range	*Unit*	*Factory setting*
1...100	°C (K)	32

Effect

Xp influences the controller's P-behavior.

5.33 Integral action time of mixing valve Y1 (Tn)

Benefit

Adapting the control characteristic to the plant's behavior (controlled system).

Description

Setting the I-part for control of mixing valve actuator Y1 that can be used for heating circuit 1 or for maintained boiler return temperature control.

Setting

42

Setting range	*Unit*	*Factory setting*
10...873	s	120

Effect

Tn influences the controller's I-behavior.

5.34 Actuator running time mixing valve Y1

Benefit

Setting the actuator running time.

Description

Mixing valves have different actuator running times.

Setting

43

Setting range	*Unit*	*Factory setting*
30...873	s	120

5.35 Maximum nominal setpoint of d.h.w. temperature (TBWmax)

Benefits

Setting can be limited by the end-user.
Reduces risk of scalding.

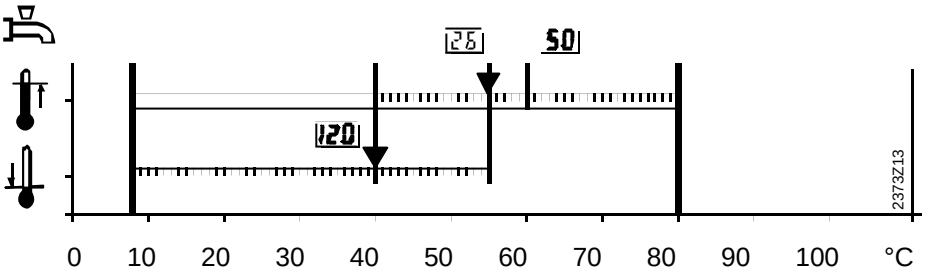
Setting

50

Setting range	*Unit*	*Factory setting*
8...80	°C	60

Effect

The setting will ensure maximum limitation of the nominal d.h.w. temperature setpoint (setting on line 26).



26 Setting "Nominal setpoint of the d.h.w. temperature"
120 Setting "Reduced setpoint of the d.h.w. temperature"
50 OEM Setting "Maximum nominal setpoint of the d.h.w. temperature"

5.36 Switching differential of d.h.w. temperature (SDBW)

Benefit

Optimum frequency of d.h.w. heating.

Description

D.h.w. heating is in the form of 2-position control for which a switching differential must be set.

Note

The switching differential used for d.h.w. control does not affect d.h.w. heating with a control thermostat.

Setting

51

Setting range	*Unit*	*Factory setting*
0...20	°C (K)	5

Effect

The setting will change the switching differential of the d.h.w. temperature control.

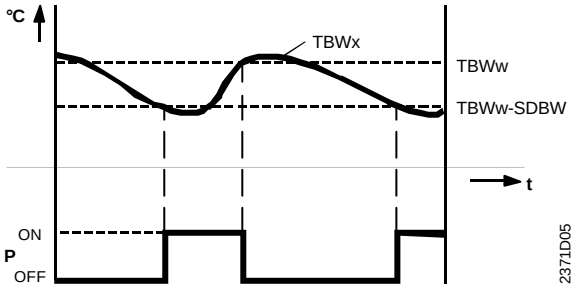
Entry:

Increase: Switching differential will become larger
Fewer and longer heating up times, larger temperature variations

Decrease: Switching differential will become smaller
More frequent and shorter heating up times, smaller temperature variations

5.36.1 D.h.w. temperature control

2-position control heats the d.h.w. at certain intervals. The duration of the heating up time is dependent on the mass of the storage tank and the amount of water contained in the tank. The greater the amount of d.h.w. needed, the longer the heating up time.

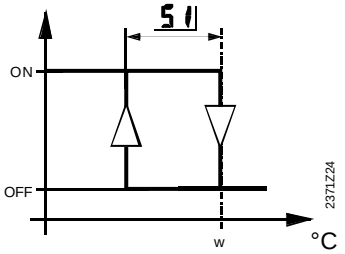


Legend

TBWx	Actual value of d.h.w. temperature
TBWw	D.h.w temperature setpoint
SDBW	Switching differential of d.h.w. temperature
ON	Switch-on point
OFF	Switch-off point

Switching differential

D.h.w. ON: TBWx = TBWw - SDBW
D.h.w. OFF: TBWx = TBWw



w Setpoint
51 Switching differential of d.h.w. temperature
Switch-on point
Switch-off point

5.36.2 D.h.w. temperature control with 2 sensors

The d.h.w. temperature is acquired with 2 temperature sensors connected to terminals B3 and B31.
The control considers the actual values of the sensor for the higher and the lower temperature as follows:

D.h.w. ON:	TBWx of both sensors	=	TBWw – SDBW
D.h.w. OFF:	TBWx of both sensors	=	TBWw

Note

If the d.h.w. temperature is controlled with 2 sensors, the respective setting must be made on line 174.

5.37 Legionella function

Benefit

Potential legionella viruses will be killed.

Description

The legionella function ensures that the d.h.w. in the storage tank will periodically be raised to a higher temperature, thus making certain that potential legionella viruses are killed.

Setting

52

Setting range	*Unit*	*Factory setting*
0 / 1	Increment	1

Effect

The setting activates or deactivates the legionella function.

Entry:

0 OFF: Function not active.

1 ON: The function will be activated every Monday morning when d.h.w. is heated up for the first time and lasts a maximum of 2.5 hours. The d.h.w. is heated up to the adjusted legionella setpoint. Also refer to "setpoint of legionella function" in Index (line 37_{OEM}).

Note

- This function is possible only when d.h.w. heating is released by the d.h.w. heating program.
- If the legionella function is aborted during the usual time (on Mondays), it will be repeated the next time the d.h.w. setpoint is changed.

Legionella

Legionellas are viruses that can occur in hot water installations which can cause pneumonia (legionnaires' disease). To minimize the risk, it is important to maintain hot water temperatures at or periodically raise them to a predetermined level.

The risk of spreading exists especially in central hot water installations with extensive piping and in air conditioning plants with air humidifiers. To minimize the risk of infection, it is very important to properly install and maintain such plant.
In large plants, it must be ensured that the water outlet temperature is not lower than 60 °C and that the temperature in the piping system does not drop by more than 5 °C.

5.38 Setpoint of legionella function

Benefit

Adjustable temperature level to kill legionella viruses.

Description

The setpoint of the legionella function is an adjustable temperature level to which the d.h.w. temperature is raised when the legionella function is activated (refer to section "Legionella function“). Also refer to "legionella function" in Index (setting line 52_{OEM}).

Setting

53

Setting range	*Unit*	*Factory setting*
8...95	°C	65

Effect

The setting changes the d.h.w. setpoint during the period of time the d.h.w. is heated up as a result of the legionella function.

5.39 Discharge protection during d.h.w. heating

Description

Presents discharging of the d.h.w. storage tank due to too low flow temperatures during d.h.w. heating.

Setting

54

Setting range	*Unit*	*Factory setting*
0…2	–	2

Effect

The setting activates or deactivates the protection against discharging:

0 Protection against discharging is **not** active
1 Protection against discharging is **active**
2 Protection against discharging is **active** only when heat generation is locked

When protection against discharging of the d.h.w. is active, the boost of the flow temperature (operating line 126) is checked during the heating cycle:

- If at least half the boost value is reached, d.h.w. heating will be **released**
- If the boost value is less than 1/8 of the value set, d.h.w. heating will be interrupted (pump will overrun for at least 1 minute) 1 min

5.40 Continuous display

Benefit

Choice of continuous displays.

Setting

90

Setting range	*Unit*	*Factory setting*
0 / 1	–	0

Effect

The setting will change the continuous display which appears when no setting line is selected.

	With heat generation functionality	*Without heat generation functionality*
0	Weekday / time of day	Weekday / time of day
1	Actual value of the boiler temperature	Actual value of the flow temperature heating circuit

Note

In the case of application 2 x 1 cascade or cascade slave, it is always the boiler temperature that is displayed.

5.41 Software version

Benefit

Straightforward display of software version in use, without removing the controller

Description

The software version installed represents the state of the software available at the time the controller was produced.

Setting

91

Display	*Unit*
00.0 ... 99.9	Digits

Effect

The software version will automatically be displayed on this line.

Example: 01.0

The first 2 digits give the software version (01.)
The third digit gives the software revision (.0)

5.42 Device operating hours

Benefit

Display of the number of device operating hours.

Description

Here, you can read the number of hours the controller has been in operation

Setting

92

Display	*Unit*
0... 500‘000	h

Effect

The number of operating hours since the controller was first commissioned will automatically be displayed on this line.
The hours considered as operating hours are those during which power was supplied to the controller, that is, including the periods of time with no effective heating operation.
The number of operating hours cannot be reset.

6 General control processes

Introduction

The functions described below require no settings. They are performed automatically but have an impact on the plant.
For the rectification of faults, planning and plant maintenance, it may therefore be very advantageous to know about their influence on plant operation.

6.1 Generation of the boiler temperature setpoint

Benefit

Demand-dependent control of the burner.

Description

Depending on the temperature situation, the various heating circuits call for different flow temperature setpoints as demanded by boiler temperature control. However, since boiler temperature control can consider only one setpoint, a selection is made.

Process

Generally, the demand for the highest setpoint required by a consumer (e.g. by a heating circuit) generates the current boiler temperature setpoint.
The setpoint requirements considered stem from both controller-internal setpoints and setpoints transmitted via LPB.
Auxiliary functions, such as setpoint boosts and the like, are included in the setpoints actually demanded at the time.

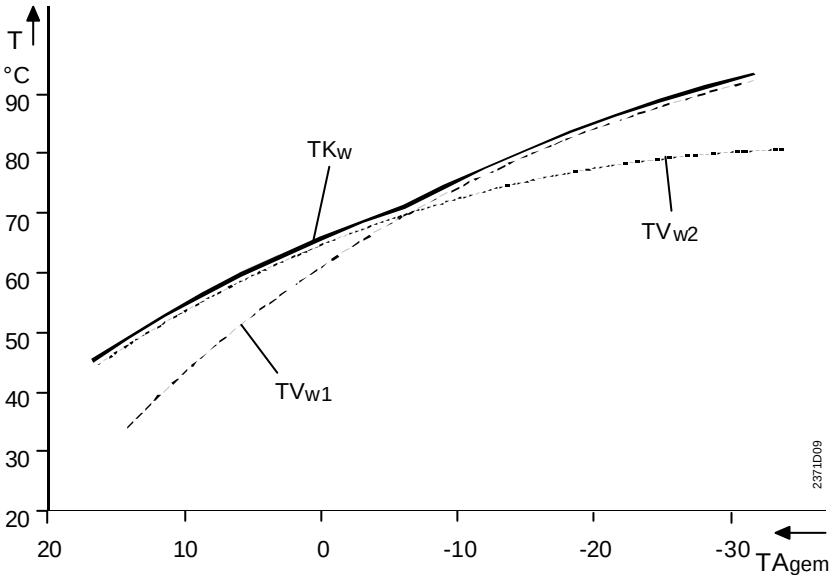
Exception

A demand for d.h.w. has priority over all other setpoint requirements, which means that the required d.h.w. setpoint will be maintained, even if it is lower than that called for by a heating circuit.

Effect

The boiler temperature is maintained at the highest setpoint currently demanded - unless d.h.w. is required.

Example



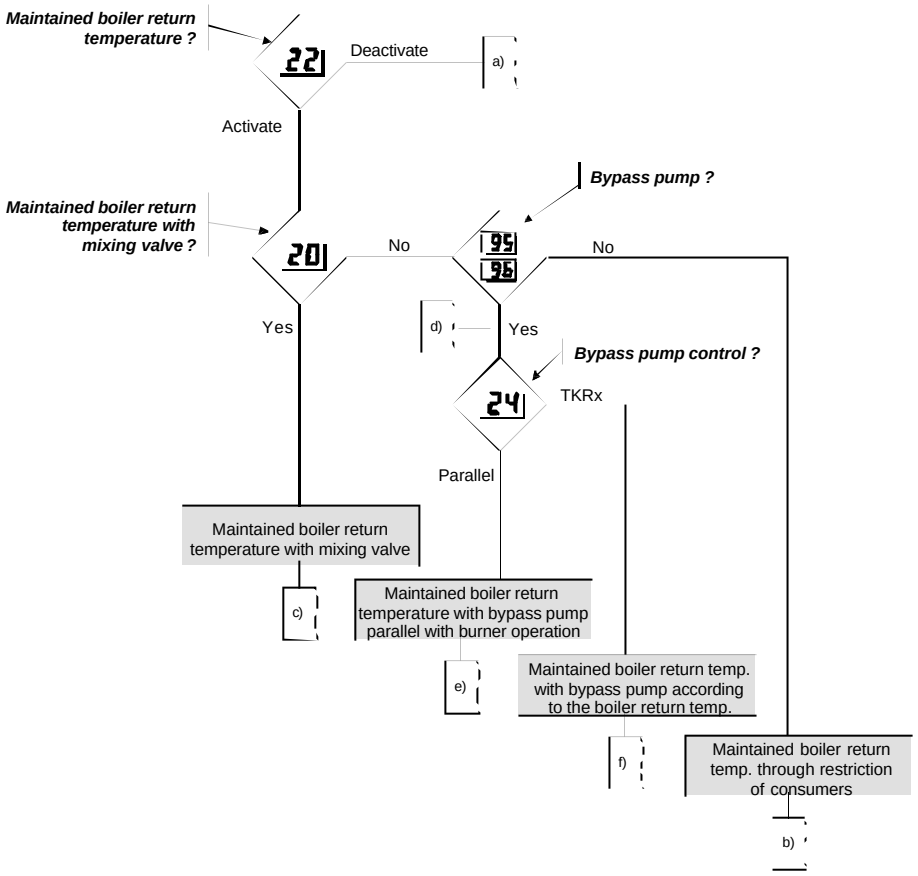
TKw Boiler temperature setpoint
TVw1 Flow temperature setpoint of heating circuit 1 (incl. setpoint boost if any)
TVw2 Flow temperature setpoint of heating circuit 2 (incl. setpoint boost if any)

6.2 Maintained boiler return temperature

Description

The boiler return temperature can be maintained at a certain level by using different types of hydraulic circuits. It is possible to maintain a high level by restricting the heat consumers or, more efficiently, by using a bypass with pump or mixing valve in the return.
For these variants, various settings are required to ensure correct functioning.

Decision diagram



Influence of the consumers can be selected with setting OEM 21. The heat consumers will be restricted by generating a locking signal. The function is based on the generation of an integral as used with protective boiler start-up.

Explanation of the diagram

a) Deactivation is possible by having the adjusted setpoint on line 22 $_{OEM}$smaller than the possible actual value of the return temperature. Dies ist durch die Standardeinstellung gegeben. This will have no influence from maintained boiler return temperature.

b) Maintained boiler return temperature is ensured only by restricting the consumers (locking signal).

c) The return temperature is maintained at the require setpoint with the help of mixing valve Y1 and circulating pump Q2. The positioning behavior of the mixing valve's actuator can be adjusted on lines $41_{OEM,}$ 42_{OEM} and $43_{OEM.}$

d) The return temperature is maintained with the help of the boiler bypass pump. For that purpose, it must be assigned to the relevant output relay on lines 95/96.

e) The return temperature is maintained with the help of the bypass pump parallel to the burner signal.

f) The return temperature is maintained at the adjusted return temperature setpoint (line 22_{OEM}) within the "bypass pump switching differential" (line 23_{OEM}) with the help of the bypass pump in on / off operation.

6.3 Modulating burner control

6.3.1 Setting rules for Xp, Tn and Tv

Introduction

Setting values **Xp** (proportional band), **Tn** (integral action time) and **Tv** (derivative action time) are used to match the controller to the plant's characteristics. This enables the plant to quickly adjust heat generation to load changes when the demand for heat increases, for example, so that the boiler temperature will only slightly deviate from the setpoint and for short periods of time only.

Most plants change their behavior depending on the load.
If the setting values are not adequately adjusted, the control system's response is either too slow or too quick. If the control system operates correctly in the upper load range and not satisfactorily in the lower load range (or via versa), mean values should be used, which may lead to a slightly less satisfactory control behavior in the load range that previously showed a good performance.

It should be made certain that when commissioning the modulating burner for the first time, the present parameters of Xp, Tn and Tv will be used. To optimize and check the control parameters, it is recommended to follow the procedure detailed below under "Checking the control function".

6.3.2 Checking the control function

To check the control behavior with the preset control parameters, the following procedure is recommended:
after the controller has reached and held the setpoint for a certain time, change the setpoint by 5 to 10 %, either up or down. When making this test, it is of advantage to have the plant operating in the lower load range where, usually, it is more difficult to control.

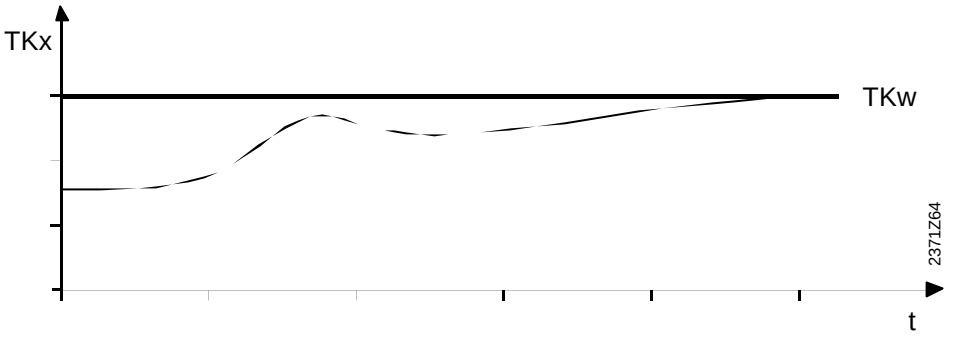
In principle, control must be stable, but it may be fast- or slow-acting.
If fast control is required, the boiler temperature must reached the new setpoint fairly quickly.

If fast control of a setpoint change (disturbance) is not a mandatory requirement, the control action can be rather slow. Non-oscillating control reduces wear on the actuator and on other electromechanical controls used in the plant.

If the control does not produce the required result, the control parameters should be adjusted as follows:

6.3.3 Control action too slow

If the control system's response is too slow, setting parameters Xp, Tv and Tn must be decreased in a stepwise fashion. A new readjustment should be made only after the control action resulting from the previous readjustment is completed.



Control action of modulating burner too slow

TKx Actual value of the boiler temperature
TKw Boiler temperature setpoint

Procedure

1.	Reduce Xp in steps of about 25 % of the previous value.

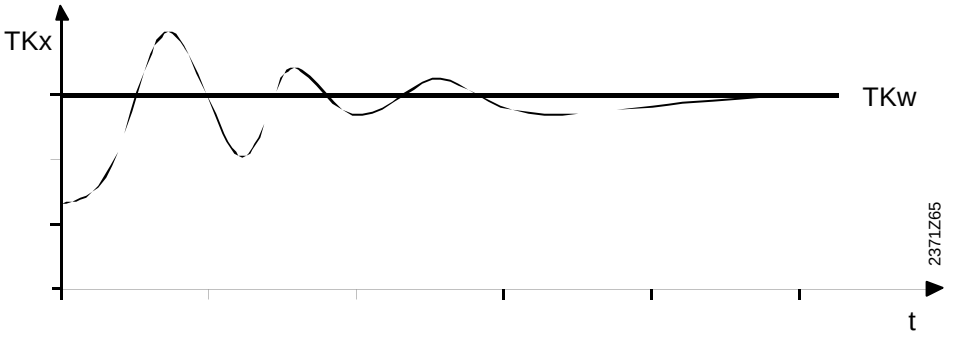
If not sufficient:

2.	Reduce Tv in steps of 1 to 2 seconds (if value 0 is reached, the controller operates as a PI controller)
3.	Reduce Tn in steps of 10 to 20 seconds

Repeat steps 2 and 3 alternately.

1.1.2 Control action too fast

If the control system's response is too "hefty" so that it starts oscillating, setting parameters Xp, Tn and Tv must be increased in a stepwise fashion. A new readjustment should be made only after the control action resulting from the previous readjustment is completed.



Control action of modulating burner too fast

Procedure

1.	Increase Xp in steps of about 25 % of the previous value.

If not sufficient:

2.	Increase Tv in steps of 2 to 5 seconds.
3.	Increase Tv in steps of 10 to 20 seconds.

Repeat steps 2 and 3 alternately.

6.4 Automatic 24-hour heating limit

Benefits

Automatic shut-down of heating.
Saving energy without sacrificing comfort.

Description

This is a fast-acting savings function since the heating is switched off when there is no more demand for heat. Economical operation is ensured throughout the year, especially during intermediate seasons. Manual switching off is no longer required.

Notes

The automatic 24-hour heating limit does not function in continuous operation .
The display shows the automatic 24-hour heating limit as “ECO”

1.1.3 Without room influence

Introduction

If **no** room unit is connected, the room temperature setpoint will **not** be readjusted by the room influence. In that case, the automatic 24-hour heating limit operates according to the selected setpoint of or ..

Process

The temperature basis used for this process are the values of the flow temperature setpoint and the current room temperature setpoint.

Switching off

If the flow temperature setpoint falls below the room temperature setpoint plus a correction value, the heating will be switched off.

- Heating OFF

TVw	=	TRw + 2 S/10

Switching on

If the flow temperature setpoint exceeds the room temperature setpoint plus a correction value, the heating will be switched on.

- Heating’s switch-on point

TVw	=	TRw + 4 S/10

TVw	Flow temperature setpoint
TRw	Room temperature setpoint
s	Slope of heating curve

6.4.1 With room influence

Introduction

The automatic 24-hour heating limit operates depending on the current flow temperature setpoint. If a room unit is connected, the room influence continuously readjusts the flow temperature setpoint.
This means that the automatic 24-hour heating limit differs when room influence is used.

Process

The temperature basis used for this process are the values of the flow temperature setpoint and the current room temperature setpoint.

Switching off

If the flow temperature setpoint corrected by the room influence falls below the room temperature setpoint plus a correction value, the heating will be switched off.

- Heating's switch-off point

$$TVwk \leq TRw + 2\frac{S}{10} - \frac{31OEM}{16}$$

Switching on

If the flow temperature setpoint corrected by the room influence exceeds the room temperature setpoint plus a correction factor, the heating will be switched on.

- Heating's switch-on point

$$TVwk \geq TRw + 4\frac{S}{10} - \frac{31OEM}{16}$$

TVwk	Flow temperature setpoint readjusted by the room influence
TRw	Room temperature setpoint
s	Slope of heating curve

6.5 Quick setback with room sensor

Benefit

Making use of the building's thermal storage capacity.

Description

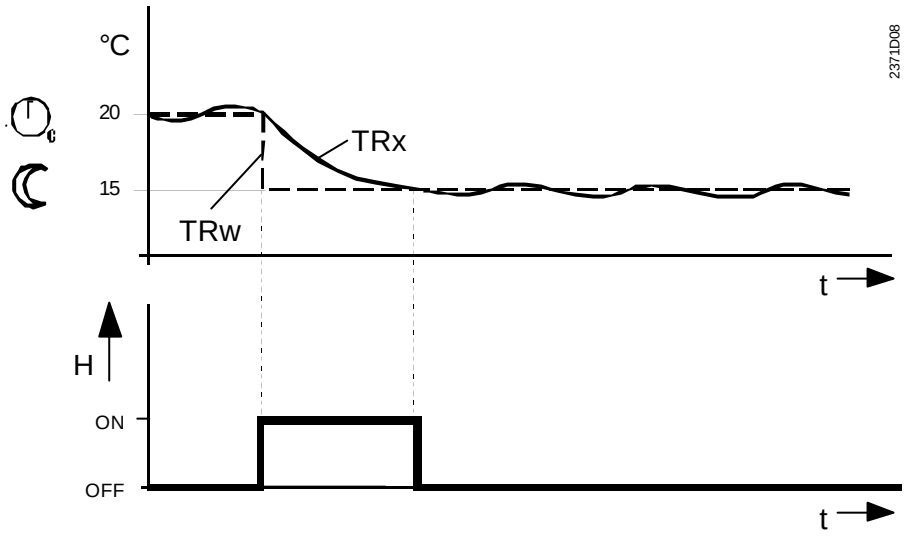
Quick setback is dependent on whether or not a room temperature sensor is used. A differentiation must therefore be made between quick setback with or without room sensor.

Important

This process has an impact only when a room sensor is used.

Process

Quick setback is started as soon as a change to a lower room temperature setpoint takes place (e.g. switching times in automatic mode).
Quick setback is terminated as soon as the actual room temperature reaches the level of the respective room temperature setpoint (TRx = TRw).



TRx Actual value of the room temperature
TRw Room temperature setpoint
H Quick setback function

Effect

Due to the readjustment of the room temperature setpoint, the heating circuit pump will be switched off until the quick setback process is terminated. This means that the room temperature falls quicker since the supply of heat from the boiler is cut off.

Note

If no room sensor is connected, quick setback will not be accomplished through this process. Also refer to "constant for quick setback" in Index.

6.6 Overtemperature protection mixing heating circuit

Description

This function is used to prevent the mixing heating circuit from reaching excessive temperatures, caused by a defect of the mixing valve, for example.

Note

The function is independent of the pump heating circuit's overtemperature protection and cannot be deactivated.

Process

If the flow temperature exceeds the limit value "Maximum limitation of flow temperature" + 7.5 °C (fixed value), the pump will be deactivated.
This limit function acts only with the mixing heating circuit.

6.7 Attenuated outside temperature

Benefit

Making use of the building's thermal storage capacity.

Description

The attenuated outside temperature is the simulated room temperature of a fictive building that has no internal heat source. This means that it is only the outside temperature that affects the room temperature.

Setting

No direct setting can be made. The generation of the attenuated outside temperature cannot be influenced.

Reset

It is possible, however, to reset the attenuated outside temperature:

1. Press the line selection buttons to select line 34.
2. Press the + / - buttons for 3 seconds.
   As soon as the display stops flashing, the attenuated outside temperature is reset to the actual outside temperature.

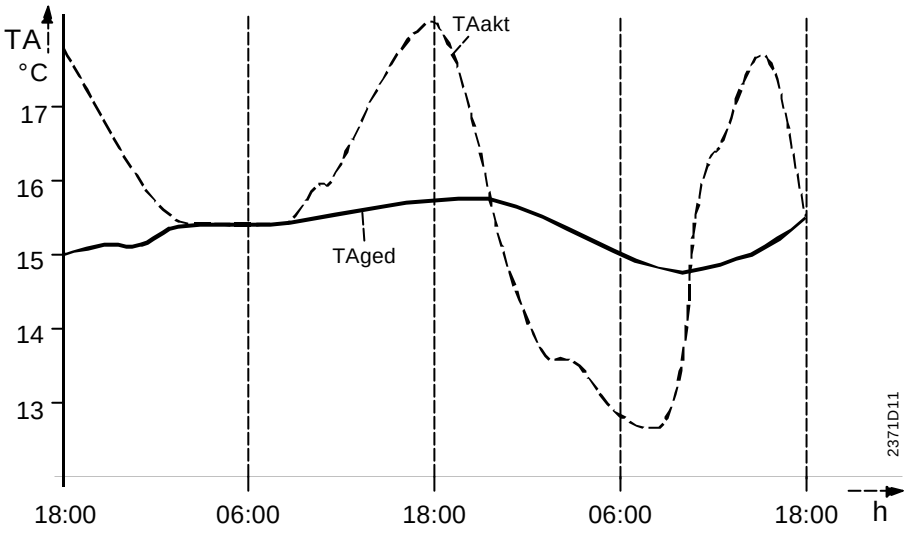
Process

The attenuated outside temperature is generated by the controller. It is calculated at 10-minute intervals, based on the actual outside temperature. The factory setting uses a basic value of 0 °C.

Effect

The attenuated outside temperature affects directly only summer / winter changeover. The attenuated outside temperature acts indirectly, via the composite outside temperature, on flow temperature control.

Example



TAakt Actual outside temperature
TAged Attenuated outside temperature

6.8 Composite outside temperature

Benefit

Compensating variable for flow temperature control.

Description

The composite outside temperature is a mixture of the actual outside temperature and the attenuated outside temperature as calculated by the controller.

Process

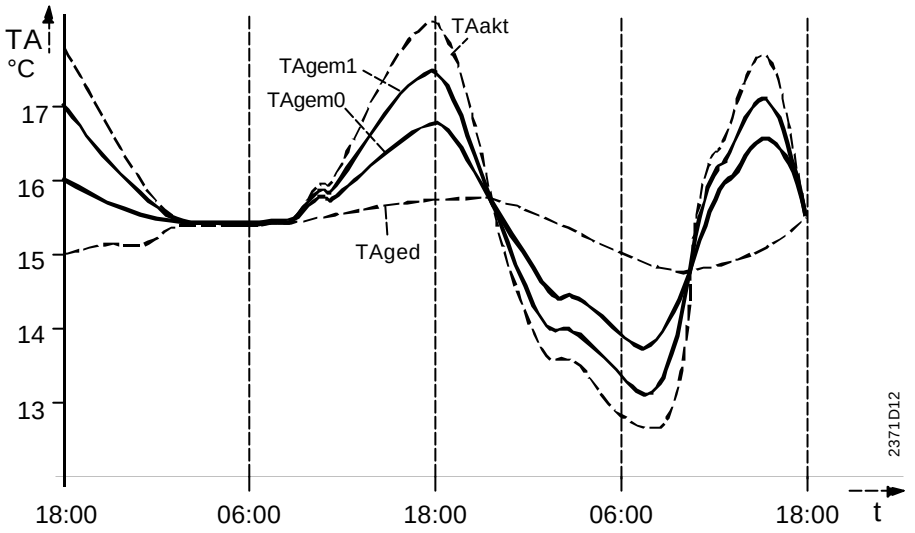
The mixture of actual and attenuated outside temperature is dependent on the type of building construction (setting 113) and is generated as follows:

Selected type of construction	*composite outside temperature*
Heavy (setting 113 = 0)	Tagem = ½ TAakt + ½ TAged
Heavy (setting 113 = 1)	Tagem = ¾ TAakt + ¼ TAged

Effect

The composite outside temperature as a compensating variable acts on flow temperature control, that is thus matched to the prevailing weather conditions.
It also acts on the 24-hour heating limit to shut down the heating.

Example



TAakt	Actual outside temperature
TAged	Attenuated outside temperature
TAgem1	Composite outside temperature for light building structures
TAgem0	Composite outside temperature for heavy building structures

6.9 D.h.w. push

Benefit

Availability of d.h.w. is also ensured during non-occupancy times.

Description

If, due to unexpected demand, the d.h.w. storage tank is emptied, the d.h.w. push provides one-time charging of the storage tank until the nominal d.h.w. temperature setpoint is reached.

Process

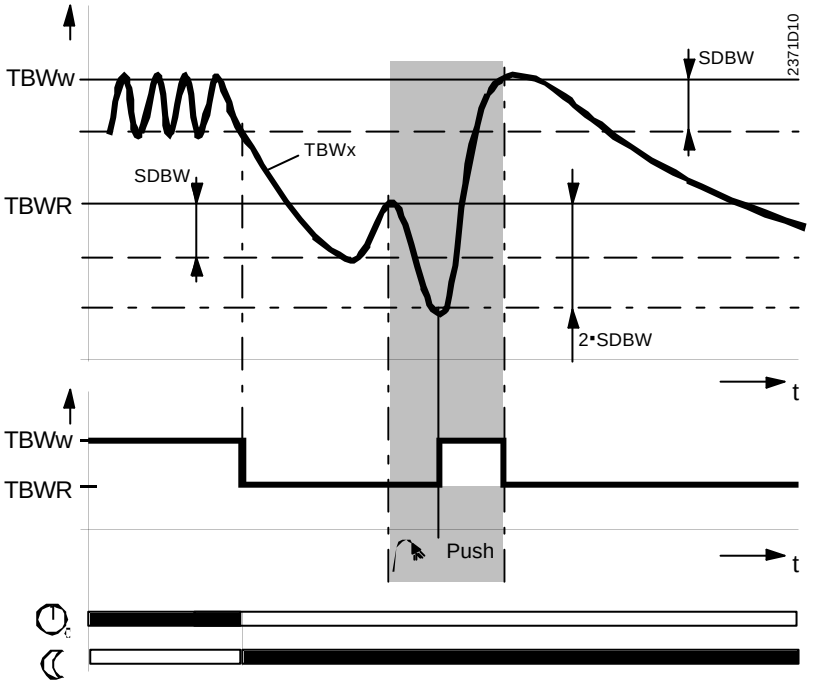
The d.h.w. push is triggered as soon as the actual d.h.w. temperature falls below the reduced d.h.w. setpoint (line 51OEM) by an amount that exceeds twice the switching differential (line 120).

TBWx < TBWR - 2 SDB

Effect

When the d.h.w. push is triggered, the storage tank is charged once until the nominal d.h.w. temperature setpoint (line 120) is reached.
Then, normal operation according to the d.h.w. heating program is resumed.

Example



SDBW Switching differential d.h.w.
TBWw Nominal setpoint of the d.h.w. temperature
TBWR Reduced setpoint of the d.h.w. temperature

6.10 Pump and valve kick

Benefit

No seizing of pumps and valves.

Description

The pump and valve kick is a protective function aimed at preventing the pumps and valves from seizing.

Process

The connected pumps and valves will be activated for 30 seconds every Friday morning at 10:00 h, on by one, at 30 second intervals. Non-existing devices will be skipped so that the order of activation may vary.
The pump kick is activated without giving consideration to any of the other functions.
The valve kick is activated only when there is no demand for heat.

Effect

During the periods of time pump and valve kick are activated, the water circulates. The mechanical parts of the pumps and the valve seats will be purged, thus preventing the pumps and valves from seizing.

Exception

The electric immersion heater (K6/K7) is not affected by this function!

6.11 Protection against discharging after d.h.w. heating

Benefit

Inadvertent discharging of the d.h.w. storage tank will be prevented.

Description

The “Protection against discharging after d.h.w. heating” prevents inadvertent discharging of the d.h.w. storage tank resulting from the pump overrun. Together with “Protection against discharging during d.h.w. heating” (operating line 54_{OEM}), efficient protection against discharging is thus ensured.

Process

The controller compares the storage tank temperature with the cascade flow temperature (common flow temperature) or, in certain situations, with the boiler temperature.

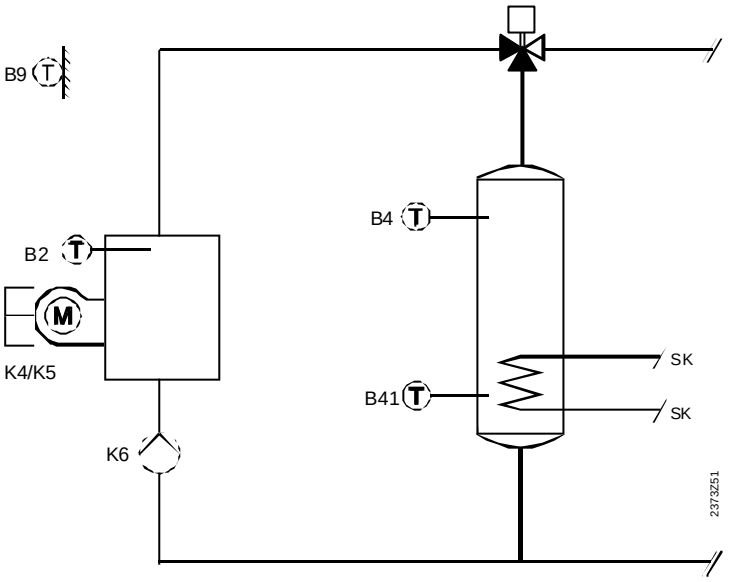
If the cascade temperature (or the boiler temperature) is lower than the storage tank temperature, pump overrun will be stopped prematurely.

6.12 Buffer storage tank operation

If a buffer storage tank sensor B4 is connected, a decision is made based on the temperature acquired with B4 (actual value 1 of buffer storage tank temperature) whether the consumers shall receive their heat from the heat source or from the buffer storage tank.
If the temperature measured in the buffer storage tank is higher than the flow temperature called for by the consumers, the heat generation will be locked and the consumers receive their heat from the buffer storage tank.
If the temperature measured in the buffer storage tank is lower than the flow temperature called for by the consumers, the buffer storage tank will be locked and the consumers receive their heat solely from the heat source.

Example

Example of a hydraulic circuit with a buffer storage tank. The buffer storage tank can be charged by any type of heat source (wood-fired boiler, solar collectors, heat pump, etc).



SK = solar collectors

Connection of diverting valve

The diverting valve must be connected in parallel to the pump of the boiler. The pump must be defined as a boiler pump (refer to operating line 95).

6.13 Overview of pump operation

Benefit

Straightforward checking of proper functioning of the various pumps.

Description

Operation of the various pumps depends on a number of factors. To enable you to quickly understand the different interrelationships when commissioning and checking the plant, please make use of the list below. It provides information about the combinations of settings (pump setting / heat demand) where a pump runs : The meaning of the different pump settings is defined on setting lines 95 (K6) and 96 (K7):

	Application	Pump behavior with valid [2] demand for heat: by HC	via H1 / H2	by d.h.w.
Q2	Pump HK1	Runs when HK1 demands heat	Does not run	Does not run
Q2	Maintained boiler return temperature valve	Runs when there is demand for heat	Runs when there is demand for heat	Runs when there is demand for heat
Q3	D.h.w. pump	Does not run	Does not run	Runs when there is demand for heat
K6 K7	No function No function	Does not run	Does not run	Does not run
K6 K7	HK2 HK2	Runs when HK2 demands for heat	Does not run	Does not run
K6	System pump after d.h.w.	Runs when there is demand for heat [1]	Runs when there is demand for heat	Does not run
K6	System pump before d.h.w.	Runs when there is demand for heat [1]	Runs when there is demand for heat	Runs when there is demand for heat
K6	System pump external demand	Does not run	Runs when there is demand for heat [1]	Does not run
K6 K7	D.h.w. circulating pump D.h.w. circulating pump	No influence from type of heat demand. Pump runs according to the setting made on line 122.		
K6 K7	Electric immersion heater for d.h.w. Electric immersion heater for d.h.w.	Does not run	Does not run	Runs when there is demand for heat only in summer operation
K6 K7	Solar pump Solar pump	No influence from type of heat demand. Pump runs according to solar criteria.		
K6	Pump H1	Does not run	Runs when there is demand by H1	Does not run
K7	Pump H2	Does not run	Runs when there is demand by H2	Does not run
K6	Boiler pump	Runs when there is demand for heat [1]	Runs when there is demand for heat	Runs when there is demand for heat
K6 K7	Boiler bypass pump Boiler bypass pump	Pump runs according to the setting made on operating line 24OEM.		

The pumps in operation overrun when there is no more demand for heat (with the exception of the d.h.w. circulating pump, electric immersion heater for d.h.w. and solar pump). Also refer to pump overrun time (8_{OEM}).

[1] Pump also overruns when there is demand for heat another controller integrated in the (LPB) system.

[2] Reasons for an invalid demand for heat can be, for example:summer / winter changeover, 24-hour heating limit, quick setback, or room temperature limitation by room sensor.

6.14 Frost protection

Benefit

Ensures that the boiler and the d.h.w. temperature will not fall below a certain level.

Description

In addition to the frost protection modes described here, frost protection for the building and frost protection for the plant, whose parameters can be set, are also active. For details, refer to the description of lines 28 and 34 OEM.

6.14.1 For the boiler

Process

If...	*then...*
the actual boiler temperature falls below 5 °C... (TKx < 5 °C)	... the frost protection function for the boiler becomes **active**
The actual value of the boiler temperature exceeds the minimum limitation of the boiler temperature (line 81) by more than one boiler switching differential (line 3 OEM)..., (TKx > TKmin + SDK)	... the frost protection function will be **terminated**

Effect

If the frost protection function for the boiler is activated, the burner will be switched on and the boiler water heated up until the frost protection function is terminated.

Note

The frost protection setpoint for the boiler is factory-set at 5 °C and cannot be changed
Protective boiler startup remains activated within its functionality
The minimum burner running time (line 4 OEM) is taken into consideration

6.14.2 For the d.h.w.

Process

If...	*then...*
the actual value of the d.h.w. temperature falls below 5 °C... (TBWx < 5 °C)	... the frost protection function for the d.h.w. becomes **active**
the actual value of the d.h.w. temperature exceeds 5 °C by more than one d.h.w. switching differential (line 51 OEM)... (TBWx > 5 °C + SDBW)	... the frost protection function for d.h.w. will be **terminated**

Effect

If the frost protection function for d.h.w. is activated, first the boiler water is heated until the minimum limitation of the boiler temperature is reached (TKmin, setting on line 81), then, the d.h.w. is heated by means of the charging pump or the diverting valve.

Note

- The frost protection setpoint for the d.h.w. is factory-set at 5 °C and cannot be changed
- Protective boiler start-up remains activated within its functionality
- The minimum burner running time (line 4 OEM) is taken into consideration
- Pump overrun will be activated when d.h.w. heating is terminated
- This function is not available when heating the d.h.w. with a control thermostat

6.14.3 For the heating circuit

Frost protection for the heating circuit is active with both types of application, pump heating circuit and mixing heating circuit. If the flow temperature of the heating circuit falls below 5 °C, a valid temperature demand of 10 °C will be generated. This causes the heating circuit pump to be activated and – in case of the mixing heating circuit – the mixing valve actuator to be driven to the required position.
If the flow temperature reaches the switch-off threshold of 7 °C, the temperature demand will be maintained for another 5 minutes. This ensures that the hot water will reach the entire heating circuit including the return.

7 Application examples

Introduction

This chapter contains all types of plant that can be handled by the controller. These plant types use reference numbers some of which are not in a consecutive order. The missing plant types can be covered by other controllers from the ALBATROS range.

Notes

- The plant type no. is identical with the number displayed on setting line 53
- The buffer storage tank application has no impact on the type of plant
- The following settings have no impact on the type of plant:
  Setting line 95 (K6): settings 5 through 8 and 11
  Setting line 96 (K7): settings 2 through 5 and 7

7.1 Structure of plant diagrams

Introduction

The following summary of plant diagrams is structured in the form of a matrix. Since application of the available functionality is very comprehensive, a complete presentation of the diagrams would be somewhat confusing.
However, the selected structure demands observance of the following procedure to find the required type of plant.

Select the heat source variant

Basically, the presentations are subdivided into heat sources and plants. So, first of all, select the type of heat source from the chapter with the same name.

Example

No. **C1** for a 2-stage burner without maintained boiler return temperature.

Determine the possible types of plant

Based on the selected heat source variant, a choice of plant types is now available in each group of plants.

Example

Hence, in the above example, all plant types would be possible where there is a **1** in column **C** of the relevant table.

Note

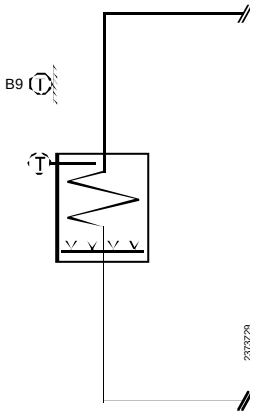
The graphic presentations of the plant types always correspond to the possible full use of the grouping given.

7.2 Heat source variants

Type of heat source	80	*Heat source variant*		
No heat source (RVA63)	0	**A1**	**-**	**-**
PPS-BMU	0	**B1**	**-**	**-**
Single-stage burner	1	**C1**	**C2**	**C3**
2-stage burner	2	**C1**	**C2**	**C3**
Modulating burner, 3-pos.	3	**D1**	**D2**	**D3**
Modulating burner, 2-pos.	4	**D1**	**D2**	**D3**
Cascade 2 x single-stage	5	**E1**	**-**	**-**
		Without maintained boiler return temperature	Maintained boiler return temperature with bypass pump K6 or K7 (line 95 or 96)	Maintained boiler return temperature with mixing valve (line 20 OEM)

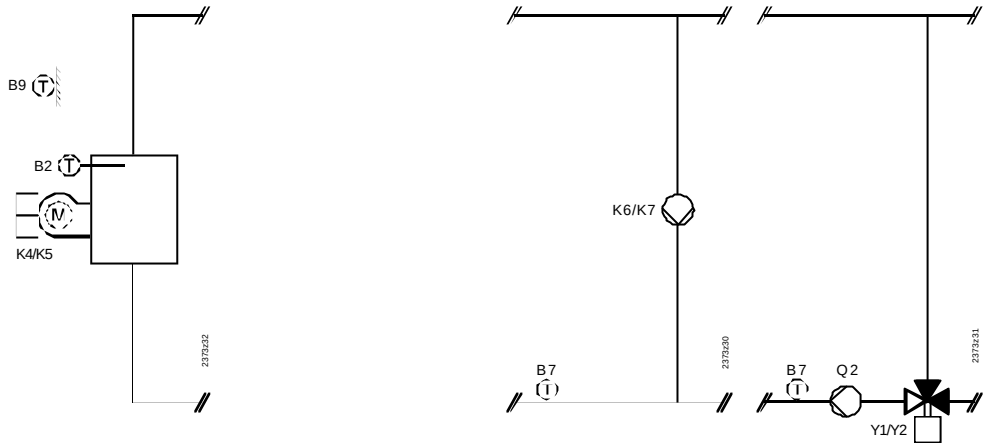
7.2.1 PPS-BMU

B1
Without maintained boiler return temperature



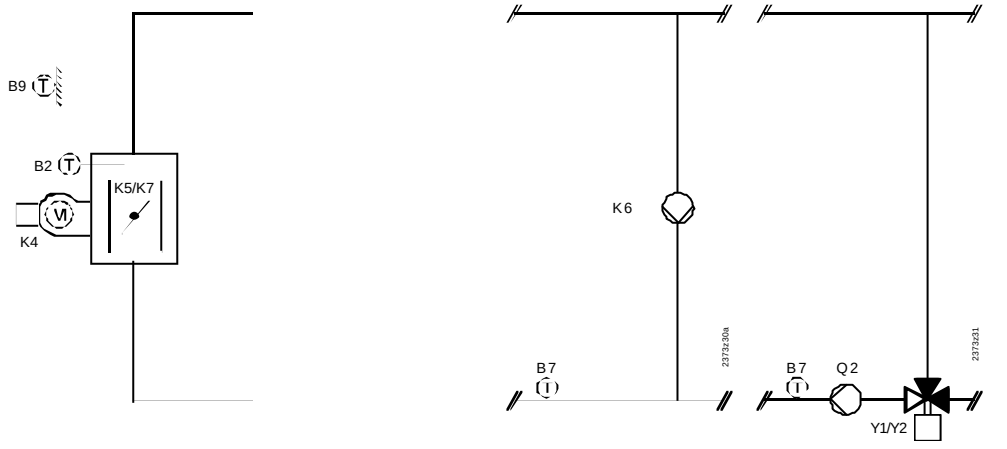
7.2.2 Multi-stage burner

	C1 *Without maintained boiler return temperature*	C2 *Maintained boiler return temperature with bypass pump*	C3 *Maintained boiler return temperature with mixing valve*



7.2.3 Modulating burner

	D1 *Without maintained boiler return temperature*	D2 *Maintained boiler return temperature with bypass pump*	D3 *Maintained boiler return temperature with mixing valve*

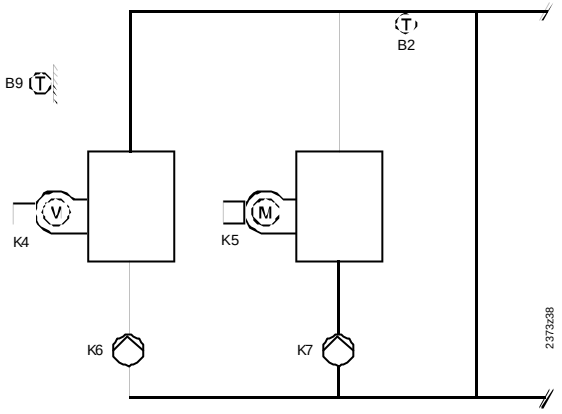


Important

RC members for suppression of interference and for protection of relay contacts K5 and K7 must be fitted externally.

7.2.4 Cascade 2 x 1

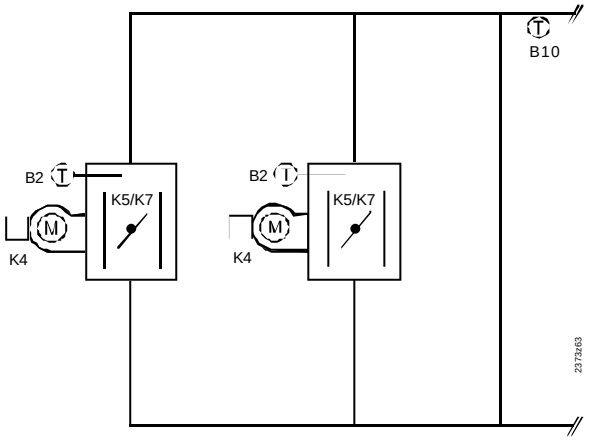
E1
Without maintained boiler return temperature



7.2.5 Cascade slave

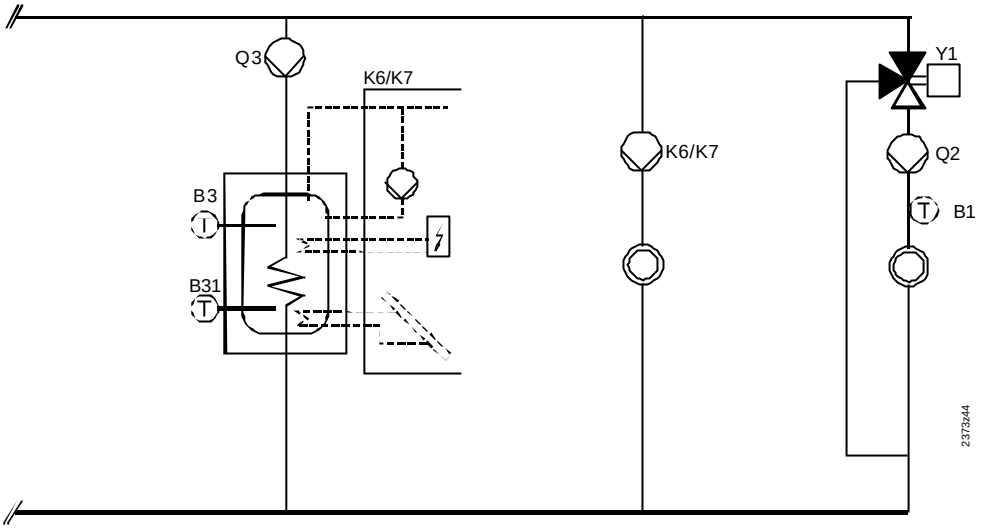
Example:

RVA63.242	RVA63.242	RVA43.222	
0	0	0	Segment
2	3	1	Address



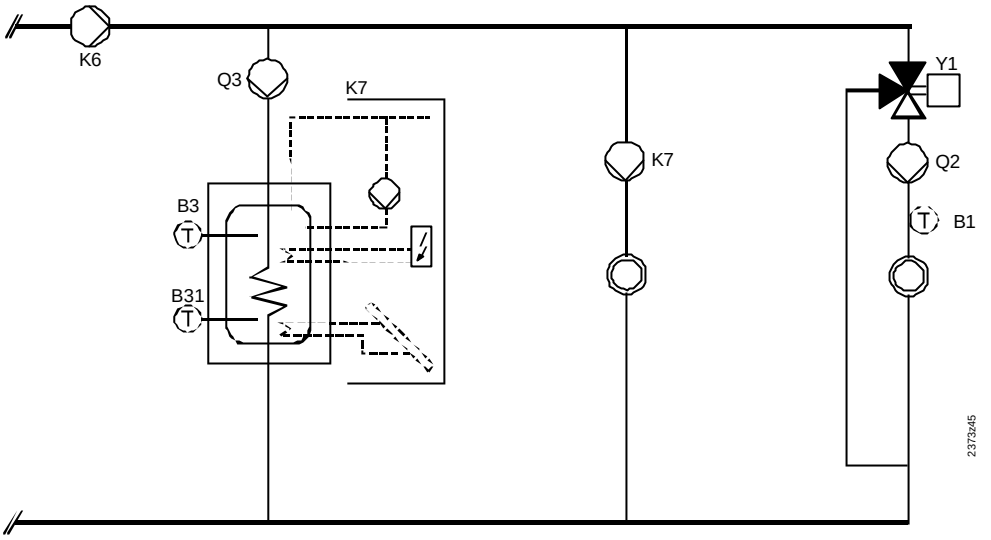
7.3 Plant types

7.3.1 Without system pump



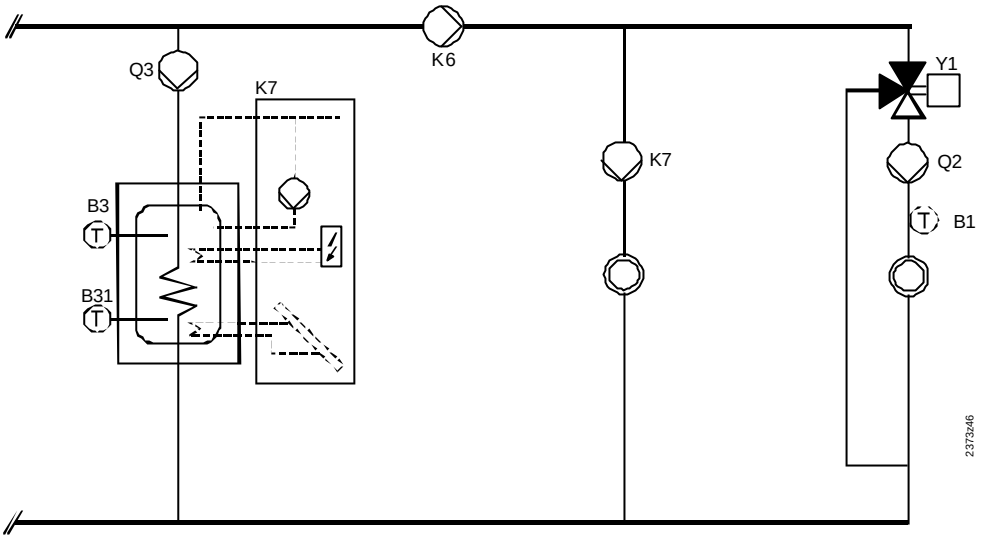
Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
1					41	x		
1					38	x	x	
1					12		x	
1					37	x		x
1					11			x
1					122	x	2	
1					123		2	
1					124	x	x	x
1					125		x	x
	1	1	1		4	x		
	1	1	1		5 [c)]			
	1	1	1		21	x	x	x
	1	1	1		22 [c)]		x	x
	1	1	1		23	x	2	
	1	1	1		24 [c)]		2	
	1	1	1		1	x	x	
	1	1	1		2 [c)]		x	
	1	1	1		15	x		x
	1	1	1		16 [c)]			x
		2	2		46	x		
		2	2		47			
		2	2		13	x	x	
		2	2		14		x	
		2	2		17	x		x
		2	2		18			x
		2			83	x	2	
		2			84		2	
		2			85	x	x	x
		2			86		x	x
		3	3		87 [b)]	x		
		3	3		88 [b)]			
		3	3		89	x	x	
		3	3		90		x	

7.3.2 System pump before d.h.w.



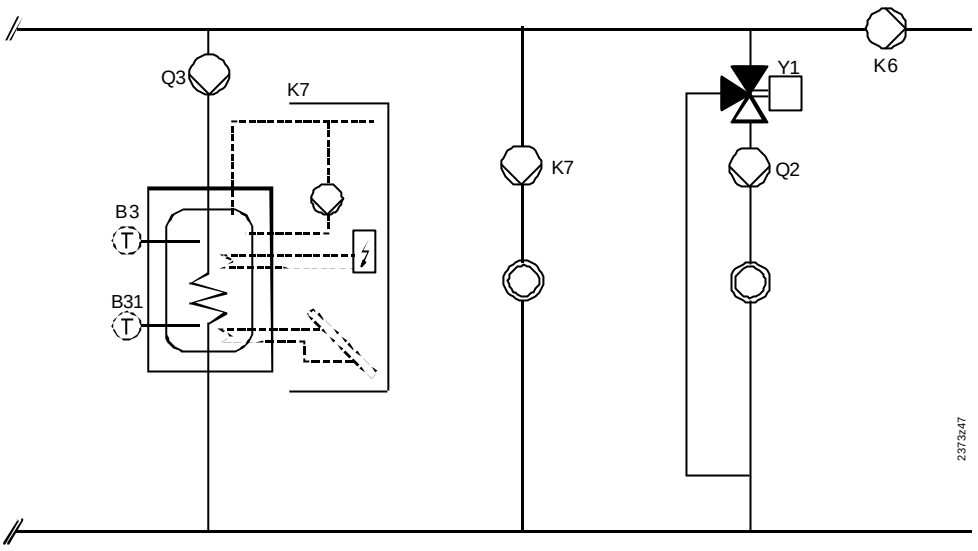
Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
1					128	x		
1					129			
1					130	x	x	
1					131		x	
1					132	x		x
1					133			x
1					134	x	2	
1					135		2	
1					136	x	x	x
1					137		x	x
	1	1	1		45 [a)]	x		
	1	1	1		7 [a) c)]			
	1	1	1		42 [a)]	x	x	
	1	1	1		43 [a) c)]		x	
	1	1	1		19 [a)]	x		x
	1	1	1		20 [a) c)]			x
	1	1			68 [a)]	x	2	
	1	1			69 [a) c)]		2	
	1	1			70 [a)]	x	x	x
	1	1			71 [a) c)]		x	x
		2			91 [a)]	x		
		2			92 [a)]			
		2			93 [a)]	x	x	
		2			94 [a)]		x	
		2			95 [a)]	x		x
		2			96 [a)]			x
		3	3		97 [b)]	x		
		3	3		98 [b)]			
		3			99	x	x	
		3			100		x	

7.3.3 System pump after d.h.w.



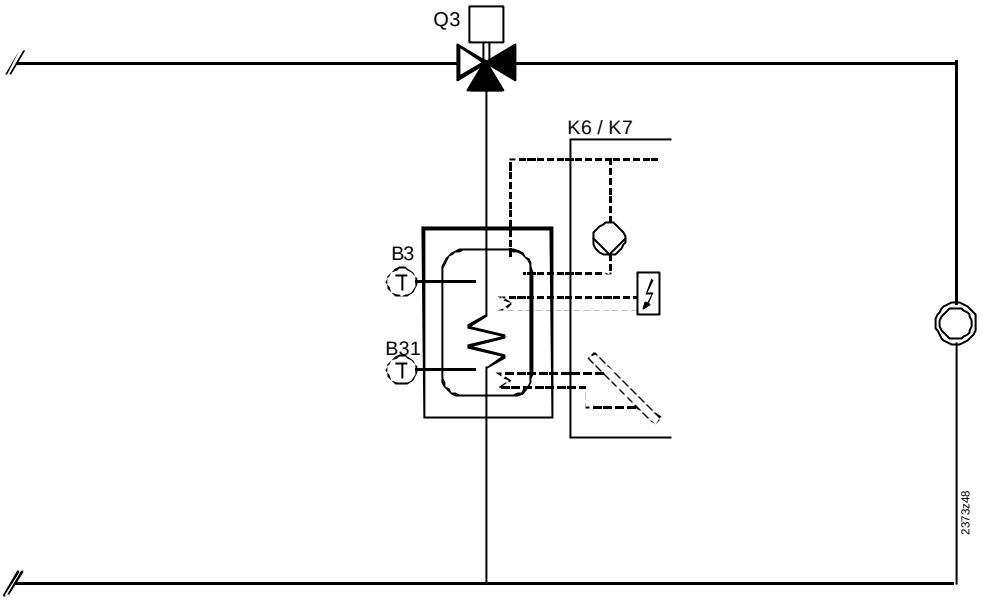
Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
1					138	x		
1					129			
1					139	x	x	
1					131		x	
1					140	x		x
1					133			x
1					141	x	2	
1					135		2	
1					142	x	x	x
1					137		x	x
	1	1	1		6	x		
	1	1	1		7 [c)]			
	1	1	1		44	x	x	
	1	1	1		43 [c)]		x	
	1	1	1		72	x		x
	1	1	1		20 [c)]			x
	1	1			73	x	2	
	1	1			69 [c)]		2	
	1	1			74	x	x	x
	1	1			71 [c)]		x	x
		2			101	x		
		2			92			
		2			102	x	x	
		2			94		x	
		2			103	x		x
		2			96			x
		3	3		104 [b)]	x		
		3	3		98 [b)]			
		3			105	x	x	
		3			100		x	

7.3.4 System pump with external heat demand



Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
1					138	x		
1					129			
1					143	x	x	
1					144		x	
1					145	x		x
1					146			x
1					147	x	2	
1					148		2	
1					149	x	x	x
1					150		x	x
	1	1	1		6	x		
	1	1	1		7 [c)]			
	1	1	1		75	x	x	
	1	1	1		76 [c)]		x	
	1	1	1		77	x		x
	1	1	1		78 [c)]			x
	1	1			79	x	2	
	1	1			80 [c)]		2	
	1	1			81	x	x	x
	1	1			82 [c)]		x	x
		2			101	x		
		2			92			
		2			106	x	x	
		2			107		x	
		2			108	x		x
		2			109			x
		3	3		104 [b)]	x		
		3	3		98 [b)]			
		3			110	x	x	
		3			111		x	

7.3.5 D.h.w. diverting valve



Standalone

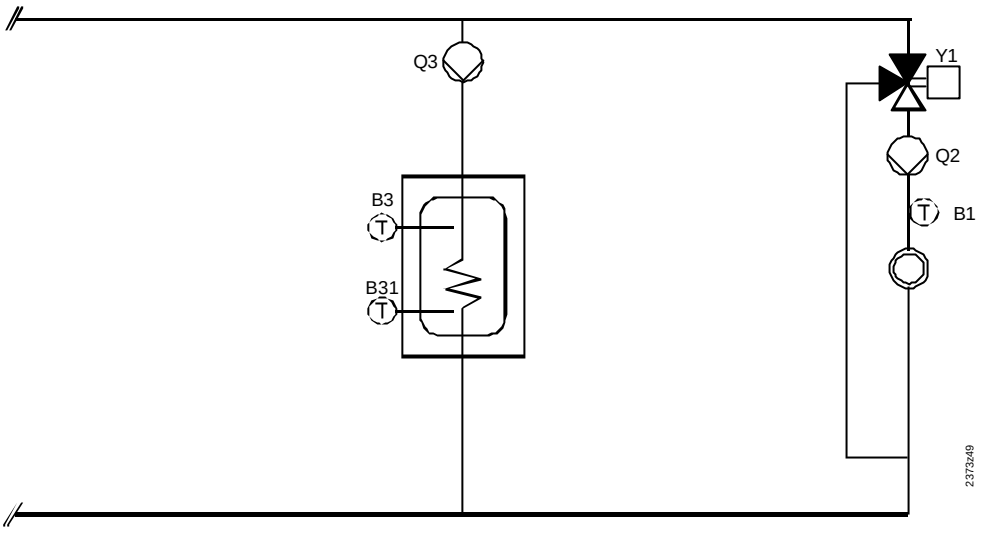
Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
		1			3	x	x	

- With a multi-stage heat source, Q2 becomes the boiler pump

Cascade slave with separate d.h.w. circuit

Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
		1	1		10	x		
		1	1		118	x	x	
		1	1		119	x		x
		1			120	x	2	
		1			121	x	x	x

7.3.6 Cascade 2 x 1



Heat source variant					*Plant type*	*D.h.w.*	*PC*	*MC*
A	B	C	D	E				
				1	112	x		
				1	113			
				1	114	x	x	
				1	115		x	
				1	116	x		x
				1	117			x

7.4 Supplementary information on the plant types listed

a) With these applications, setting “System pump before d.h.w.“ can be substituted by setting “Boiler pump“.

b) If, due to the applicatin, multi-functional outputs K6 and K7 cannot be parameterized as HC2 pump, the controller can generate a weather-compensated flow temperatue. For heating circuit slope HC1 (line 30), a valid value must be set.
This function is required in the case the consumer side does not generate heat demand signals, that is, no LPB-compatible devices are connected and it is not possible to use input H1 or H2.

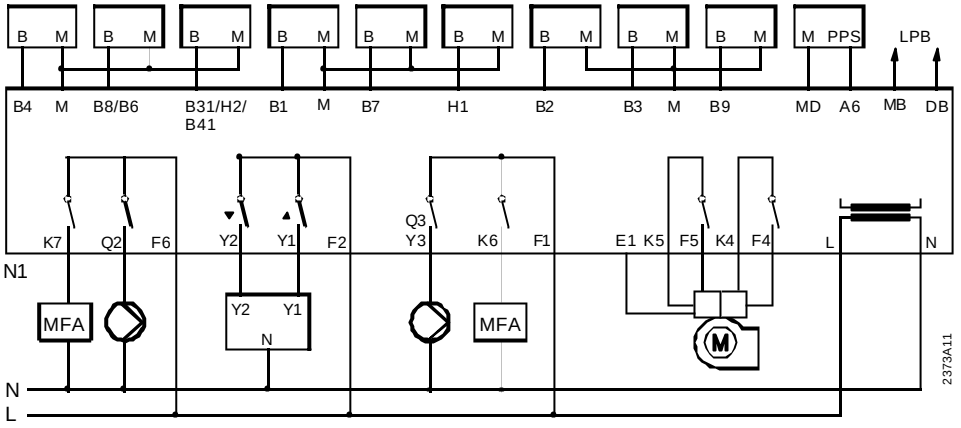
c) In the case of BMU applications (B1) with d.h.w. heating by the BMU, this plant type is also shown.
With this application, setting “D.h.w. priority” of the RVA63 is not active.

7.5 Legend to plant types

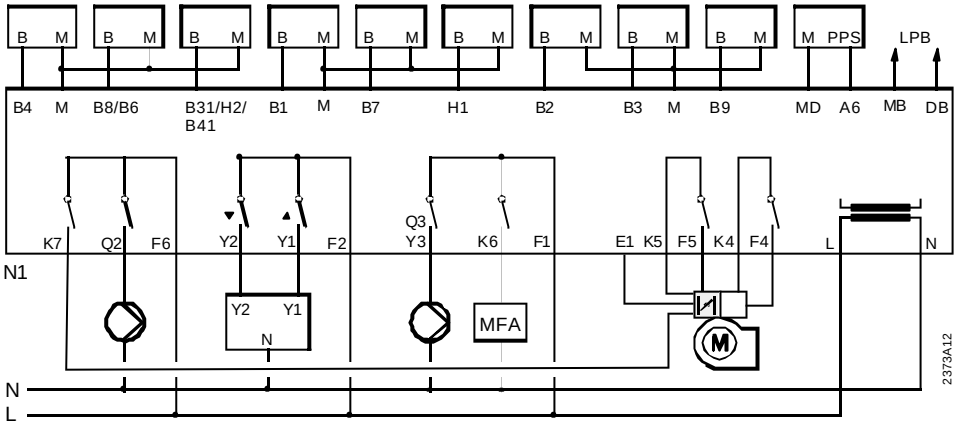
Low voltage side	A6	Room unit bus (PPS)
	B1	Flow sensor mixing valve
	B2	Boiler sensor
	B3	D.h.w. sensor / control thermostat
	B31/H2	D.h.w. sensor 2 / contact H2 / buffer storage tank sensor 2
	B4	Buffer storage tank sensor
	B7	Return sensor
	B8/B6	Flue gas sensor / collector sensor
	B9	Outside sensor
	DB	Data bus (LPB)
	H1	Changeover contact
	MB	Ground bus (LPB)
	MD	Ground room unit bus (PPS)
	M	Ground sensors
Mains voltage side	E1	Hours run burner stage 1
	F1	Phases K6 and Q3/Y3
	F2	Phase Y1 and Y2
	F4	Phase burner stage 1
	F5	Phase burner stage 2
	F6	Phases Q2 and K7
	K4	Burner stage 1
	K5	Burner stage 2
	K6	Multi-functional output
	K7	Multi-functional output
	L	Live AC 230 V (mains connection)
	N	Neutral (mains connection)
	Q2	Heating circuit pump
	Q3/Y3	D.h.w. charging pump / d.h.w. diverting valve
	Y1	Mixing valve OPEN
	Y2	Mixing valve CLOSED

7.6 Electrical connections

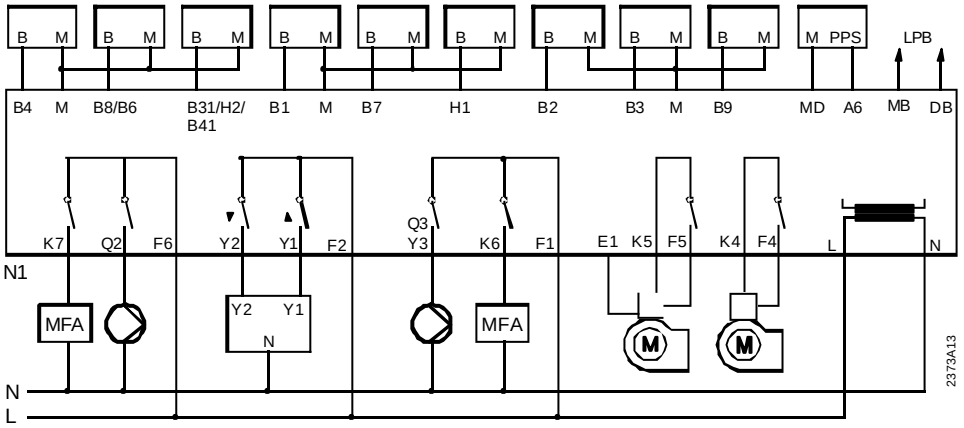
Multi-stage burners



Modulating burner

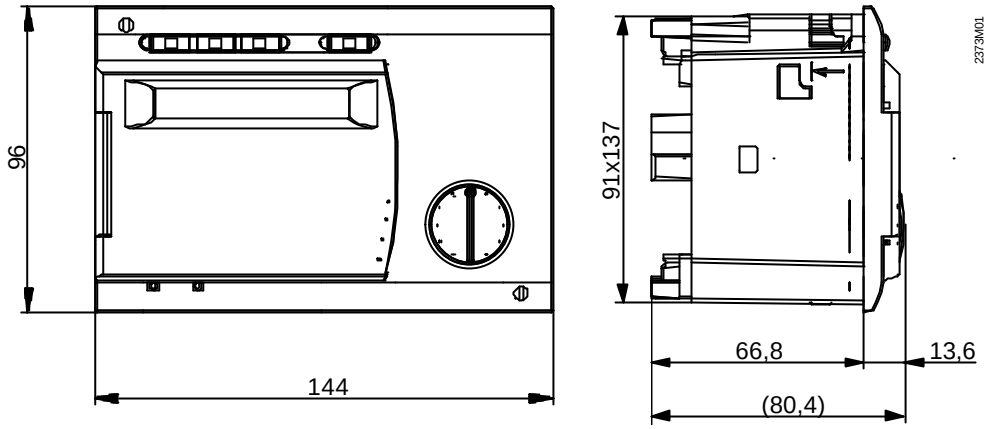


2 x single-stage cascade

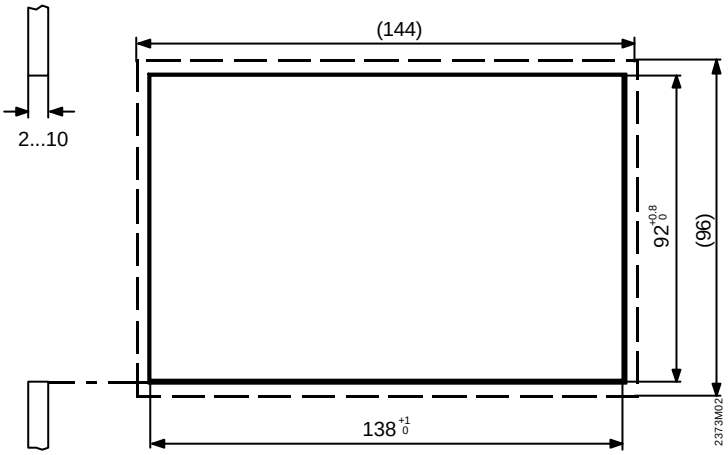


8 Dimensions

Device



8.1.1 Panel cut-out



8.1.2 Combination of controllers

When arranging a number of controllers side by side, the total length of the panel cut-out must be calculated as follows:
The sum of all nominal lengths minus the corrective dimensions for the intermediate space (e) gives the total length of the panel cut-out.

Example

Combination	*e*	*Calculation*	*Panel cut-out*
96 plus 96	4	96+96-4	188 mm
144 plus 96	5	96+144-5	235 mm
144 plus 144	6	144+144-6	282 mm

9 Technical data

Power supply	Nominal voltage	AC 230 V (±10 %)
	Nominal frequency	50 Hz (±6 %)
	Power consumption	max. 7 VA
Requirements	Safety class (if adequately mounted)	II to EN 60730
	Degree of protection (if adequately mounted)	IP 40 to EN 60529
	Electromagnetic immunity	EN 50082-2
	Electromagnetic emissions	EN 50081-1
Climatic conditions	Operation	
	To IEC 721-3-3	Class 3K5
	Temperature	0..0.50°C
	Storage	
	To IEC 721-3-1	Class 1K3
	Temperature	-25..0.70 °C
	Transport	
	To IEC 721-3-2	Class 2K3
	Temperature	-25..0.70 °C
Mechanical conditions:	Operation to IEC 721-3-3	Class 3M2
	Storage to IEC 721-3-1	Class 1M2
	Transport to IEC 721-3-2	Class 2M2
Mode of operation	To EN 60730 par. 11.4 11.4	1b
Output relays	Voltage range	AC 24...230 V
	Nominal current	5 mA...2 A (cos phi > 0.6)
	Switch-on peak	max. 10 A, max. 1 s
	Anschlussabsicherung	max. 10A
Bus extension	PPS	
	Cable (telephone wire)	2 x 0.5 mm^2 (interchangeable)
	Permissible cable length	50 m
	LPB	
	Cable	(2-wire, **not** interchangeable)
	Permissible cable length	max. 1.4 km
	Node spacing	500 m (with copper cable 1.5 mm^2)
	Bus loading number (E)	3
Perm. sensor cable lengths	0.6 mm dia.	max. 20 m
	1.0 mm^2	max. 80 m
	1.5 mm^2	max. 120 m
Inputs	Outside sensor	NTC (QAC31), Ni 1000 (QAC21)
	D.h.w. sensor	Ni 1000 Ω at 0 °C (QAZ21)
	Flow sensor	Ni 1000 Ω at 0 °C (QAD21)
	Remote telephone switch, auxiliary switches (H1, H2), and d.h.w. control thermostat	suitable for low voltage (gold-plated contacts)
Miscellaneous	Weight of controller	approx. 0.6 kg
	Clock reserve	min. 12 h

Index

Korrigenda

§	Side:	Location:	Changes:
1	xx	Complete document	Due to a comprehensive revision, a number of new functions have been added and a large number of existing functions have been modified and adapted. It is therefore not possible to give a detailed description of all the changes made.

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