

en Installation Instructions

RVD120 RVD140



Keep these instructions with the controller!

Installation

Place of installation

- In a dry room, e.g. the heat exchanger room
- Mounting choices:
 - In a compact station
 - In a control panel (in the front, on the inner wall, or on a top hat rail)
 - In the sloping front of a control desk
- Permissible ambient temperature: 0...50 °C

Electrical installation

- Local regulations for electrical installations must be complied with
- Only qualified staff may carry out electrical installations
- Cable tension relief must be ensured
- Cable glands made of plastic must be used
- The cables from the controller to the actuators and pumps carry mains voltage
- The cables to the sensors may not be run parallel to mains carrying cable (safety class II to EN 60730!)
- If a device is defective or damaged, immediately disconnect it from power and replace it

Permissible cable lengths

 For all sensors: 	
Copper cable 0.6 mm dia.	20 m max.
Copper cable 1.0 mm ²	80 m max.
Copper cable 1.5 mm ²	120 m max.
For room units:	
Copper cable 0.25 mm ²	25 m max.
Copper cable from 0.5 mm ²	50 m max.
 For the data bus 	

 For the data bus Copper cable ≥0.25 mm² 1000 m max. (2-wire, twisted pairs, shielded) For details, refer to the modbus specification

Mounting and wiring the base

Wall mounting

- 1. Separate base from the controller
- 2. Hold base against the wall. Marking "TOP" must be at the top!
- 3. Mark fixing holes on the wall
- 4. Drill holes
- If required, knock out holes on the base for cable glands
- 6. Screw base to the wall
- 7. Wire up base

Rail mounting

- 1. Fit top hat rail
- 2. Separate base from the controller
- 3. If required, knock out holes on the base for cable glands
- 4. Fit base to the rail. Marking "TOP" must be at the top!
- 5. If required, secure base (depending on the type of rail
- used) 6. Wire up base

Flush panel mounting

- Maximum thickness: 3 mm
- Panel cutout required: 138 × 92 mm
- 1. Separate base from the controller
- 2. If required, knock out holes on the base for cable glands
- 3. Insert base in the panel cutout from behind until stop is reached. Marking "TOP" must be at the top!
- 4. Push lateral tongues behind the front panel (refer to illustration below)



Place tongues on both sides correctly – they may not be located inside the cutout!

5. Wire up base. Make sure the cable lengths are such that there is sufficient space to open the control panel door

Securing the controller to the base

1. Ensure correct position and location of levers by turning the fixing screws (refer to illustration on the lateral wall of the unit)



- Insert controller in the base until stop is reached. Marking "TOP" must be at the top!
- 3. Tighten fixing screws alternately

Commissioning

Preparatory checks

- 1. DO NOT switch on power supply yet
- 2. Check wiring according to the plant connection diagram
- 3. Check each motorized valve: see if
 - it is correctly installed (observe direction of flow indicated on the valve body)
 - the manual lever is disengaged

4. Note with underfloor and ceiling heating systems!

The limit thermostat must be set to the correct value. During the functional test, the flow temperature may not exceed the maximum permissible level (usually 55 °C). If it does, proceed immediately as follows:

- Either close the valve manually, or
- Switch off the pump, or
- Close the pump isolating valve
- Switch on power supply. The display must show the time of day. If not, the reason may be one of the following:
 - No mains voltage present
 - Main fuse defective
 - Mains isolator or main switch not set to ON
- If one of the operating mode buttons flashes, the room unit overrides the controller. Select operating mode ⊕ on the room unit

General information about operation

- Setting elements for commissioning:
 - Nominal room temperature setpoint: with the setting knob
 - Other variables: in the display, where one operating line is assigned to each setting
- Buttons for selecting and readjusting the values:
 - To select the next operating line below
 - To select the next operating line above
 - To decrease the displayed value
 - $\stackrel{\bullet}{
 m D}$ To increase the displayed value
- Adopting a setting value:

The setting value is adopted by selecting the next operating line (or by pressing one of the operating mode buttons)

- Block jump function: To select a single operating line quickly, two button combinations can be used:

Keep \bigtriangledown depressed and press $\stackrel{\bullet}{\rhd}$ to select the next line block above

Keep \bigtriangledown depressed and press $\overline{\lhd}$ to select the next line block below

• The display lighting turns on for a period after pushing a button

Setting procedure

- P Enter all adjusted values in the tables provided!
- Make settings on the "End-user" level (operating lines 1...49)
- 2. Configure plant type on operating lines 51...55
- Make the relevant settings in the parameter list below. All functions and operating lines configured for the type of plant are activated and adjustable. All operating lines that are not required are locked.
- 4. Make settings on the "Heating engineer's" level (operating lines 56...222).
- 5. Make settings on the "Locking functions" level (operating lines 226...251)

Commissioning and functional check

- Specific operating lines for the functional check: 141 = sensor test
 - 142 = relay test
- 149 = reset of service settings
- If *Er* (Error) appears in the display: interrogate operating line 50 to pinpoint error
- If no line selection button has been pressed for eight minutes, or if one of the operating mode buttons is pressed (controller in the non-operated status), setting buttons ⊂ and ⁺⊂ can be used to prompt all actual values and the time of day. The actual values are presented like those on operating line 141.

Setting elements



- 1 Operating mode buttons
- 2 Display (LCD)
- 3 Buttons for selecting operating lines
- Button for manual operation ON / OFF
 Button for d.h.w. heating ON / OFF
- 5 Button for d.h.w. heating ON / OFF6 Buttons for making readjustments of values
- Setting knob for nominal room temperature setpoint

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Connection diagrams

Low voltage side



electric immersion heater / collector pump

Y7

Actuator of changeover valve / mixing valve

Parameter list

Settings on the "End-user" level

Press \bigtriangledown or \bigtriangleup to activate the "End-user" level

Line	Function, display	Factory setting (Range)	Setting	Explanations, notes and tips
1	Current nominal room tem- perature setpoint	Display function		Including room unit
2	Reduced room temperature setpoint	14 °C (variable*)	°C	* From frost protection setpoint to nominal setpoint
3	Frost protection / holiday mode setpoint	8 °C (variable*)	°C	* From 8 °C to reduced setpoint Holiday setting only with room unit
5	Heating curve slope	1.5 (0.254.0)		
6	Weekday, for entering the heating program	Current weekday (17 / 1-7)		1 = Monday 2 = Tuesday etc. 1-7 = entire week
7	Heating period 1 start	6:00 (: / 00:0024:00)		Switching program for heating circuit : = period inactive
8	Heating period 1 end	22:00 (: / 00:0024:00)		Switching program for heating circuit : = period inactive
9	Heating period 2 start	: (: / 00:0024:00)		Switching program for heating circuit : = period inactive
10	Heating period 2 end	: (: / 00:0024:00)		Switching program for heating circuit : = period inactive
11	Heating period 3 start	: (: / 00:0024:00)		Switching program for heating circuit : = period inactive
12	Heating period 3 end	: (: / 00:0024:00)		Switching program for heating circuit : = period inactive
13	Time of day	(00:0023:59)		
14	Weekday	Display function	on	1 = Monday 2 = Tuesday etc.
15	Date	(01.0131.12)		Day.Month
16	Year	(20092099)		
17	Weekday, for entering the d.h.w. program	Current weekday (17 / 1-7)		1 = Monday 2 = Tuesday etc. 1-7 = entire week
18	Release period 1 start	6:00 (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
19	Release period 1 end	22:00 (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
20	Release period 2 start	: (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
21	Release period 2 end	: (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
22	Release period 3 start	: (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
23	Release period 3 end	: (: / 00:0024:00)		Switching program for d.h.w. : = period inactive
24	Room temperature	Display function		
25	Outside temperature	Display function		Press
26	D.h.w. temperature	Display function		
27	Flow temperature heating circuit	Display functio	n	Keep
41	Setpoint d.h.w. temperature NORMAL	55 °C (variable)	°C	
42	Setpoint d.h.w. temperature REDUCED	40 °C (variable*)	°C	* From 8 °C to normal d.h.w. setpoint

49 Reset of operating 212, 1723 and	lines d 41, 42	Press ⊂ and ^t → until display changes: 0 (flashing) = normal status 1 = reset to factory settings completed
50 Faults	Display fun	10 =fault outside sensor30 =fault flow sensor40 =fault return sensor (primary side)42 =fault return sensor (secondary side)50 =fault d.h.w sensor / storage tank sensor 152 =fault storage tank sensor 261 =fault room unit62 =connected unit shows wrong identification73 =fault secondary pressure sensor86 =short-circuit on room unit bus (PPS)170 =fault primary pressure sensor195 =maximum refill period per charge reached196 =maximum refill period per week reached

Settings on the "Heating engineer's" level

Press \bigtriangledown and \bigtriangleup simultaneously for 3 seconds, thus activating the "Heating engineer's" level for configuring the plant type and for setting the plant-related variables. The "End-user" level remains activated.

Configuration of plant

The required plant type must be configured on operating lines 51...55. This activates all functions and operating lines required for the particular type of plant, which can then be set.

51	Plant type	$(1 \ 3 \text{ or } 1 \ 8)$		RVD120 : range 13		
		(1		For	the diagrams, refe	er to the following section
52	Space heating present	1		0 = no space heating present		g present
	Only with plant types 28	(0 / 1)		1 =	space heating pr	resent
53	Use of universal sensor	1	5	0 =	secondary return	n sensor
	Only with plant types 4, 6, 7	(0 / 1)		1 =	d.h.w. sensor	
54	Flow switch present / circulating pump present (heat	0 (03)			Flow switch present	Circulating pump present
	losses are compensated)			0 =	no	insignificant (heat losses fully compen- sated [100 %])
				1 =	yes	no
\mathbf{C}	90.0			2 =	yes	yes, heat losses partly compensated (80 %)
				3 =	yes	yes, heat losses fully compensated (100 %)
55	Return flow of circulating pump	0 (02)		0 = 1 = 2 =	d.h.w. storage ta heat exchanger, pensated (80 %) heat exchanger, pensated (100 %	nk / no circulating pump heat losses partly com- heat losses fully com- b)
56	Periodic pump run (pump kick)	1 (0 / 1)		0 = 1 =	no periodic pump weekly pump rur	o run n enabled
57	Winter- / summertime changeover	25.03 (01.0131.12)		Sett	ting: the earliest p	oossible changeover date
58	Summer- / wintertime changeover	25.10 (01.0131.12)		Sett	ting: the earliest p	oossible changeover date

Plant types



- A6 Room unit
- B1 Flow sensor (controlled variable)
- В3 D.h.w. sensor / storage tank sensor 1 B32
- Storage tank sensor 2 (only with RVD140) Collector sensor (only with RVD140) B6
- B7 Primary return sensor
- B71 Universal sensor
- В9 Outside sensor
- H5 Flow switch
- Multifunctional output K6 or K7 (only with RVD140) Кx
- Heating circuit pump M1
- M3 D.h.w. charging pump
- M7 Circulating pump (only with RVD140)
- Μ External circulating pump
- N1 Controller
- U1 Secondary pressure sensor (only with RVD140)
- U2 Primary pressure sensor (only with RVD140)
- Y1 Two-port valve in the primary return
- Y5 Two-port valve / mixing valve
- Changeover valve Y7

Heating slope chart



Function blocks

Block "Space heating"

61	Heating limit (ECO)	–3 K		= function deactivated
		(/ –10…+10)	K	
62	Building structure	1		0 = heavy
		(0 / 1)		1 = light
63	Quick setback without room	1		0 = no quick setback
	sensor	(015)	<u></u>	1 = min. setback time
				15 = max. setback time
69	Heat gains	0 K		Setting in K room temperature
		(-2+4)	K	
70	Room temperature influence	10		Function can be provided only with room
	(gain factor)	(020)		sensor
71	Parallel displacement of heat-	0.0 K		Setting in K room temperature
	ing curve	(-4.5+4.5)	K	
72	Overrun time heating circuit	4 min		0 = no pump overrun
	pump	(040)	min	
73	Frost protection for the plant	1		0 = no frost protection for the plant
		(0 / 1)		1 = frost protection for the plant
74	Max. limitation of room tem-	K		Limit value: nominal setpoint plus setting on
	perature	(/ 0.54)	K	this line
				= function deactivated

Block "Actuator heat exchanger"

81	Actuator Y1 running time com-	120 s		
	mon flow	(10873)	S	
82	P-band common flow control	35 K		
		(1100)	K	
83	Integral action time common	120 s		
	flow control	(10873)	S	
85	Max. limitation of common	°C	2	* Min. value on operating line 86
	flow temperature	(/ variable*140)	°C	= no limitation
86	Min. limitation of common flow	°C	\leq	* Max. value on operating line 85
	temperature	(/ 8variable*)	°C	= no limitation

Block "Actuator heating circuit"

91	Actuator running time heating circuit	120 s (10…873)	S	
92	P-band heating circuit control	35 K (1100)	К	7900
93	Integral action time heating circuit control	120 s (10…873)	S	
94	Setpoint boost for control of the common flow (B1 and Y1)	10 K (050)	K	

95	Max. limitation of flow	°C		* Min. value on operating line 96
1	temperature heating circuit	(/ variable*140)	°C	= no limitation
96	Min. limitation of flow tempera-	°C		* Max. value on operating line 95
	ture heating circuit	(/ 8variable*)	°C	= no limitation

Block "D.h.w heating"

98	D.h.w. temperature sensor	0 (02)		0 = a 1 = o 2 = tw Plant setting	utomatically, withon ne sensor with sol vo sensors with so types without sola g = 0	ut solar d.h.w. heating ar d.h.w. heating lar d.h.w heating r d.h.w. heating:
101	Release of d.h.w. heating	0 (03)		0 = pe 1 = ac 2 = ac 3 = ac fo	ermanently (24 h/c ccording to the d.f ccording to the he ccording to the he prward shift (opera	day) n.w. program ating program ating program with ting line 109)
102	Release of circulating pump	1 (02)		0 = pe 1 = ac 2 = ac	ermanently (24 h/c ccording to the d.h ccording to the he	day) w. program ating program
103	D.h.w. switching differential	5 K (120)	K			5
104	Legionella function	6 (/ 17, 1-7)		1 = 2 = 1-7 = =	Monday Tuesday etc. entire week no legionella fund	tion
105	Setpoint legionella function	65 °C (60…95)	°C			
106	D.h.w. priority	4 (04)		l	D.h.w. priority	Flow temp. setpoint according to:
				0 = a	absolute priority	d.h.w.
				1 = s	shifting priority	d.h.w.
				2 = s	shifting priority	max. selection
				3 = r	none (parallel)	d.h.w.
			1905/	4 = r	none (parallel)	max. selection
107	Overrun time charging pump M3	4 min (040)	min	Plant	type 3: changeove	er valve Y7
108	Overrun time charging pump (M7 in the secondary d.h.w. circuit, after M3)	4 min (040)	min	\leq		
109	Max. time d.h.w. heating	150 min (/ 5…250)	min	= fi	unction deactivate	d

Block "D.h.w. actuator 1"

Block	"D.h.w. actuator 1"				
111	Opening time actuator Y5 d.h.w. circuit	35 s (10…873)	S		
112	Closing time actuator Y5 d.h.w. circuit	35 s (10…873)	S		
113	P-band d.h.w. control	35 K (1…100)	K		
114	Integral action time d.h.w. control	35 s (10873)	S		
115	Derivative action time d.h.w. control	16 s (0255)	S		
116	Setpoint boost with d.h.w. heating	16 K (–5…50)	K		
117	Max. d.h.w. temperature setpoint	65 °C (20…95)	°C		
119	Reduced d.h.w. setpoint for storage tank sensor at the bottom	5 K (020)	К	Only when two sensors exist	

Block "D.h.w. actuator 2"

121	Actuator running time, mixing valve Y7 in the secondary d.h.w. circuit	35 s (10…873)	S	
122	P-band d.h.w. control	35 K (1…100)	K	
123	Integral action time d.h.w. control	35 s (10…873)	S	

Block "D.h.w. load limit"

124	Load limit when flow switch is	25 %		Setting in % of the current max. stroke
	activated	(060)	%	

Block "Additional legionella functions"

126	Time for charging	:		
		(: / 00:0023:50)		
127	Dwelling time at legionella	min		
	setpoint	(/ 10360)	min	
128	Circulating pump operation	1		0 = no
	during legionella function	(0 / 1)		1 = yes

Block "Multifunctional relays"

129	Function multifunctional relay	0		0 = no function
	K6	(03)	\sim	1 = refill function
				2 = electric immersion heater
				3 = collector pump
				No prevention of wrong configurations!
130	Function multifunctional relay	0		0 = no function
	K7	(03)		1 = refill function
				2 = electric immersion heater
				3 = collector pump
				No prevention of wrong configurations!

Block "Test and display"

141	Sensor test	0	0 = outside sensor (B9)
	= open circuit or no	(0 9)	1 = flow sensor (B1)
	sensor	(00)	2 = d.h.w. sensor / storage tank sensor 1 (B3)
	ooo = short-circuit		3 = room unit sensor (A6)
			4 = primary return sensor (B7)
			5 = universal sensor (B71)
			6 = storage tank sensor 2 (B32)
			7 = collector sensor (B6)
			8 = secondary pressure sensor (U1)
			9 = primary pressure sensor (U2)
142	Relay test	0	0 = normal operation (no test)
		(010)	1 = all relays de-energized
		, , , , , , , , , , , , , , , , , , ,	2 = relay Y1 energized
			3 = relay Y2 energized
			4 = relay Q1 energized
<u></u>			5 = relay Q3/Y7 energized
1			6 = relay Y5 energized
			7 = relay Y6 energized
			8 = relay Q7/Y8 energized
			9 = relay K6 energized
			10=relay K7 energized
			To terminate the relay test:
			 Select another operating line
			 Press an operating mode button
			 Automatically after 8 minutes
			Note:
			With plant type 5, perform relay test only when
			main valve is closed!
			Recommendation:
			Always close main valve when making the
			relay test

143	Display of active limitations	Display function	Maximum limitation [: 1 = primary return temperature 2 = common flow temperature 3 = secondary flow temperature heating circuit 4 = temperature differential 5 = room temperature 6 = storage tank charging temperature 7 = storage tank maximum temperature 8 = evaporation temperature heat carrier 9 = collector overtemperature heat carrier 9 = collector overtemperature protection Minimum limitation]: 11 = reduced room temperature setpoint 12 = common flow temperature 13 = secondary flow temperature heating circuit
146	Status at terminal H5	Display function	H5 0 = H5 contact open H5 1 = H5 contact closed
149	Reset of operating lines 5696, 101128 and 201221		Press
150	Software version	Display function	

Block "Modbus parameter"

171	Linit number			Modbus address
17.1	Onit number			
		(/ 1247)		= no data bus connection
172	Parity	0		0 = even
		(02)		1 = odd
				2 = none
173	Baud rate	3		0 = 1200 Baud
		(04)		1 = 2400 Baud
				2 = 4800 Baud
			P-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	3 = 9600 Baud
				4 = 19200 Baud
174	Modbus version	Display function		

Block "Solar d.h.w."

201	Temperature differential ON	8 K		Temperature differential between collector and
	solar	(040)	K	storage tank
202	Temperature differential OFF	4 K		Temperature differential between collector and
	solar	(040)	K	storage tank
203	Collector frost protection	°C		= no collector frost protection
		(/ –20…5)	°C	
204	Collector overtemperature	105 °C		= no collector overtemperature protection
	protection	(/ 30240)	°C	
205	Evaporation temperature heat	140 °C		= no collector pump protection
	carrier	(/ 60…240)	°C	
206	D.h.w. charging temperature	80 °C		
	maximum limitation	(8100)	°C	
207	D.h.w. storage tank tempera-	90 °C		No safety function
	ture maximum limitation	(8100)	°C	-
208	Collector start function	min/K		= function deactivated
	gradient	(/ 120)	min/K	

Block Refill function

211	Relative secondary minimum	bar		= refill function inactive
	pressure	(/ 0.510)	bar	
212	Refill locking time after shut	10 min		= function inactive
	down	(/ 102400)	min	
213	Minimum secondary under-	10 s		= function inactive
	pressure period	(/ 102400)	S	
214	Secondary switching differen-	0.3 bar		
	tial	(0.11.0)	bar	
215	Function primary pressure	0		0 = display function (see operating line 141)
	sensor U2	(0 / 1)		1 = monitoring
216	Maximum refill period per	S		= function inactive
	charge	(/ 10…2400)	S	
217	Maximum refill period per	min		= function inactive
	week	(/ 1…1440)	min	

218	Secondary pressure sensor U1: Pressure at DC 10 V	10 bar (0…100)	bar	Scaling for DC 10 V
219	Secondary pressure sensor U1: Pressure at DC 0 V	0 bar (–10…0)	bar	Scaling for DC 0 V
220	Primary pressure sensor U2: Pressure at DC 10 V	10 bar (0…100)	bar	Scaling for DC 10 V
221	Primary pressure sensor U2: Pressure at DC 0 V	0 bar (–10…0)	bar	Scaling for DC 0 V
222	Reset of the counters "Refill period per charge" and "Refill period per week"			Press ⊂ and [†] > until display changes: 0 (flashing) = normal status 1 = reset completed

Settings on the "Locking functions" level

To access the "Locking functions" level, proceed as follows:

- Press
 → and
 → simultaneously for 6 seconds
 The display shows Cod oooo
- 3. Enter the code (for information about the code, contact your Siemens Service centre)

The "End-user" and "Heating engineer's" levels remain activated.

Block "Locking functions"

226	Max. limitation of primary	°C		= no limitation
	return temperature, constant	(/ 0140)	°C	TRt
	value	(, , , , , , , , , , , , , , , , , , ,	_	OpL 226
227	Max. limitation of primary	7		
	return temperature, slope	(040)		N CopL 227
228	Max. limitation of primary	10 °C		Ê
	return temperature slope,	(-50+50)	°C	
	start of shifting limitation			-10
				OpL = operating line
				TRt = return temperature
229	Max. setpoint of return tem-	°C		Only with plant types 2, 3, 7 and 8
_	perature with d.h.w. heating	(/ 0140)	°C	= function deactivated
230	Integral action time	15 min		
	primary return temperature	(060)	min	
	limitations			
231	Max. limitation of temperature	°C		Only with plant types 1, 2, 3, 4, 6 and 7
	differential (between primary	(/ 0.550.0)	°C	= function deactivated
	return and secondary return			
	temperature)			
232	Max. setpoint of the return	°C		
	temperature during d.h.w.	(/ 0…140)	°C	
	heating on legionella setpoint			
236	Raising the reduced room	0		Effect of outside temperature on the reduced
	temperature setpoint	(010)		setpoint of the room temperature
007				0 = function deactivated
237	Daily forced d.h.w. heating at			Only with plant types 2, 3, 6, 7 and 8
	the start of release period 1	(0 / 1)		0 = function deactivated
000				1 = function activated
238	Idle heat function primary flow	min		Only with plant types 4 and 5
		(/ 3255)	min	= function deactivated
				If B7 is available, place sensor as indicated:
				\square
				5551 2551
251	Locking on the hardware side	0		0 = no locking
		(0 / 1)		1 = code can be entered only when terminals
				B71–M on the base are bridged

Keep Instructions

Enter the settings and keep these Installation Instructions in a safe place!

Dimensions



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[mm]