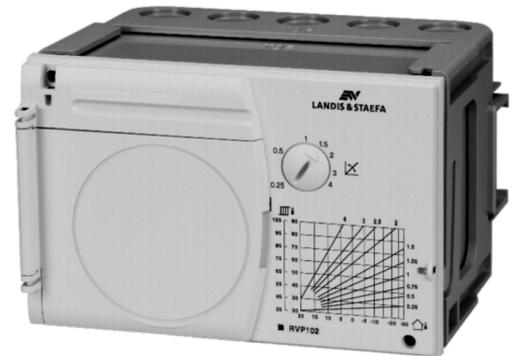


## Heating Control System

## RVP102/SET



**Heating control system for use in smaller plants. Control of boiler temperature through direct burner control, pump control, weather-compensated setpoint (with or without room temperature influence), or room temperature compensation.**

**Analog setting elements, operating voltage AC 230 V, in conformance with CE directives.**

### Use

- Types of houses:  
Single family houses and holiday houses
- Types of plant:  
Heating zones with direct burner control
- Types of heating systems:  
Radiator, convector and underfloor heating systems

### Functions

#### Key function

Key function is the control of the boiler temperature by a single-stage burner. The following modes of control are available:

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

#### Other functions

- Pump control
- Room temperature-dependent quick setback and boost heating
- Automatic heating limit switch for demand-dependent switching of the heating system, based on the outside temperature
- Frost protection, ensured in all operating modes

#### Operating modes

The required operating mode is selected on the room unit QAW70 (not possible on the controller).

	<p>Automatic operation</p> <p>Automatic changeover between normal and reduced temperature according to the 24-hour or weekly program, with ECO automatic energy saver</p>
	<p>Manual changeover between normal temperature (no ECO automatic energy saver) and reduced temperature (with ECO) by means of presence button</p>
	<p>Standby</p>



Room unit QAW70 with room detector, time switch, setpoint adjustment, presence button, and setting knob for room temperature readjustment

## Ordering

When ordering the complete heating control system, please give type reference **RVP102/SET**.

This set will be comprised of the following units:

- Heating controller RVP102
- Room unit QAW70
- Outside detector QAC32
- Clamp-on temperature detector QAD22

## Equipment combinations

Suitable detectors and room units:

- Flow temperature: all detectors with sensing element LG Ni 1000  $\Omega$  at 0 °C (contained in the set: QAD22)
- Room temperature: digital room unit QAW70 (part of the set)
- Outside temperature (the controller identifies the type of detector used):  
outside detector QAC32 (part of the set)  
outside detector QAC22

## Technical design

### Compensating variables

- Weather-compensated: the setpoint of the boiler temperature is continuously shifted in function of the outside temperature (outside detector). Assignment of the flow temperature to the actual outside temperature is made via the heating curve. Its slope is adjustable. Room temperature authority = 0 %
- Weather-compensated with room temperature influence: the setpoint of the boiler temperature is shifted in function of the outside temperature (outside detector) and, in addition, in function of the setpoint / actual value deviation of the room temperature. Room temperature authority = 1...99 % (adjustable, guide value is 50 %)
- Room temperature-compensated: the setpoint of the boiler temperature is shifted in function of the setpoint / actual value deviation of the room temperature. Room temperature authority = 100 %

The compensating variable used for weather compensation is the composite outside temperature. It is generated from the actual and the attenuated outside temperature. The attenuated outside temperature is calculated. It is strongly attenuated and delayed when compared with the actual outside temperature.

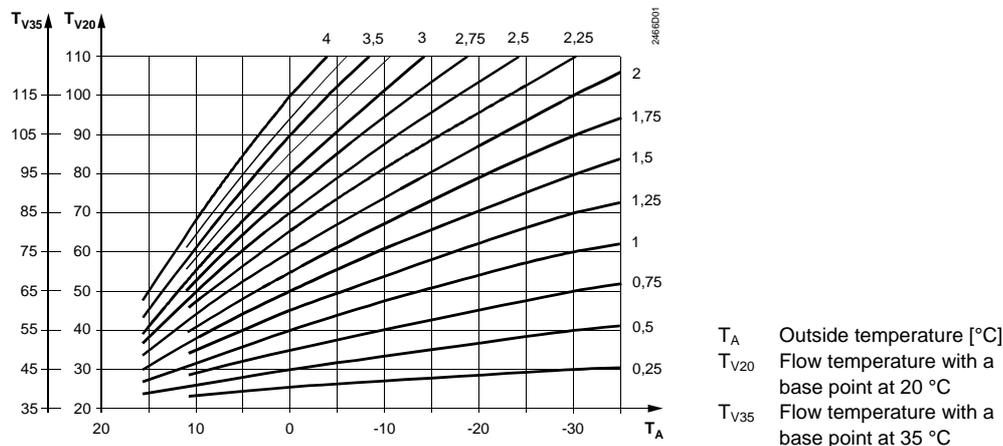
With weather-compensated control, the compensating variable can be changed in function of the operational level, independent of the selected room temperature authority:

- Without changeover: weather-compensated control with or without room temperature influence when heating to the normal **and** to the reduced temperature
- With changeover: weather-compensated control with or without room temperature influence when heating to the normal temperature, and room temperature compensated control when heating to the reduced temperature

In addition, the RVP102 allows the base point (tilting point) of the heating curve to be changed:

- Base point at 20 °C flow temperature: suitable for radiators and underfloor or ceiling heating systems
- Base point at 35 °C flow temperature: suitable for convectors

## Heating curve chart



**Boiler temperature control** The boiler temperature is controlled via a single-stage burner which is switched depending on demand. The burner's minimum on time is two minutes. The switching differential is adjustable in the range 1...20 K (factory-setting 6 K).

The boiler will be shut down:

- After quick setback
- When there is no demand for heat

This means that it will not be necessary to maintain a minimum boiler temperature.

## Frost protection for the boiler

If the boiler temperature falls below 5 °C, the burner will be switched on. After it has risen above this level by the amount of the switching differential, the burner will be switched off again.

## Frost protection for the plant

Frost protection for the plant protects the heating plant against freeze-ups by activating the circulating pump. It can be provided with or without an outside detector:

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

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

## Frost protection for the building

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.

- Without room unit:
  - Attenuated outside temperature  $\leq 5$  °C: the control is switched on and the flow temperature is controlled such that a room temperature of 5 °C will be maintained
  - Attenuated outside temperature  $> 6$  °C: the control is switched off
- With room unit and with quick setback active:
  - Room temperature  $\leq 5$  °C: the control is switched on and the flow temperature is controlled such that a room temperature of 5 °C will be maintained
  - Room temperature  $> 6$  °C: the control is switched off
- With room unit, but without quick setback:
  - Same as without room unit can be deactivated, if required.

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

## Pump control

Control functions of the circulating pump:

- Pump overrun of six minutes (function can be deactivated)
- Pump kick; the circulating pump is switched on for one minute at 36-hour intervals

## Boost heating

When changing from the reduced temperature to the normal temperature, the controller will initiate boost heating, in which case 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.

Boost heating necessitates a room unit. This function can be deactivated if required.

### **Quick setback**

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.

Quick setback necessitates a room unit. This function can be deactivated if required.

### **ECO automatic energy saver**

The ECO automatic energy saver switches the heating off if permitted by outside temperature conditions while considering the outside temperature and an adjustable heating limit.

In the RVP102, the ECO automatic energy saver is subdivided into two part functions. ECO function 1 is primarily active during the summer months while ECO function 2 is mainly used during the intermediate seasons and responds to short-time temperature variations.

The thermal inertia of the house is taken into consideration by making use of the attenuated outside temperature.

The ECO temperature can be adjusted in the range  $-10\text{ K} \dots +8\text{ K}$ . It refers to the room temperature setpoint.

The ECO automatic energy saver requires an outside detector. It can be switched off, if required.

### *ECO function 1*

This function operates as an automatic summer / winter function. It switches the heating off when the attenuated outside temperature crosses the heating limit.

The heating limit is determined as follows:

Heating limit = normal room temperature setpoint + ECO temperature

**Example:**

A normal room temperature setpoint of 20 °C and an ECO temperature of  $-5\text{ K}$  give a heating limit of 15 °C.

### *ECO function 2*

This function operates as an automatic 24-hour heating limit switch. It switches the heating off when the actual **or** the composite outside temperature crosses the heating limit.

The heating limit is determined as follows:

Heating limit = current room temperature setpoint + ECO temperature

**Example:**

A current room temperature setpoint of 18 °C and an ECO temperature of  $-5\text{ K}$  give a heating limit of 13 °C.

The current room temperature setpoint depends on the weekly heating program.

This function takes into account when heating to a reduced level is provided - in contrast to ECO function 1.

The heating will be switched on again when both the actual **and** the composite temperature have fallen below the limit by 1 K.

### **Room temperature influence**

The room temperature influence is dependent on:

- The setpoint / actual value deviation of the room temperature
- The slope of the heating curve
- The selected authority (0...100 %)

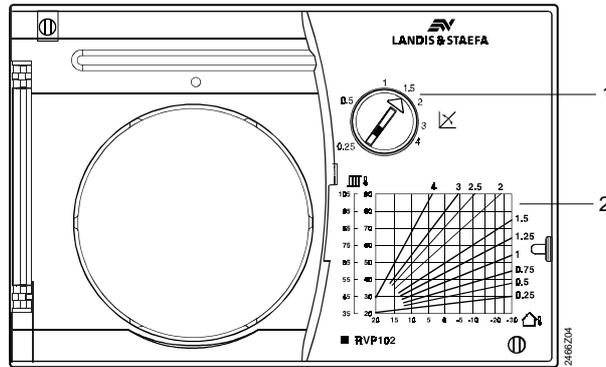
With boiler temperature control, the room temperature influence ensures that there will be no control offset. In addition, the room temperature influence controls boost heating and quick setback.

### **Remote operation**

The room unit QAW70 is required for:

- Acquiring the room temperature
- Selecting the operating mode
- Entering the weekly heating program (changeover times and setpoints of normal and reduced room temperature)
- Selecting the operational level with the presence button
- Entering the holiday period

## Mechanical design



- 1 Setting knob for heating curve slope
- 2 Heating curve chart

## Controller

The RVP102 is comprised of controller insert, which houses the electronics, the power section, the output relays and the operating elements, and the base, which carries the connection terminals. The controller insert is secured to the base by means of two screws.

The operating elements for the heating engineer can be accessed after removal of a cover. The setting knob for selecting the heating curve slope is located on the front and can be accessed by the end-user.

## Mounting

The RVP102 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.)

## Notes

### Engineering

- The cables of the measuring circuits carry extra low voltage
- The cables to the burner and the pump carry AC 24...230 V
- The local regulations on electrical installations must be complied with
- Detector cables must not be run parallel to mains carrying cable for loads like pump, burner, etc.

## Commissioning

### Settings on the controller RVP102

The following settings and inputs must be made on the controller:

- Slope of heating curve
- Switching differential for burner control
- ECO heating limit
- Room temperature influence (authority of room temperature deviation on the control)
- Base point of heating curve (20 °C or 35 °C flow temperature)
- Changeover of compensating variable in function of the operational level (always weather-compensated control or changeover to room temperature-compensated control in case of the reduced level)
- Frost protection for the plant duser or deactivated
- Pump overrun of 6 minutes or 0 minutes (off)

On the RVP102, the end-user can only change the slope of the heating curve. All other settings must be made by the heating engineer.

### Settings on the room unit QAW70

The following settings and inputs must be made on the room unit:

- Operating mode
- Setpoints of normal and reduced room temperature
- Room temperature readjustments
- Heating program
- Time of day

## Instructions

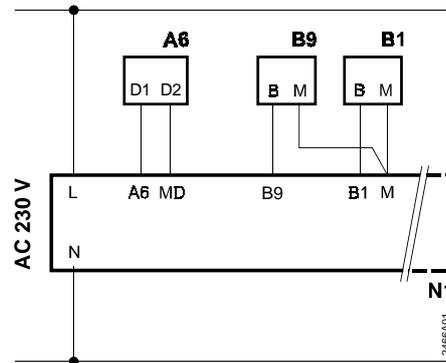
The controller is supplied with installation and commissioning instructions.

## Technical data

<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
Frequency	50 Hz
Power consumption	7 VA
Degree of protection	IP40 D EN 60529
Safety class	II EN 60730
Output relays	
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.)
Perm. ambient temperature	
Transportation and storage	-5...+55 °C
Operation	0...55 °C
Permissible cable lengths to the detectors and the room unit	
Copper cable 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
Weight (net)	0.68 kg

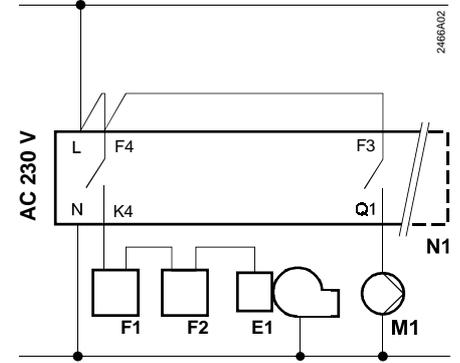
## Connection diagrams

Basic connections, low voltage side



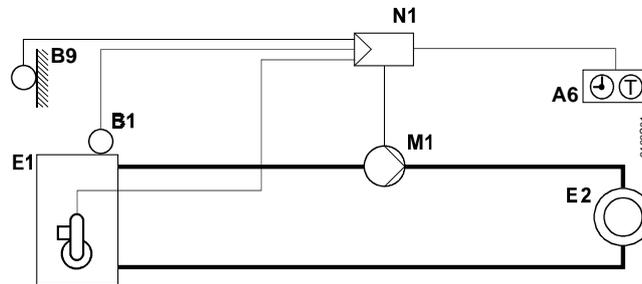
- A6 Room unit QAW70 (connections are interchangeable)
- B1 Boiler temperature detector QAD22
- B9 Outside detector QAC32
- E1 Burner

Basic connections, mains voltage side



- F1 Thermal reset limit thermostat
- F2 Manual reset safety limit thermostat
- M1 Circulating pump
- N1 Controller RVP102

## Application example



- A6 Room unit QAW70
- B1 Boiler temperature detector QAD22
- B9 Outside detector QAC32
- E1 Boiler
- E2 Load (space)
- M1 Circulating pump
- N1 Controller RVP102

# Dimensions

