



Series D

## District Heating Controller RVD240

for 2 heating circuits and d.h.w., communicating

- Controller for use in autonomous or interconnected plants with a district heat connection
- Weather- or room-compensated control of 2 pump or mixing heating circuits or demand-dependent pre-control
- D.h.w. heating with a storage tank or instantaneous system (with idle heat function) or directly (off the heat exchanger)
- 14 preprogrammed plant types with automatic assignment of the functions required for each type of plant
- Direct analog setting of the room temperature setpoint, the other settings are digital and made via the operating lines
- Communication capability, via LPB or M-bus, connection facility for PC tool
- Operating voltage AC 230 V, controller for flush panel mounting measuring 96×144 mm, conforming to CE
- Optional remote operation via the room unit

### Use

- Plants:
  - Autonomous heating zones with 2 independent heating circuits and own d.h.w. heating, with connection to a district heat substation
  - Interconnected plants consisting of several heating zones each with 2 independent heating circuits and own d.h.w. heating (within the district heat substation)
- Buildings:
  - Residential and non-residential buildings with own district heat connection
- Space heating systems:
  - All types of common heating systems, such as radiator, convector, underfloor and ceiling heating systems, or radiant panels

## Functions

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### Heating circuit control

- Weather-compensated flow temperature control, mixing valve with a 3-position actuator
- Weather-compensated flow temperature control with room temperature influence, mixing valve with a 3-position actuator
- Room-compensated flow temperature control, mixing valve with a 3-position actuator
- Demand-dependent control of the common flow temperature

### D.h.w. control

- D.h.w. heating with storage tanks, with or without a mixing valve in the secondary circuit
- D.h.w. heating with instantaneous systems
- D.h.w. directly via the heat exchanger

### Other functions

- Optimum start / stop control
- Automatic heating limit (ECO function)
- Frost protection (for the building, plant and d.h.w.)
- Annual clock for annual holidays, with automatic summer-/wintertime changeover
- Independent time switch programs for space heating and d.h.w.
- Maximum limitation of the rate of flow temperature increase and flow alarm
- Analog (DC 0...10 V) and digital input
- PWM output for controlling a variable speed pump
- Communication via LPB (Local Process Bus)
- Communication via M-bus
- Pump kick and valve kick
- Idle heat function in the case of instantaneous d.h.w. heating via the parallel heat exchanger
- Flow switch with adjustable load limit, protection against tampering and adaptation to the seasons
- Maximum limitation of return temperature differential (DRT function)
- Minimum limitation of the flow rate for suppressing hydraulic creep
- Relay and sensor tests
- Remote operation via the room unit

## Ordering

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When ordering, please give type reference **RVD230** and the language code letter (-A or -C) for the Operating Instructions and the Installation Instructions in the requested language:

-A for English, French, Italian, German (e.g. RVD240-A for English)

-C for Danish, Finnish, Swedish, Polish (e.g. RVD240-C for Danish)

Sensors, room unit, actuators and valves must be ordered as separate items.

## Equipment combinations

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### Suitable sensors and room units

<i>Type of sensor</i>	<i>Type reference</i>	<i>Data sheet</i>
Outside sensor LG-Ni 1000	<b>QAC22</b>	N1811
Outside sensor NTC 575	<b>QAC32</b>	N1811
Strap-on temperature sensor	<b>QAD22</b>	N1801
Immersion temperature sensor	<b>QAE212...</b>	N1781
Other sensors with LG-Ni 1000 sensing element	<b>QA...</b>	–
Immersion temperature sensor Pt 500	Commercially available	–
Room unit	<b>QAW70</b>	N1637
Room unit	<b>QAW50</b>	N1635
Room unit (addressable)	<b>QAW50.03</b>	N1635
Room temperature sensor	<b>QAA10</b>	N1725
Digital time signal receiver (LPB)	<b>AUF77</b>	–

## Suitable actuators

All types of electric and electrohydraulic actuators made by SBT HVAC Products with the following features can be used:

- Operating voltage AC 24...230 V
- 3-position control

When used in connection with d.h.w. heating, the actuator running times and time constants of the temperature sensors must be taken into consideration. For detailed information, refer to Basic Documentation P2384.

For actuators and valves, refer to data sheets N4000...N4999.

## Suitable room units

Available are 2 types of room units and a room temperature sensor:



QAW70 room unit, with room temperature sensor, time switch, setpoint adjustment and readjustment of the room temperature setpoint (setting knob)



QAW50... room unit, with room temperature sensor, and readjustment of the room temperature setpoint (setting knob)



QAA10 room temperature sensor

If a room unit or room sensor is used in both heating circuits, one of the 2 units must be addressable. This means:

- The first room unit may be a QAA10, QAW50, QAW50.03 or QAW70
- The second room unit must then be a QAW50.03 or QAW70

## Technical design

### Functioning

The RVD240 controller has four types of heating circuits and 8 types of d.h.w. heating modes preprogrammed. By combining the 2, it is possible to configure 14 different types of plant.

When commissioning the system, the required plant type must be entered. The necessary functions, settings and displays will then automatically be assigned, and the parameters not required for the respective type of plant will be hidden.

### Operating modes



#### Automatic operation

Automatic heating according to the time switch program, ECO function and room unit active



#### Continuous operation

Heating with no time switch program, setpoint adjustment for both heating circuits with 2 setting knobs



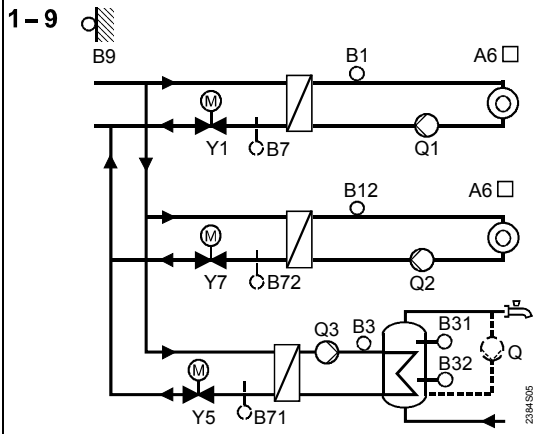
#### Standby

Heating off, frost protection ensured

The operating mode of the heating circuit does not affect d.h.w. heating.

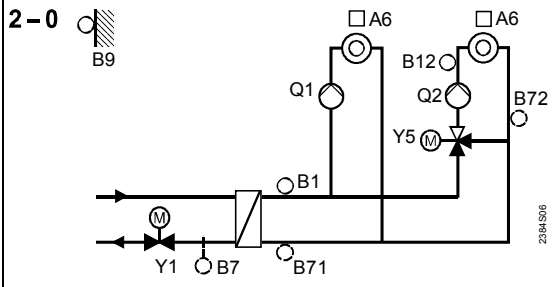
Plant types

<p><b>1-0</b></p>	<p>A6 Room units            B1 Flow sensor, heating circuit 1            B12 Flow sensor, heating circuit 2            B3 Secondary return sensor, heating circuit 2            B7 Primary return sensor, heating circuit 1*            B71 Secondary return sensor, heating circuit 1            B72 Primary return sensor, heating circuit 2*            B9 Outside sensor            Q1 Pump, heating circuit 1            Q2 Pump, heating circuit 2            Y1 2-port valve, primary return heating circuit 1            Y7 2-port valve, primary return heating circuit 2</p> <p>* Suppression of hydraulic creep</p>
<p><b>1-3</b></p>	<p>A6 Room units            B1 Flow sensor, heating circuit 1            B12 Flow sensor, heating circuit 2            B31 Storage tank sensor 1            B32 Storage tank sensor 2            B7 Primary return sensor, heating circuit 1*            B71 Return sensor, d.h.w. circuit            B72 Primary return sensor, heating circuit 2*            B9 Outside sensor            Q1 Pump, heating circuit 1            Q2 Pump, heating circuit 2            Q3 Circulating pump (optional)            Y1 2-port valve, primary return heating circuit 1            Y5 2-port valve, d.h.w. primary return            Y7 2-port valve, primary return heating circuit 2</p> <p>* Suppression of hydraulic creep</p>
<p><b>1-4</b></p>	<p>A6 Room units            B1 Flow sensor, heating circuit 1            B12 Flow sensor, heating circuit 2            B3 Flow sensor, d.h.w.            B32 Return sensor, d.h.w.            B7 Primary return sensor, heating circuit 1*            B71 Primary return sensor, d.h.w. circuit            B72 Primary return sensor, heating circuit 2*            B9 Outside sensor            H5 Flow switch (optional)            Q1 Pump, heating circuit 1            Q2 Pump, heating circuit 2            Q3 Circulating pump (optional)            Y1 2-port valve, primary return heating circuit 1            Y5 2-port valve, d.h.w. primary return            Y7 2-port valve, primary return heating circuit 2</p> <p>* Suppression of hydraulic creep</p>
<p><b>1-8</b></p> <p>a) Circulating pump feeding water into the heat exchanger's return            b) Circulating pump feeding water into the storage tank</p>	<p>A6 Room units            B1 Flow sensor, heating circuit 1            B12 Flow sensor, heating circuit 2            B3 Flow sensor, d.h.w.            B31 Storage tank sensor 1            B32 Storage tank sensor 2            B7 Primary return sensor, heating circuit 1*            B71 Primary return sensor, d.h.w. circuit            B72 Primary return sensor, heating circuit 2*            B9 Outside sensor            Q Circulating pump (optional, controlled externally)            Q1 Pump, heating circuit 1            Q2 Pump, heating circuit 2            Q3 Storage tank charging pump            Y1 2-port valve, primary return heating circuit 1            Y5 2-port valve, d.h.w. primary return            Y7 2-port valve, primary return heating circuit 2</p> <p>* Suppression of hydraulic creep</p>



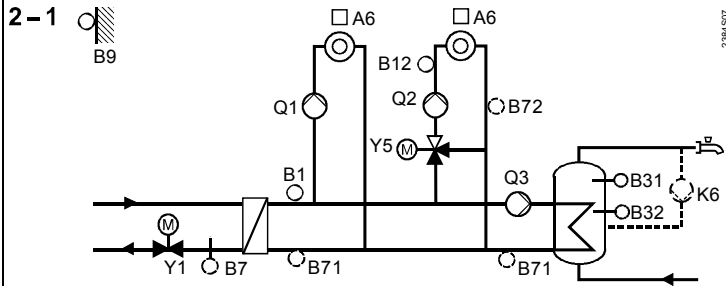
- A6 Room units
- B1 Flow sensor, heating circuit 1
- B12 Flow sensor, heating circuit 2
- B3 Flow sensor, d.h.w.
- B31 Storage tank sensor 1
- B32 Storage tank sensor 2
- B7 Primary return sensor, heating circuit 1\*
- B71 Primary return sensor, d.h.w. circuit
- B72 Primary return sensor, heating circuit 2\*
- B9 Outside sensor
- Q Circulating pump (optional, controlled externally)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 D.h.w. intermediate circuit pump
- Y1 2-port valve, primary return heating circuit 1
- Y5 2-port valve, d.h.w. primary return
- Y7 2-port valve, primary return heating circuit 2

\* Suppression of hydraulic creep



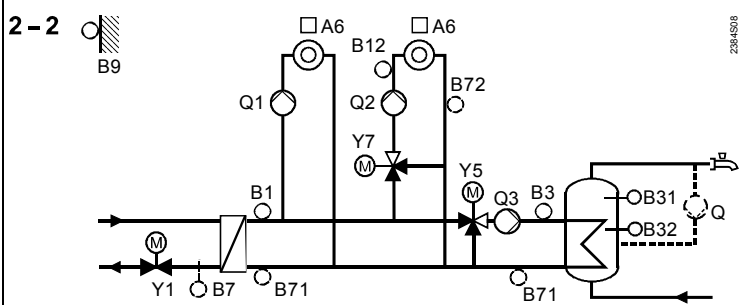
- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return
- B72 Return sensor, heating circuit 2
- B9 Outside sensor
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Y1 2-port valve, common primary return
- Y5 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep



- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 2
- B31 Storage tank sensor 1
- B32 Storage tank sensor 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return or return d.h.w. circuit
- B72 Return sensor, heating circuit 2
- B9 Outside sensor
- K6 Circulating pump (optional)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 D.h.w. intermediate circuit pump
- Y1 2-port valve, common primary return
- Y5 Mixing valve, heating circuit 2

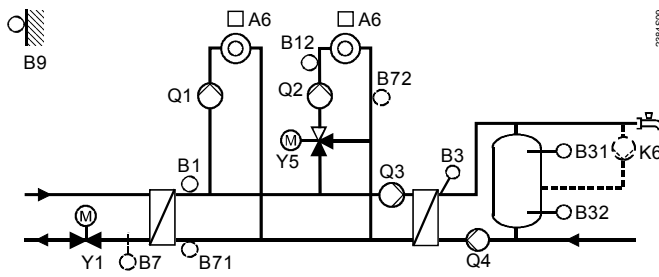
\* Suppression of hydraulic creep



- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 2
- B3 Flow sensor, d.h.w.
- B31 Storage tank sensor 1
- B32 Storage tank sensor 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return or return d.h.w. circuit (only if Q3 is speed-controlled)
- B72 Return sensor, heating circuit 2
- B9 Outside sensor
- Q Circulating pump (optional, controlled externally)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 D.h.w. intermediate circuit pump
- Y1 2-port valve, common primary return
- Y5 Mixing valve, d.h.w. circuit
- Y7 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep

2-6

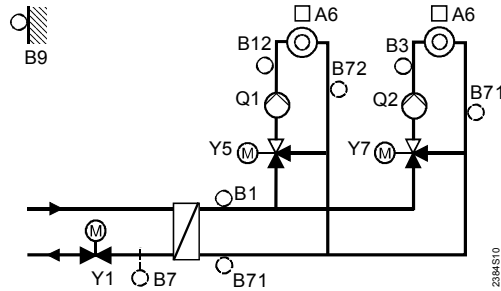


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- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 2
- B3 Flow sensor, d.h.w.
- B31 Storage tank sensor 1
- B32 Storage tank sensor 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return
- B72 Return sensor, heating circuit 2
- B9 Outside sensor
- K6 Circulating pump (optional)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 D.h.w. intermediate circuit pump
- Q4 Storage tank charging pump
- Y1 2-port valve, common primary return
- Y5 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep

3-0

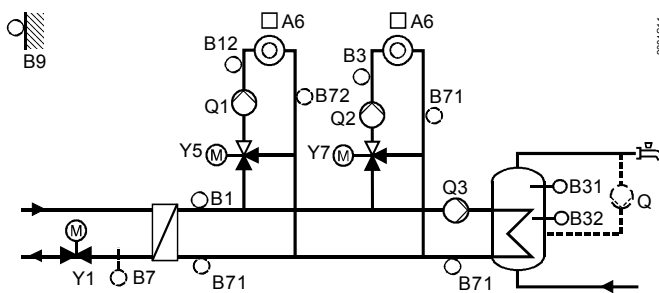


2384510

- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 1
- B3 Flow sensor, heating circuit 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return or return heating circuit 2
- B72 Return sensor, heating circuit 1
- B9 Outside sensor
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Y1 2-port valve, common primary return
- Y5 Mixing valve, heating circuit 1
- Y7 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep

3-1

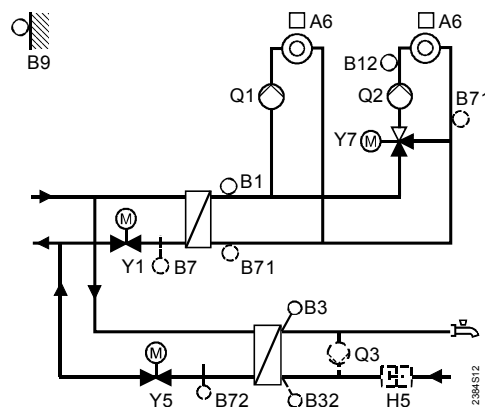


2384511

- A6 Room units
- B1 Sensor, common flow
- B12 Flow sensor, heating circuit 1
- B3 Flow sensor, heating circuit 2
- B31 Storage tank sensor 1
- B32 Storage tank sensor 2
- B7 Sensor, common primary return\*
- B71 Sensor, common secondary return or return heating circuit 2 or return d.h.w. circuit (only if Q3 is speed-controlled)
- B72 Return sensor, heating circuit 1
- B9 Outside sensor
- Q Circulating pump (optional, controlled externally)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 D.h.w. intermediate circuit pump
- Y1 2-port valve, common primary return
- Y5 Mixing valve, heating circuit 1
- Y7 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep

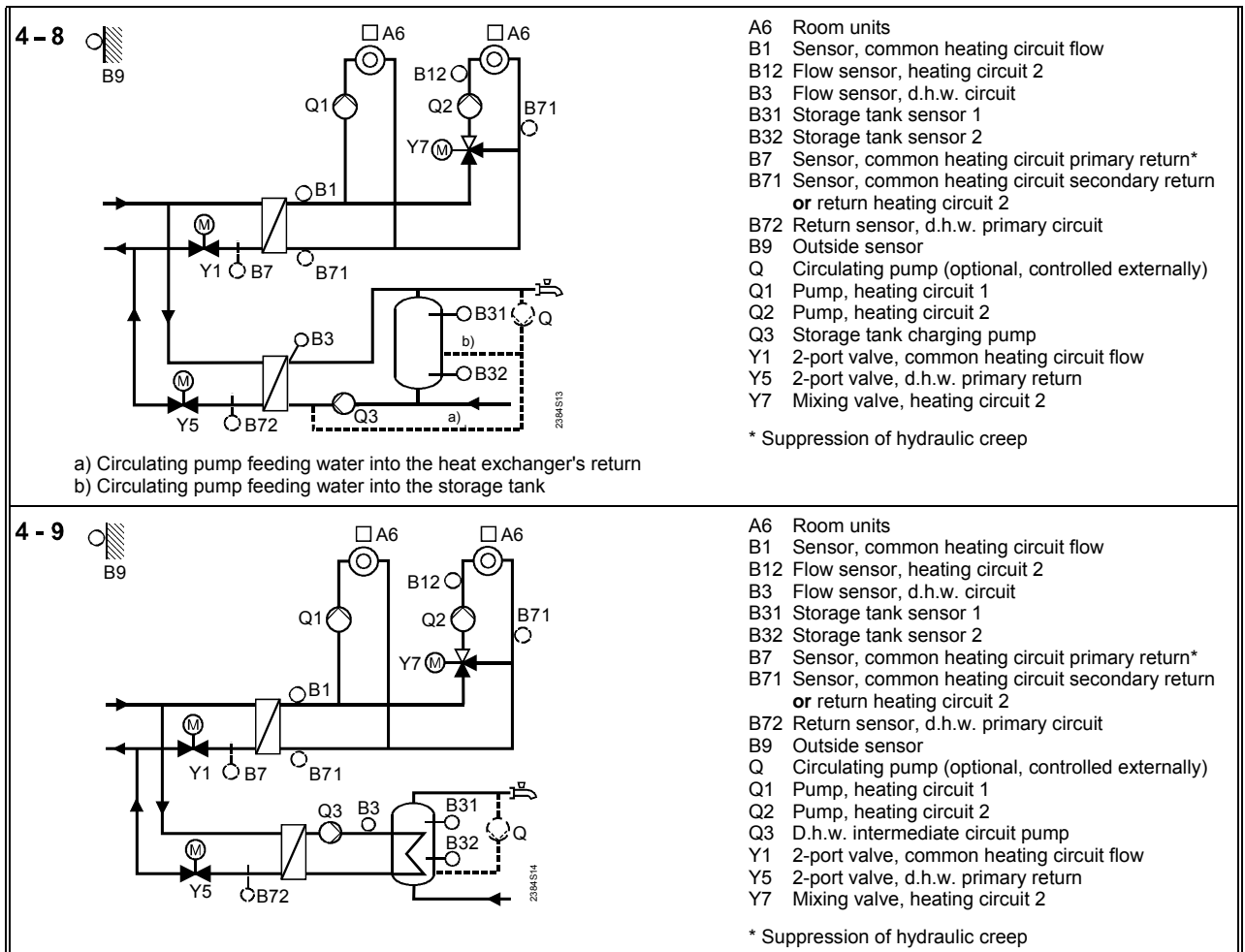
4-4



2384512

- A6 Room units
- B1 Sensor, common heating circuit flow
- B12 Flow sensor, heating circuit 2
- B3 Flow sensor, d.h.w. circuit
- B32 Return sensor, d.h.w. circuit
- B7 Sensor, common heating circuit primary return\*
- B71 Sensor, common heating circuit secondary return or return heating circuit 2
- B72 Return sensor, d.h.w. circuit
- B9 Outside sensor
- H5 Flow switch (optional)
- Q1 Pump, heating circuit 1
- Q2 Pump, heating circuit 2
- Q3 Circulating pump (optional)
- Y1 2-port valve, common heating circuit flow
- Y5 2-port valve, d.h.w. primary return
- Y7 Mixing valve, heating circuit 2

\* Suppression of hydraulic creep



## Heating circuit control

### Plant types

The RVD240 makes possible the control of the following types of plant:

- 2 pump heating circuits off 2 separated heat exchangers
- 2 mixing heating circuits off a common heat exchanger
- One mixing heating circuit and one pump heating circuit off a common heat exchanger

### Acquisition of measured values

The measuring variables of the heating circuit are acquired with the following types of temperature sensors (sensing elements):

- Heating circuit flow and common flow B1: LG-Ni 1000
- Heating circuit flow B12: LG-Ni 1000
- District heat return B7: LG-Ni 1000 or Pt 500
- Secondary return B71 and B72: LG-Ni 1000 or Pt 500

The controller automatically identifies the type of sensor used.

### Compensating variables

With weather-compensated control systems, the composite outside temperature is used as the compensating variable. It is generated from the actual and the attenuated outside temperature (calculated by the controller).

The building's time constant can be adjusted.

### Generation of flow temperature setpoint

The setpoints of the nominal room temperature, the reduced room temperature and the room temperature for frost protection can be adjusted separately for each heating circuits. The assigned flow temperature setpoint is generated as follows:

- Weather-compensated control: the flow temperature setpoint is continuously controlled depending on the prevailing weather conditions. The assignment of the flow temperature to the actual outside temperature is made via the heating curve
- Weather-compensated control with room influence: the flow temperature setpoint is controlled depending on the prevailing weather conditions and, in addition, depending on the deviation of the actual room temperature from the setpoint
- Room-compensated control: the flow temperature setpoint is controlled depending on the deviation of the actual room temperature from the setpoint

The maximum rate of flow temperature setpoint increase can be limited. Also, a flow alarm is provided: the period of time during which the flow temperatures may stay outside a defined setpoint range can be adjusted. A fault message will be delivered when the period of time has elapsed.

#### Heating circuit control

The controlled variable in each heating circuit is always the secondary flow temperature. With **all** types of plant, it is controlled through the 2-port valve in the primary return depending on the plant's total demand for heat (heating circuits and d.h.w. circuit).

#### Maximum limitation of return temperature

- Primary circuit: the valve in the primary circuit starts traveling towards the closed position when the limit value is exceeded. The characteristic is constant-shifting-constant depending on the outside temperature
- Secondary circuit: the valve in the primary circuit starts traveling towards the closed position when the limit value is exceeded. The differential to the primary circuit limit value must be set

#### Optimization

The control is optimized. Switching on, heating up and switching off are controlled such that the required room temperature is ensured during occupancy times. At the end of each occupancy period, the heating is switched off (circulating pump) until the room temperature setpoint of the non-occupancy time is reached (quick setback, can be deactivated).

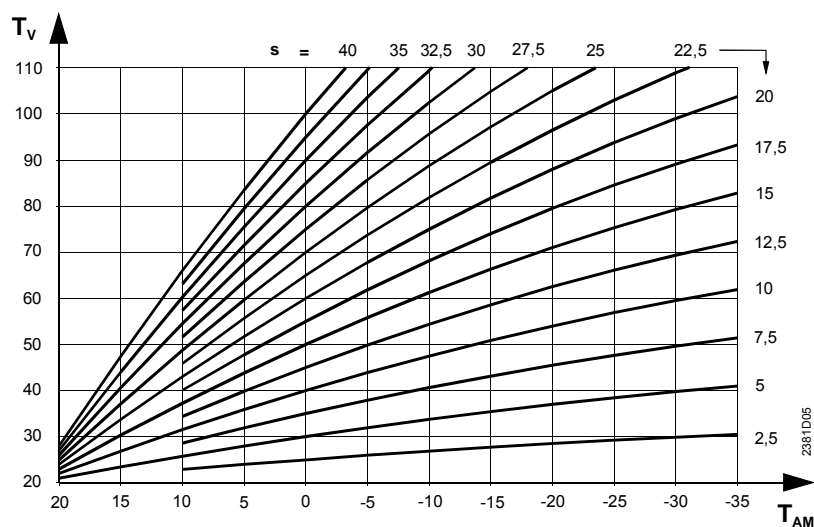
Maximum limit values can be set for the heating up time and for early shutdown. The optimization functions can be deactivated.

#### ECO function

With the automatic ECO function, the heating is controlled depending on demand. It will be shut down if permitted by the prevailing outside temperature. Consideration is given to the actual, the attenuated and the composite outside temperature, as well as to a heating limit (separately adjustable for each heating circuit).

The ECO function necessitates an outside sensor. It can be deactivated, if required.

#### Heating curve



s Slope  
 $T_{AM}$  Composite outside temperature  
 $T_V$  Flow temperature



Maximum and minimum limitation of the flow temperature	Both limitations are accomplished via the heating curve. When the limit value is reached, the heating curve assumes a constant value. The display shows whenever a limitation is active. Both limitations can be deactivated.
DRT function	The differential between the primary and the secondary temperature is limited to a maximum value (separately adjustable for each heating circuit).
Pump kick and valve kick	To prevent seizing, a kick can be set for all pumps and valves. The kick is made once a week and lasts 30 seconds.
Relay and sensor tests	To facilitate commissioning and fault tracing, the controller provides the following tests: <ul style="list-style-type: none"> <li>• Relay test: each of the relays can be manually energized</li> <li>• Sensor test: all actual sensor values can be interrogated</li> <li>• Setpoint test: all actual setpoints can be interrogated</li> </ul>
Pulse lock for actuators	To reduce relay contact wear, the total duration of the closing pulses delivered to an actuator is limited to five times the actuator's running time.
Raising the reduced room temperature	The setpoint of the reduced room temperature can be raised as the outside temperature falls. The increase (authority) is adjustable. This function can be deactivated, if required.
Frost protection for the building	Frost protection for the building maintains an adjustable minimum room temperature. This function cannot be deactivated.
Frost protection for the plant	Frost protection for the plant protects the heating plant against freeze-ups through activation of the heating circuit pump. This function can be used with or without outside sensor: <ul style="list-style-type: none"> <li>• With outside sensor: <ul style="list-style-type: none"> <li>Outside temperature <math>\leq 1.5</math> °C: the heating circuit pumps run for 10 minutes at 6-hour intervals</li> <li>Outside temperature <math>\leq -5</math> °C: the heating circuit pumps run continuously</li> </ul> </li> <li>• Without outside sensor: <ul style="list-style-type: none"> <li>Flow temperature <math>\leq 10</math> °C: the heating circuit pumps run for 10 minutes at 6-hour intervals</li> <li>Flow temperature <math>\leq 5</math> °C: the heating circuit pumps run continuously</li> </ul> </li> </ul> This function can be deactivated, if required.
Signal inputs	The following signal inputs are available: <ul style="list-style-type: none"> <li>• Analog input for display and for passing on DC 0...10 V signals resp. for heat demand DC 0...10 V</li> <li>• Binary input for pulses or signals delivered by a flow switch or heat meter, for heat demand signals or alarms</li> </ul>
Suppression of hydraulic creep	Minimum limitation of the flow rate aimed at suppressing hydraulic creep can act on both the heating circuits and the common primary return. This limitation is accomplished via an auxiliary switch in the actuator

## D.h.w. heating

Plant types	<p>The RVD240 controller makes possible d.h.w. heating with the following types of plant and d.h.w. heating systems:</p> <ul style="list-style-type: none"><li>• With a stratification storage tank and a storage tank charging pump</li><li>• With a storage tank and intermediate circuit pump, with or without mixing valve in the d.h.w. circuit</li><li>• Directly via own heat exchanger</li></ul> <p>Heat can be delivered to the d.h.w. circuit via the own heat exchanger or off the common flow (heating circuit and d.h.w. circuit).</p>
Acquisition of measured values	<p>The measuring variables required for d.h.w. heating are acquired with the following types of temperature sensors (sensing elements):</p> <ul style="list-style-type: none"><li>• Flow sensor B3: LG-Ni 1000 or Pt 500</li><li>• Flow sensor B12: LG-Ni 1000</li><li>• Storage tank sensor B31: LG-Ni 1000</li><li>• Storage tank or secondary return sensor B32: LG-Ni 1000</li><li>• Primary or secondary return sensors B71 and B72: LG-Ni 1000 or Pt 500</li></ul> <p>The controller automatically identifies the type of sensor used.</p>
Settings	<p>Adjustable are: Normal setpoint and reduced setpoint, maximum setpoint, setpoint boost, switching differential, overrun time of the charging pump and maximum time of d.h.w. heating.</p>
Frost protection for d.h.w.	<p>A minimum d.h.w. temperature of 5 °C is always maintained.</p>
Manual operation	<p>Manual d.h.w. heating can take place:</p> <ul style="list-style-type: none"><li>• Independent of the time switch program and temperature conditions</li><li>• During standby periods</li></ul> <p>D.h.w. heating can also be switched off manually. Frost protection will remain active.</p>
Limitation	<p>It is possible to provide maximum limitation of the primary return temperature. The adjusted limit value is independent of the heating circuit control.</p>
Releases	<p>The release of d.h.w. heating and that of the circulating pump can be selected:</p> <ul style="list-style-type: none"><li>• Continuously (24 hours per day)</li><li>• According to own d.h.w. time switch program</li><li>• During the controller's heating circuit time switch program (d.h.w. heating with forward shift of the first daily release)</li></ul>
Priority	<p>The behavior of the heating circuits during d.h.w. heating can be selected:</p> <ul style="list-style-type: none"><li>• Absolute: heating circuit pumps deactivated or heating circuit mixing valve closed and pump activated</li><li>• Shifting: heating circuit pumps remains activated as long as there is sufficient heating energy available. The d.h.w. setpoint or the maximum setpoint is maintained</li><li>• Parallel: no priority; heating circuits remain on. The d.h.w. setpoint or the maximum setpoint is maintained</li></ul>
Idle heat function	<p>In instantaneous systems, the heat exchanger's primary side is heated up at regular intervals.</p>
Flow switch	<p>To improve the heat exchanger's control performance, with adjustable load limit, adapts to the seasons, tamperproof (prevents the control system from responding too frequently).</p>

Forced charging	D.h.w. heating takes place every day with the first release (or at midnight with the 24-hour program). It also takes place when the actual value lies within the switching differential.
Legionella function	The d.h.w. is heated up at regular intervals to kill potential legionella viruses.
	With certain types of d.h.w. heating systems, some of the functions listed above are not possible.

### Extra functions

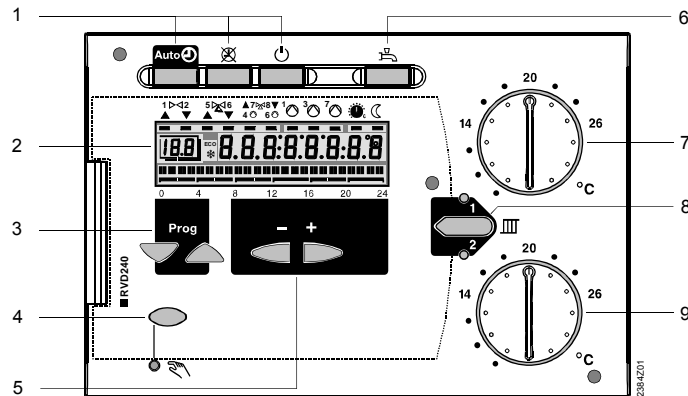
Time switch programs	To provide automatic operation of the heating system, the RVD240 controller features 2 seven-day programs with 3 adjustable heating periods per day. Another seven-day program is available for the release of d.h.w. heating. A yearly clock with summer-/wintertime changeover is used for the dates of up to 8 holiday periods. During the holiday periods, <ul style="list-style-type: none"> <li>• heating circuit control is in standby</li> <li>• d.h.w. is not heated</li> </ul>
Remote operation via room unit	<ul style="list-style-type: none"> <li>• QAW50... room unit: Changeover of operating mode, room temperature setpoint adjustments and room temperature readjustments</li> <li>• QAW70 room unit: Overriding the setpoints, the heating program and the annual holiday program</li> </ul> Each heating circuit may have its own room unit.
PWM output	The PWM (pulse width modulation) output can be used to control a variable speed pump.
Communication	Communication with other devices, controllers, etc., can be established via <ul style="list-style-type: none"> <li>• LPB, e.g. assignment of d.h.w. heating, reception of time signal, master / slave assignments for the time switch, reception of outside temperature signal or reception of heat demand signals (when the RVD240 is used as a pre-controller)</li> <li>• M-bus</li> </ul>
Manual operation	In manual operation, the heating can be controlled manually, in which case d.h.w. heating remains activated. The relays will be switched as follows: <ul style="list-style-type: none"> <li>• Actuator of the primary return valve: no power, but can be manually controlled from the controller</li> <li>• All other actuators: fully closed, no power</li> <li>• Heating circuit pumps: activated</li> </ul>

## Mechanical design

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<b>Controller</b>	<p>The RVD240 consists of controller insert and base.</p> <p>The controller insert accommodates the electronics, the power section, the output relays – on the front of the unit – the LCD and all operating elements. 2 screws are used to secure the controller insert to the base, which carries the connection terminals. The controller contains nine relays.</p> <p>The RVD240 can be mounted in 3 different ways:</p> <ul style="list-style-type: none"> <li>• Wall mounting (on a wall, in a control panel, etc.)</li> <li>• Rail mounting (on a DIN rail)</li> <li>• Flush panel mounting (compact station, control panel front, etc.)</li> </ul>
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## Display and operating elements



- 1 Operating mode buttons
- 2 LCD
- 3 Buttons (Prog) for selecting the operating lines
- 4 Button for manual operation ON / OFF
- 5 Buttons (- and +) for changing values
- 6 Button for d.h.w. heating ON / OFF
- 7 Setting knob for nominal room temperature setpoint of heating circuit 1
- 8 Button for changeover of heating circuits
- 9 Setting knob for nominal room temperature setpoint of heating circuit 2

## Operation

- Analog operating elements:
  - 2 setting knobs for the room temperature setpoint in continuous operation
  - Button for selecting the heating circuit when setting the heating circuit-specific variables
  - Buttons for selecting the required operating mode and for d.h.w. heating ON / OFF
  - Button for manual operation
- Digital operating elements:
 

Entry or readjustment of all other setting parameters, activation of the optional functions and readout of actual values and statuses is made based the operating line principle. Each parameter, actual value and selection function is assigned an operating line with an associated number. Selection of an operating line is made with one pair of buttons, readjustment of the display with another pair.

The buttons are located behind a hinged cover. Operating instructions are inserted at the rear of the cover.

## Engineering notes

### Electrical installation

- The wires of the measuring circuits carry safety extra low voltage.
- The wires to the actuator and to the pumps carry AC 24...230 V.
- The local regulations for electrical installations must be complied with.
- Sensor cables may not be run parallel to mains carrying cables powering actuators, pumps, etc.

### Radiator valves

In control systems using a room temperature sensor, the reference room may not be equipped with thermostatic radiator valves. Manual valves must be locked in their fully open position.

### Lightning protection

- If bus cables are also laid outside the buildings, the devices are exposed to transients caused by lightning and must be appropriately protected
- Every bus cable and the devices to be protected require specific protective elements
- The protective function is ensured only if the installation is made in compliance with the directives and regulations
- For notes relating to EMC-compatible installations, refer to data sheet N2034

## Mounting notes

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- Suitable mounting locations are compact stations, control panels, control desks or the heating room. Not permitted are wet or damp locations.
- The controller is suited for wall, DIN rail or flush panel mounting.
- All connection terminals for safety extra low voltage (sensors, room unit bus) are located in the top section of the terminal compartment, those for mains voltage (actuators and pumps) in the bottom section.

## Commissioning notes

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- The plant type must be selected.
- The settings can be locked on the software side, either completely or partly. In addition, the district heat parameters can be locked on the hardware side.
- The controller is supplied with mounting, commissioning and operating instructions.
- On the room unit for heating circuit 2, the address to be set is 2

## Technical data

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<b>Power supply</b>	Rated voltage	AC 230 V $\pm 10\%$
	Rated frequency	50 Hz
	Max. power consumption	8.5 VA, 6.5 W, $\cos \varphi > 0.7$
<b>Functional data</b>	Reserve of clock	12 h
<b>Classifications to EN 60 730</b>	Software class	A
	Mode of operation	type 1b (automatic controls)
	Degree of contamination	normal contamination
<b>Inputs</b>		
<b>Sensor inputs (B...)</b>	Sensing element	refer to sections "Acquisition of measured values"
	Max. number of sensors per input	1
	Measuring range	0...150 °C
<b>Digital input (H5)</b>	Low-voltage up to	U < 10 V
	Switching current	I $\geq 2$ mA (for reliable operation)
	Voltage with contact open	DC 12 V
	Voltage with contact closed	DC 2...5 mA
	Contact resistance	R $\leq 80 \Omega$
<b>Outputs</b>		
Switching outputs	Rated switching voltage	AC 24...230 V
	Rated current	
	Outputs Y1, Y2, Q1	AC 0.02...2(2) A
	Outputs Y5, Y6, Q3/Y7, Q7/Y8	AC 0.02...1(1) A
	Switch-on current	max. 10 A max. 1 s
	Max. rating as mixing valve relay Y1, Y2, Y5, Y6, Y7, Y8	15 VA
PMW output	Idle voltage	12 V
	Max. internal resistance	1340 $\Omega$
	Frequency	2400 Hz

**Interfaces**

PPS	Connection (to the room unit)	2-wire connection, interchangeable
LPB	Connection	2-wire connection, not interchangeable
	Bus loading number E	3
	Detailed information for Standard Controls:	
	Basic System Data	Data Sheet N2030
	Local Process Bus	Data Sheet N2032
Detailed information for OEM:		
	Local Process Bus	Basic documentation P2370

**Perm. cable lengths**

To the sensors	
Copper cable, 0.6 mm dia.	20 m
Copper cable, 1.0 mm <sup>2</sup>	80 m
Copper cable, 1.5 mm <sup>2</sup>	120 m
To the room unit	
Copper cable, 0.6 mm dia,	37 m
Copper cable, ≥0.8 mm dia.	75 m

**Degrees of protection**

Degree of protection of housing to IEC 60 529	IP 40D
Safety class to EN 60 730	II

**Perm. environmental conditions**

Transport	
Temperature	-25...+70 °C
Humidity	<95 % rH (noncondensing)
Storage	
Temperature	-5...+55 °C
Humidity	<95 % rH (noncondensing)
Operation	
Temperature	0...+50 °C
Humidity	<85 % rH (noncondensing)

**Standards**

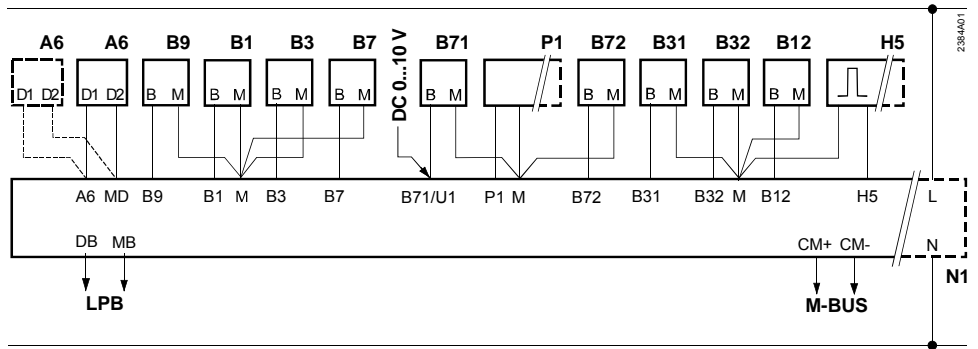
CE conformity to EMC directive	89/336/EEC
Immunity	EN 50082-2
Emissions	EN 50081-1
Low voltage directive	73/23/EEC
Product safety	
Automatic electrical controls for household and similar use	EN 60730-1
Particular requirements for temperature sensing controls	EN 60730-2-9
Special requirements for energy controllers	EN 60730-2-11

**Weight**

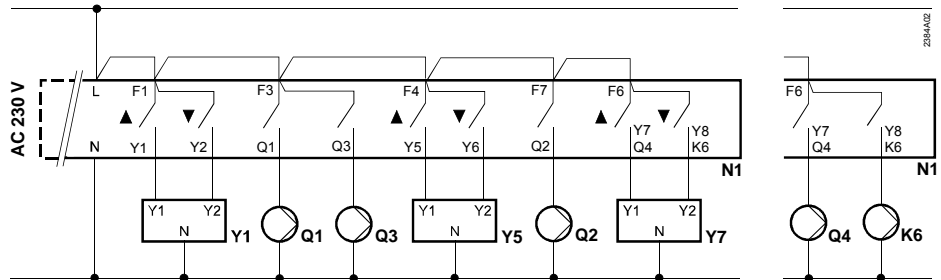
Net weight	0.84 kg
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## Connection diagrams

### Low voltage side

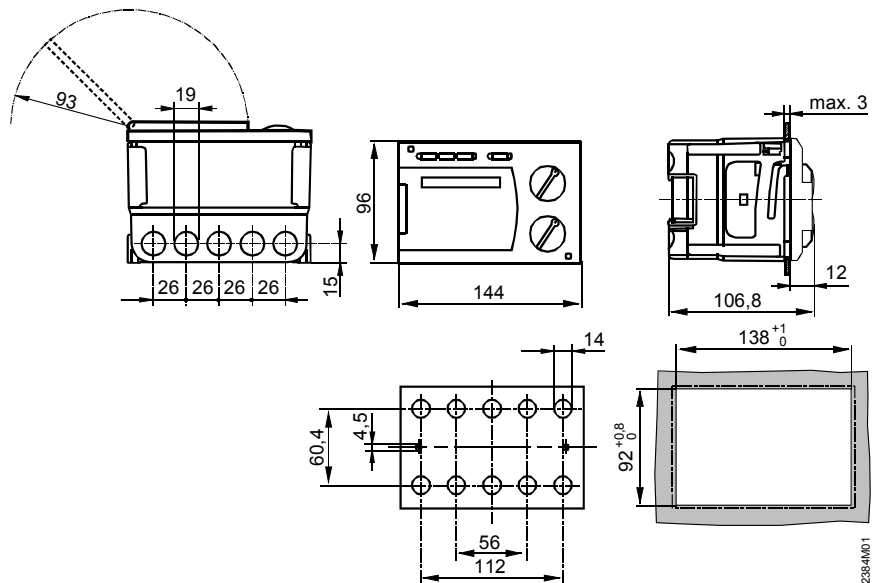


### Mains voltage side



- A6 Room unit (QAW50..., QAW70 or QAA10)
- B1 Flow sensor, heating circuit 1 or common flow (depending on the type of plant)
- B12 Flow sensor, heating circuit
- B3 Flow or return sensor (depending on the type of plant)
- B31 Storage tank sensor
- B32 Storage tank or return sensor (depending on the type of plant)
- B7 Primary return sensor
- B71 Primary or secondary return sensor (depending on the type of plant)
- B72 Primary or secondary return sensor
- B9 Outside sensor
- H5 Heat meter, flow switch, alarm contact, etc.
- K6 Circulating pump (depending on the type of plant)
- N1 Controller RVD240
- P1 Variable speed pump (PWM output)
- Q1 Heating circuit / system pump
- Q2 Heating circuit or storage tank charging pump (depending on the type of plant)
- Q3 D.h.w. intermediate circuit pump, storage tank charging pump or circulating pump (depending on the type of plant)
- Q4 Storage tank charging pump
- Y1 Actuator for 2-port valve in the primary return
- Y5 Actuator 2 (depending on the type of plant)
- Y7 Actuator 3 (depending on the type of plant)

## Dimensions



Dimensions in mm

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Subject to alteration

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