



## Heating Controller

with or without d.h.w. heating

**RVP200...**  
**RVP210...**

Heating controller for use in residential or smaller non-residential buildings that have their own heat generating plant. Weather-compensated flow temperature control with or without room temperature influence or room temperature control. Control of 3-position or 2-position actuators or direct control of burner and circulating pump. Control of d.h.w. heating. Analog operating elements for the end-user. Operating voltage AC 230 V, in conformance with CE directives.

### Use

- Types of houses and buildings:
  - Small multi-family houses
  - Single-family houses or holiday houses
  - Smaller non-residential buildings
- Types of plant:
  - Heating zones with their own heat generating equipment and own d.h.w. heating
- Types of heating systems:
  - Radiator, convector, underfloor and ceiling heating systems, as well as radiant panels

### Functions

#### Key functions

The RVP200/210 heating controller has been designed for use with the following types of control systems and plants:

- Flow temperature control via a motorized 3-position mixing valve
- Flow temperature control via a motorized 2-position mixing valve
- Boiler temperature control via single-stage burner and a circulating pump

With all three types of plant, one of the following control modes can be used:








- Weather-compensated
- Weather-compensated with room temperature influence
- Room temperature-compensated

#### Other functions

- Room temperature-dependent quick setback and boost heating
- ECO automatic energy saver for load-dependent switching of heating
- D.h.w. heating with choice of priority
- Frost protection for the plant and the space in all operating modes
- Remote control with room unit

Note: some of the above functions require appropriate control equipment (sensors, etc.)

#### Operating modes

-  Automatic operation normal / standby  
Automatic changeover between normal temperature and standby according to the 24-hour or weekly program, ECO automatic energy saver, d.h.w. heating
-  Automatic operation normal / reduced  
Automatic changeover between normal and reduced temperature according to the 24-hour or weekly program, ECO automatic energy saver, d.h.w. heating
-  Setback mode  
Continuous heating to the reduced temperature, with ECO automatic energy saver, d.h.w. heating
-  Normal mode  
Continuous heating to the normal temperature, no ECO automatic energy saver, d.h.w. heating
-  Standby
-  Manual operation  
Control switched off, d.h.w. charging pump and heating circuit pump running
-  Automatic d.h.w. heating only  
Heating control on standby

Note: d.h.w. heating is provided only by the RVP210

#### Type summary

| Type of unit  | Type ref.       |
|---|-----------------|
| Heating controller without time switch                                  | <b>RVP200.0</b> |
| Heating controller with analog 24-hour time switch                      | <b>RVP200.1</b> |
| Heating controller without time switch, with d.h.w. heating             | <b>RVP210.0</b> |
| Heating controller with analog 24-hour time switch, with d.h.w. heating | <b>RVP210.1</b> |
| Analog 24-hour time switch  | <b>AUZ3.1</b>   |
| Analog weekly time switch   | <b>AUZ3.7</b>   |
| Digital weekly time switch  | <b>AUD3</b>     |

#### Equipment combinations

##### Suitable sensors and room units

- Flow, boiler and d.h.w. temperature: all sensors with LG-Ni 1000  $\Omega$  at 0 °C, such as
  - Strap-on temperature sensor QAD22
  - Immersion temperature sensor QAE212... or QAP21.3
- Outside temperature (controller automatically identifies the type of sensor used):
  - Outside sensor QAC22 (Ni measuring element)
  - Outside sensor QAC32 (NTC measuring element)
- Room temperature; there are two types of room units available:



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



**Room unit QAW50**,  
with room sensor, room temperature readjustment (setting knob)

## Suitable actuators

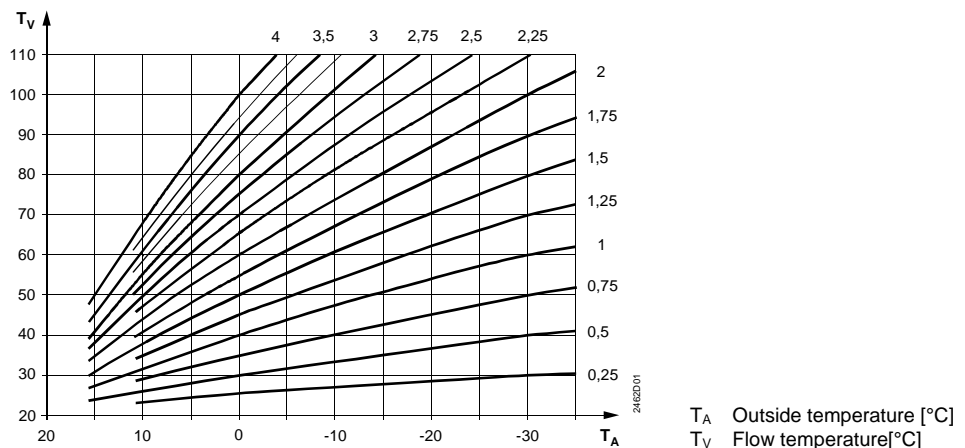
- All electric or electro-hydraulic actuators for 3-position control made by SBT HVAC Products can be used:
  - Operating voltage AC 24...230 V
  - Maximum running time 6 minutes (recommended: 2 to 3 minutes)
- All electro-thermal actuators for 2-position control:
  - Operating voltage AC 24...230 V
  - Running time 8 to 16 minutes

## Ordering

- When ordering, please give type reference according to "Type summary" and the language code letter (-D or -E) for the Operating Instructions and the Installation Instructions in the requested language:
  - D for English, German, French, Italian, Dutch (e.g. RVP210.0-D for English)
  - E for Italian, Spanish, Greek, Finnish, Danish, Swedish (e.g. RVP210.0-E for Italian)
- If a controller with a weekly time switch is required, it must be ordered without the time switch, that is, **RVP200.0** or **RVP210.0**, plus the required time switch (**AUZ3.7** or **AUD3**)
- Sensors, room unit, actuator and valve must be ordered as separate items.

## Technical design

### Heating curve chart



### Compensating variables

- Weather-compensated control: the setpoint of the flow or boiler temperature is continuously shifted in function of the outside temperature (via the outside sensor). Assignment of the flow temperature to the actual outside temperature is made via the heating curve. Its slope is adjustable
- Weather-compensated control with room temperature influence: the setpoint of the flow or boiler temperature is continuously shifted in function of the outside temperature (via the outside sensor) and, in addition, in function of the setpoint / actual value deviation of the room temperature.  
Room temperature authority is adjustable (range 1...99 %); guide value is 50 %

- Room temperature-compensated control: the setpoint of the flow or boiler temperature is continuously shifted in function of the setpoint / actual value deviation of the room temperature

With both types of weather-compensated control, the composite outside temperature is used as the compensating variable. It is generated from the actual and the attenuated outside temperature. Compared to the actual outside temperature it is significantly attenuated and delayed.

### **Flow temperature control**

- 3-position control: the flow temperature is controlled continuously with no offset via a seat or slipper valve driven by an electric or electro-hydraulic actuator.
- 2-position control: the flow temperature is controlled via a seat or slipper valve driven by an electro-thermal actuator. The switching differential is 1 K.

Maximum limitation of the flow temperature can be provided in the range 8...100 °C. This function can be deactivated.

### **Boiler temperature control**

The boiler temperature is controlled by a single-stage burner which is switched on and off. The burner's minimum on time is four minutes. The switching differential is adjustable in the range 1...20 K.

Maximum limitation of the boiler temperature can be provided in the range 8...100 °C. This function can be deactivated.

If the boiler temperature falls below 5 °C, the burner will be switched on to maintain a minimum boiler temperature.

When there is no demand for heat and during quick setback, the boiler will be switched off.

### **D.h.w. heating**

- In the case of flow temperature control with a mixing valve, d.h.w. heating is ensured with a charging pump.
- With boiler temperature control, the d.h.w. is heated either with a charging pump or changeover valve

In the case of a charging pump, priority selection can be:

- Absolute priority: during d.h.w. heating, the heating circuit pump is locked.
- No priority (parallel): heating circuit pump and d.h.w. charging pump operate at the same time.

With underfloor heating systems and boiler operations, absolute priority must always be set.

The temperature is measured with an immersion sensor LG-Ni 1000 Ω at 0 °C. If the sensor acquires a d.h.w. temperature below the setpoint, the charging pump or changeover valve will be activated. The excess flow temperature during charging is 16 K (fixed value) above the adjusted d.h.w. temperature setpoint.

The d.h.w. storage tank is protected against frost. If there is risk of frost, the d.h.w. temperature will not be allowed to fall below 5 °C.

The d.h.w. temperature can also be acquired by a thermostat. Charging takes place when the thermostat's contact closes. There is no protection against frost.

Note: a relay controlled by the thermostat (low voltage!) must be connected to terminals B3–M.

### **Frost protection for the plant**

The heating circuit pump is activated to prevent freeze-ups in the plant. Frost protection can be provided with or without an outside sensor:

- With outside sensor:
  - Outside temperature  $\leq 1.5$  °C: the heating circuit pump will be switched on for 10 minutes at 6-hour intervals
  - Outside temperature  $\leq -5$  °C: the heating circuit pump runs continuously
- Without outside sensor:
  - Flow temperature  $\leq 10$  °C: the heating circuit pump will be switched on for 10 minutes at 6-hour intervals
  - Flow temperature  $\leq 5$  °C: the heating circuit pump runs continuously

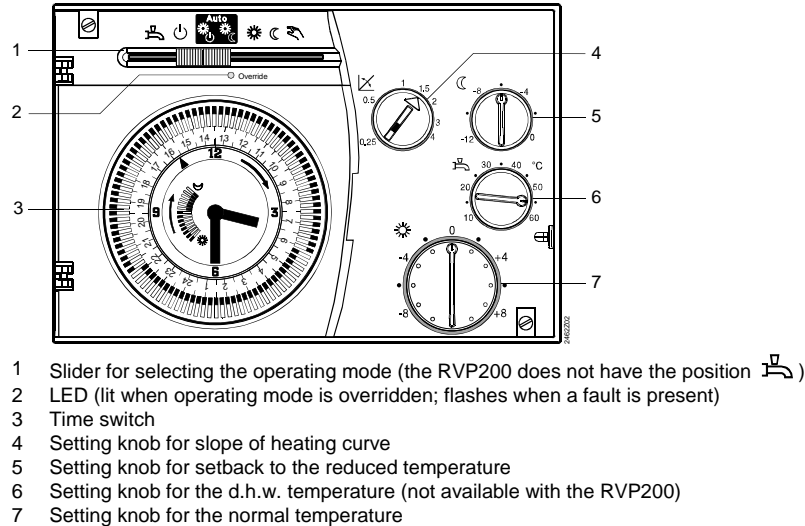
Frost protection for the plant can be deactivated, if required.

|  |   |
|--|---|
| <b>Frost protection for the building</b>     | <p>Frost protection for the building acts as minimum room temperature limitation and protects the rooms from too low temperatures. It can be achieved with or without room unit, provided the heating curve slope is correctly set.</p> <ul style="list-style-type: none"> <li>• Without room unit: <ul style="list-style-type: none"> <li>– Attenuated outside temperature <math>\leq 5\text{ °C}</math>: the control is switched on and the flow temperature is controlled such that a room temperature of <math>5\text{ °C}</math> will be maintained</li> <li>– Attenuated outside temperature <math>&gt;6\text{ °C}</math>: the control is switched off</li> </ul> </li> <li>• With room unit and with quick setback active: <ul style="list-style-type: none"> <li>– Room temperature <math>\leq 5\text{ °C}</math>: the control is switched on and the flow temperature is controlled such that a room temperature of <math>5\text{ °C}</math> will be maintained</li> <li>– Room temperature <math>&gt;6\text{ °C}</math>: the control is switched off</li> </ul> </li> <li>• With room unit, but without quick setback: <p>Same as without room unit</p> </li> </ul> <p>Frost protection for the building can be deactivated, if required.</p> |
| <b>Pump control</b>                          | <ul style="list-style-type: none"> <li>• Pump overrun: heating circuit pump and charging pump with six minutes overrun</li> <li>• Pump kick: all pumps are periodically switched on for one minute</li> </ul>   |
| <b>Boost heating</b>                         | <p>When changing from the reduced temperature or standby mode to the normal temperature, the room temperature setpoint is raised by 5 K. When the room temperature reaches a level which lies 0.25 K below the setpoint of the normal temperature, boost heating will be switched off.</p> <p>Boost heating necessitates a room unit.</p>   |
| <b>Quick setback</b>                         | <p>When changing from the normal temperature to the reduced temperature or standby mode, the heating will be shut down until the respective room temperature setpoint is reached.</p> <p>Quick setback necessitates a room unit. This function can be deactivated, if required.</p>   |
| <b>ECO automatic energy saver</b>            | <p>The ECO automatic energy saver controls the heating depending on demand. It switches the heating off if permitted by outside temperature conditions while considering the actual, the attenuated and the composite outside temperature as well as the adjustable heating limit.</p>  |
| <b>Temperature acquisition</b>               | <ul style="list-style-type: none"> <li>• Flow and boiler temperature: with a sensor LG-Ni 1000 <math>\Omega</math> at <math>0\text{ °C}</math></li> <li>• Outside temperature: with a Ni or NTC sensor; the controller identifies the type of sensor used</li> <li>• Room temperature: with a room unit</li> </ul>  |
| <b>Time switches for the heating program</b> | <p>The controller is equipped with a plug-in type time switch for entering a 24-hour or weekly heating program. Backup is ensured.</p> <p>The following choices are available:</p> <ul style="list-style-type: none"> <li>• Analog 24-hour time switch <p>Resolution of switching points: 15 minutes</p> <p>Shortest on or off times: 15 minutes</p> </li> <li>• Analog weekly time switch <p>Resolution of switching points: one hour</p> <p>Shortest on or off times: two hours</p> </li> <li>• Digital time switch</li> </ul> <p>Any of these three types of time switches can also be fitted at a later time.</p>   |
| <b>Remote operation</b>                      | <ul style="list-style-type: none"> <li>• Changeover of operating mode and room setpoint as well as room temperature readjustment with the QAW50 room unit</li> <li>• Overriding of setpoints and heating program with the QAW70 room unit</li> <li>• Changing the operating mode with an external switching contact (refer to "Mechanical design")</li> </ul>   |

### Controller

The RVP200/210 is comprised of controller insert, which houses the electronics, the power section, the output relays and all operating elements, and the base, which carries the connection terminals. The operating elements for the end-user are located behind a transparent cover.

The operating elements for the heating engineer can be accessed after removal of the time switch or when the cover is opened.



The controller insert is secured to the base by means of two screws. The cover can be sealed.

The RVP200/210 can be fitted in three different ways:

- Wall mounting (on a wall, in a control panel, etc.)
- Rail mounting (on a standard DIN mounting rail)
- Flush panel mounting (control panel door, etc)

### Switching contact

When connecting an external switching contact to the controller's terminals A6-MD, the operating mode can be selected from a remote location:

- Contact closed: controller is in standby
- Contact open: controller uses the operating mode selected with the slider.

### Engineering notes

- The wires of the measuring circuits carry extra low voltage
- The wires to the actuator and the pump carry AC 24...230 V
- The local electrical regulations must be complied with
- Sensor cables must not be run parallel to mains carrying cable for loads such as actuator, pump, burner, etc. (safety class II to EN 60730)
- The maximum limitation of the boiler temperature may not be used as a safety function. For that purpose a thermostat or safety limiter must be connected at terminals L-F1/F4

### Commissioning notes

- Setpoint adjustments:
  - Normal temperature (in °C room temperature)
  - Setback (in °C room temperature)
  - D.h.w. (only with the RVP210)
- Settings to be made by the heating engineer:
  - Slope of heating curve
  - Authority of room temperature

- ECO heating limit
- Maximum limitation of the flow or boiler temperature
- Type of regulating unit (mixing valve or burner)
- Type of control (3- or 2-position)
- Frost protection activated or deactivated
- Priority of d.h.w. heating (only with the RVP210)

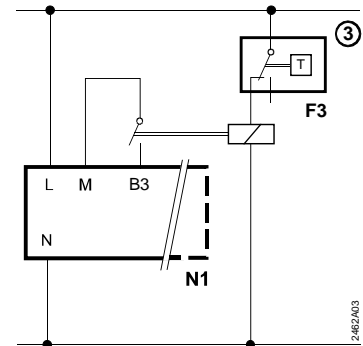
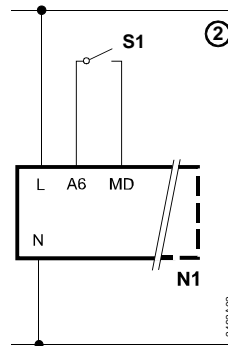
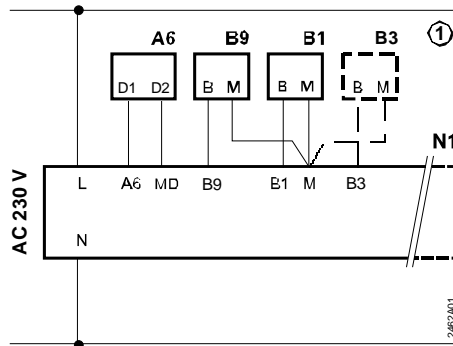
The controller is supplied complete with installation instructions and operating instructions.

## Technical data

|                                |  |  |
|--------------------------------|--|--|
| <b>General data</b>            | <b>CE</b> conformance to                                   |  |
|                                | EMC directive  | 89/336/ EEC                                |
|                                | Immunity   | EN 50082-2                                 |
|                                | Emissions  | EN 50081-1                                 |
|                                | Low voltage directive                                      | 73/23/ EEC                                 |
|                                | Safety   | EN 60730-1                                 |
|                                | Rated operating voltage                                    | AC 230 V $\pm 10\%$                        |
|                                | Frequency  | 50 Hz                                      |
|                                | Power consumption  | 7 VA                                       |
|                                | Degree of protection (cover closed)                        | IP40 D EN 60529                            |
|                                | Safety class   | II EN 60730                                |
|                                | Permissible ambient temperatures                           |  |
|                                | Transport  | -25...+70 °C                               |
|                                | Storage  | -5...+55 °C                                |
|                                | Operation  | 0...50 °C                                  |
|                                | Weight (net)   | 0.72 kg                                    |
| <b>Output relays</b>           | Test class   | II   |
|                                | Rated voltage  | AC 230 V                                   |
|                                | Rated current  | 2 (2) A                                    |
|                                | Contact current at AC 24...90 V                            | 0.1...2 A, $\cos \varphi > 0.5$            |
|                                | Contact current at AC 90...250 V                           | 0.02...2 A, $\cos \varphi > 0.5$           |
|                                | Rated current of ignition transformer                      | 1 A max. (30 s max.)                       |
|                                | Switch-on current of ignition transformer                  | 10 A max. (10 ms max.)                     |
| <b>Setting ranges</b>          | Setpoint of normal room temperature                        | 20 $\pm$ 0...8 °C                          |
|                                | Setback for reduced room temperature                       | -12...0 K                                  |
|                                | Setpoint of d.h.w. temperature (only with the RVP210)      | 10...60 °C                                 |
|                                | Slope of heating curve                                     | 0.25...4                                   |
|                                | Max. limit of flow or boiler temperature                   | 8...100 °C                                 |
|                                | ECO heating limit  | -10...+8 °C (referred to normal set-point) |
| <b>Backup of time switches</b> | Authority of room temperature                              | 0...100 %                                  |
|                                | Switching differential with 2-position control             | 1...20 K                                   |
|                                | Analog time switches                                       | 12 hours                                   |
|                                | Digital weekly time switch                                 | with backup battery                        |
| <b>Cabling</b>                 | Permissible cable lengths to the sensors and the room unit |  |
|                                | 0.6 mm dia.  | 30 m                                       |
|                                | Copper cable 0.5 mm <sup>2</sup>                           | 50 m                                       |
|                                | Copper cable 1.0 mm <sup>2</sup>                           | 80 m                                       |
|                                | Copper cable 1.5 mm <sup>2</sup>                           | 120 m                                      |

## Connection diagrams

### For low voltage

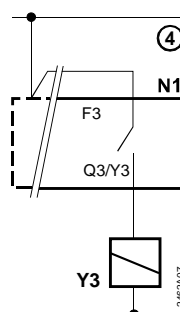
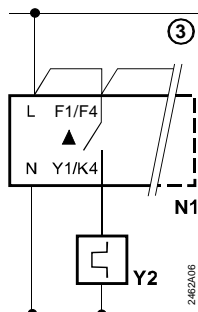
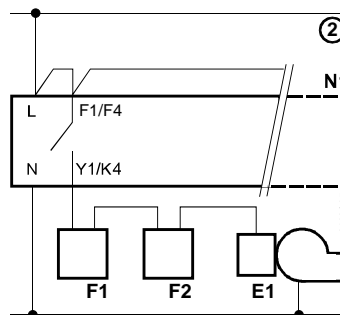
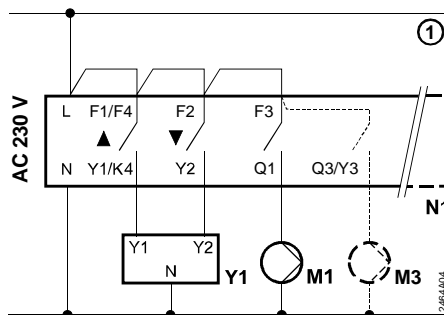


① = Measurement of d.h.w. temperature with a sensor (only with the RVP210)

② = External switch for changeover of operating mode

③ = Measurement of d.h.w. temperature with a thermostat plus an intermediate relay (only with the RVP210)

### For mains voltage



① = Connection of 3-position actuator (flow temperature control), heating circuit pump and d.h.w. charging pump (d.h.w. charging pump only with the RVP210)

② = Connection of burner (boiler temperature control)

③ = Connection of 2-position actuator (flow temperature control)

④ = Connection of actuator for changeover valve (only with the RVP210)

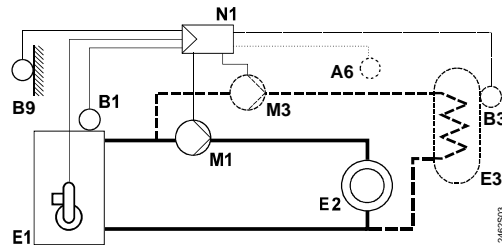
A6 Room unit QAW50 or QAW70  
B1 Flow or boiler temperature sensor  
B3 D.h.w. temperature sensor (only with the RVP210)  
B9 Outside sensor QAC22 or QAC32  
E1 Burner  
F1 Thermal reset limit thermostat  
F2 Manual reset safety limit thermostat  
F3 D.h.w. thermostat (only with the RVP210)

M1 Heating circuit pump  
M3 D.h.w. charging pump (only with the RVP210)  
N1 Controller RVP200/210  
S1 External switch  
Y1 3-position actuator  
Y2 2-position actuator  
Y3 Actuator for d.h.w. changeover valve (only with the RVP210)



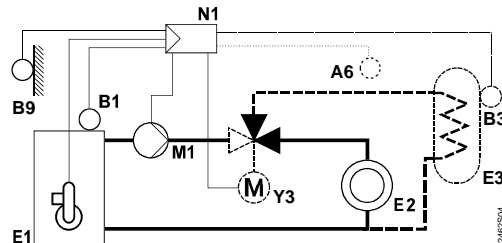
## Application examples

### Example 1



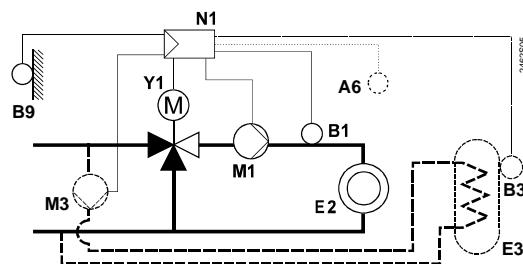
Boiler temperature control (2-position control, acting on the burner), d.h.w. heating with charging pump

### Example 2



Boiler temperature control (2-position control, acting on the burner), d.h.w. heating with changeover valve

### Example 3

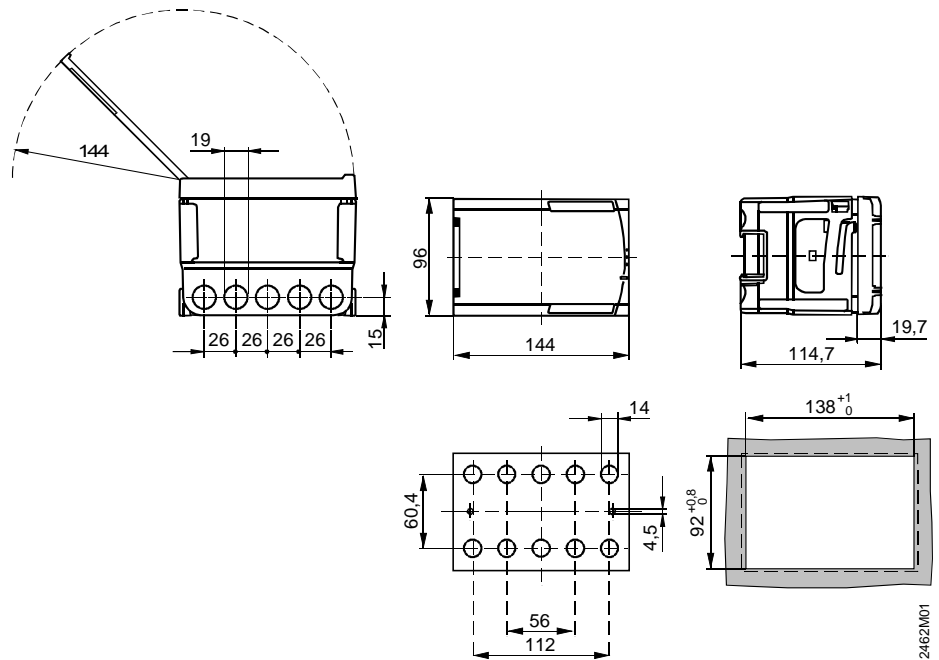


Flow temperature control (3- or 2-position control, acting on the seat or slipper valve), d.h.w. heating with charging pump

A6 Room unit QAW50 or QAW70  
B1 Boiler or flow temperature sensor  
B3 D.h.w. temperature sensor  
B9 Outside sensor  
E1 Boiler  
E2 Load (room)

E3 D.h.w. storage tank  
M1 Heating circuit pump  
M2 D.h.w. charging pump  
N1 Controller RVP200/210  
Y1 Motorized 3- or 2-position mixing valve  
Y3 Motorized changeover valve

## Dimensions



Dimensions in mm

For more detailed information about the RVP200/210, refer to the Basic Documentation P2462.