

## Operating instructions

Room thermostat (heating/cooling) 24 V  
Art. no. RTR241



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## 1 Safety instructions



Electrical devices may only be mounted and connected by electrically skilled persons.

Serious injuries, fire or property damage possible. Please read and follow manual fully.

Danger of electric shock. During installation and cable routing, comply with the regulations and standards which apply for SELV circuits.

This manual is an integral part of the product, and must remain with the end customer.

## 2 Device components

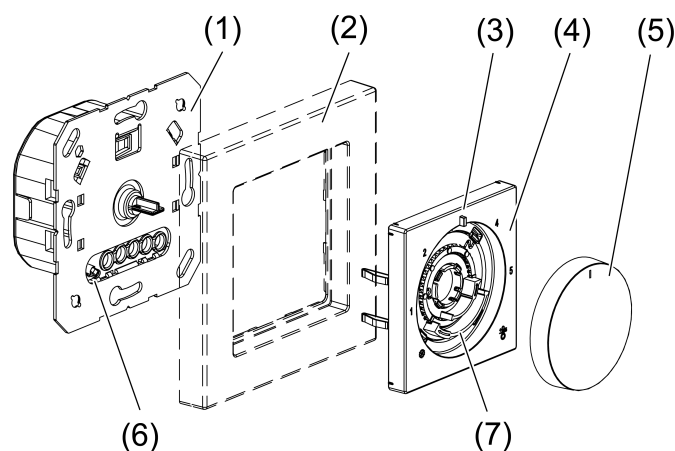


Image 1: Device components

- (1) Room temperature controller insert
- (2) Cover frame
- (3) Status LED
- (4) Central plate
- (5) Control knob
- (6) Internal temperature sensor
- (7) Adjustment rings temperature limit

**i** During renovation work, the temperature sensor (6) must not become dirty or be painted over.

## 3 Intended use

- Electronic room temperature controller for controlling electrothermal valve drives for AC 24 V
- Control of the room temperature in closed rooms
- Mounting in appliance box with dimensions according to DIN 49073

## 4 Product characteristics

- Manually setting a comfort temperature
- Manually switching off the temperature control
- Input terminal for activation of ECO temperature via central clock
- Input terminal for activating the cooling mode via central control
- Internal temperature sensor
- Frost protection function
- Temperature drop detection (adjusting to frost protection temperature when window is opened)
- Controller output working method: pulse width modulation (PWM) or two-point switchable
- Adaptation to valve type (deenergised opened or deenergised closed, switchable)
- Offset adjustment (correction value for measured temperature)
- Valve protection function (once a week opening and closing of valve)
- Permanent LED operation possible

## 5 Functional description

### ECO operation

In many areas of the building it makes sense for the temperature to be set to a lower ECO temperature at certain times rather than to heat permanently to the comfort temperature. By connecting the input terminal  $\ominus$  to 24 V, the temperature is reduced by 4 °C and the status LED lights up green. This should be controlled by a central clock. In cooling mode, the wiring of the input terminal  $\ominus$  is ignored.

### Cooling mode

Modern heat pump systems often also provide the option of cooling rooms. In cooling mode, it is possible to change the cooling temperature using the control knob. Switching between heating and cooling mode is done via the control knob or by wiring the input terminal "C" with 24 V.

### Temperature drop detection

In the event of a sharp drop in temperature, e.g. after opening a window, the system regulates to the frost protection temperature of 5 °C for a maximum of 30 minutes. Pressing or turning the control knob cancels the operation.

### Offset

This function allows the adjustment of the position of the control knob so that it corresponds to the room temperature. Thus, the indication of the temperature via the control button is comparable in different rooms. An adaptation of up to +/- 3 °C is possible.

## Controller adaptation

Depending on the heating system, the control behaviour can be adjusted.

**Pulse width modulated control** (factory setting): Optimised for electrothermal valve drives (see Technical data): The output is not permanently actuated, but for a time period (pulse width) that depends on the difference between setpoint and actual temperature. This method brings the actual temperature gradually closer to the setpoint temperature.

**Two-point control:** The output remains switched on until the selected setpoint temperature has been exceeded by 0.5 °C. The output will not be switched on again until the setpoint value is undercut by 0.5 °C. Since most heating systems respond very slowly, this type of control can entail temperature overshooting.

## Setting the valve type

Depending on the electrothermal valve drive used, an adaptation to the valve type must be made. There are valve drives where the valve is opened (deenergised opened) or closed (deenergised closed, factory setting) when no supply voltage is applied.

# 6 Operation

## Brief overview

Function	Control knob	Status LED *	LED colour
Change room temperature	... turn right or left	maximum 2 minutes	Red = heating mode green = ECO heating mode Blue = cooling mode Orange = frost protection (10 seconds)
Display operating mode	... press briefly	10 seconds.	Red = heating mode green = ECO heating mode Blue = cooling mode Orange = frost protection

\* In permanent operation, the status LED lights up continuously during the active heating or cooling phase, but with reduced brightness.

## Increasing or reducing the room temperature

- Turn the control knob to the right or left.

If the setpoint temperature is not reached, the LED lights up for a maximum of 2 minutes in the colour of the current operating mode. The indication can also take place during the entire heating/cooling process (see Activate/deactivate permanent LED operation).

In the middle position, the device regulates to approx. 20 °C setpoint temperature. The room temperature reached depends on the installation location of the device and the ambient conditions. The lowest setpoint temperature is approx. 5 °C and the highest setpoint temperature is approx. 30 °C

### Indication of the current operating mode

- Press the control knob briefly.  
The LED lights up for 10 seconds in the colour of the current operating mode. **Red** = heating mode, **green** = ECO heating mode, **blue** = cooling mode, **orange** = frost protection.

### Switching off the temperature control

- Press the control knob for longer than 2 seconds until the LED lights up **orange**.  
The device has switched to frost protection. The frost protection prevents the temperature from falling below 5 °C.  
Each time the control knob is turned, the LED lights up **orange** for 10 seconds.
- To activate the temperature control, press the control knob again for more than two seconds.  
The device switches back to the previous operating mode. The LED lights up for 10 seconds.

### Manual switching between heating and cooling mode

If 24 V is present at the input terminal **C**, manual switching to heating mode is not possible.

- Press the control knob for longer than 4 seconds until the LED flashes **red** in active heating mode, flashes **green** in ECO heating mode or flashes **blue** in cooling mode.
- Briefly press the control knob again to change the operating mode.
- Press the control knob for longer than one second until the LED lights up continuously to accept the displayed operating mode.  
After 10 seconds without actuation, the displayed operating mode is automatically adopted.

### Calibrating the actual and setpoint temperature

To see which rotary switch position corresponds to the current temperature, proceed as follows.

- Heating mode: Turn the rotary switch slowly anticlockwise when the heating phase is active (LED lights up **red**).
- Cooling mode: Turn the rotary switch slowly clockwise when the cooling phase is active (LED lights up **blue**).

When the current temperature is reached, the LED goes out.

### Activate/deactivate permanent LED operation

The status LED lights up with reduced brightness during the active heating or cooling phase.

- Press the control knob for longer than 10 seconds until the LED lights up or flashes in the colour **magenta**.  
LED lights up **magenta** = permanent operation is active  
LED flashes **magenta** = permanent operation is inactive (default setting)
- Press the control knob briefly to switch the mode.
- Press the control knob for more than one second or wait 10 seconds to adopt the displayed mode.

## 7 Information for electrically skilled persons

### Selecting a suitable installation location

- Recommended installation height: 1.50 m on interior walls
- Do not mount the device near sources of interference, such as ovens, refrigerators, draughts (e.g. next to the door) or direct sunlight. This affects the temperature measurement of the internal temperature sensor.
- Do not mount the device within shelf walls or behind curtains and similar covers
- Do not use the device in multiple combinations with heat-generating devices such as dimmers



### **DANGER!**

Mortal danger of electric shock.

Disconnect the device. Cover up live parts.

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## Connecting and fitting the device

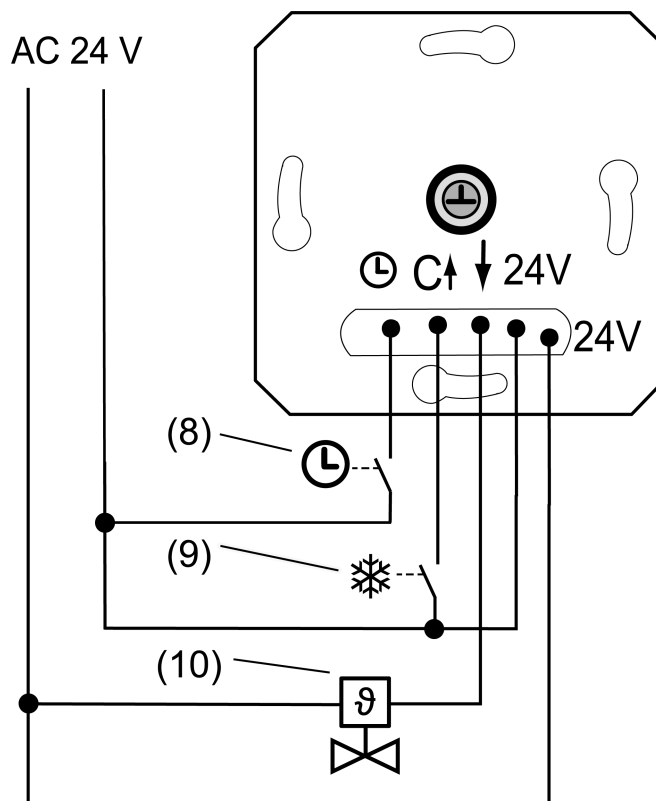


Image 2: Connection example of the insert

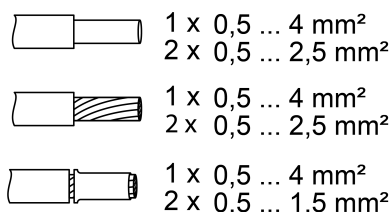


Image 3: Clampable conductor cross-section

- Connect electrothermal valve drive (10) to insert (1) according to connection diagram (see figure 2). Observe the conductor cross-sections (see figure 3).
- Optionally, connect the ECO operation input  $\ominus$  via a switching contact of a central clock (8).  
If 24 V is applied to the input, the setpoint temperature is reduced by 4 °C, exclusively in heating mode.
- Optionally, connect the cooling input C via a switching contact of the heating system (9).  
If 24 V is applied to input C, the cooling mode is active. If 24 V is switched off, the device automatically switches to heating mode. After each switchover, the LED lights up for 10 seconds in the colour of the current operating mode.
- Fit device in appliance box; terminals must be at the bottom.
- Fit the frame, central plate and control knob.
- Switch on supply voltage.



The unit calibrates itself within the first 90 minutes. Control deviations are possible during this period.

## 7.1 Commissioning

### Setting the control mode and valve type

Default setting:

- Pulse width modulated control (PWM)
- Valve type deenergised closed (NC)

This setting can be used with most heating systems without adaptation.

### Changing the settings

- Press the control knob for longer than 20 seconds.  
The LED flashes **green** for PWM control and **green/blue** for 2-point control.
  - Press the control knob briefly: The control behaviour is changed.
  - Press the control knob for longer than one second: The control behaviour is saved.  
Adapting the valve type.  
The LED flashes **red** for valve type “deenergised closed” (NC) and **red/blue** for valve type “deenergised opened” (NO).
  - Press the control knob briefly: The valve type is changed.
  - Press the control knob for longer than one second: The valve type is saved.  
The setting mode is exited automatically.
- i** After approx. 2 minutes without any operation the menu is exited without saving.

### Setting the temperature limits

The room temperature controller has a setting range of 5 ... 30 °C. The adjustment rings on the central plate can be used to limit the temperature setting range.

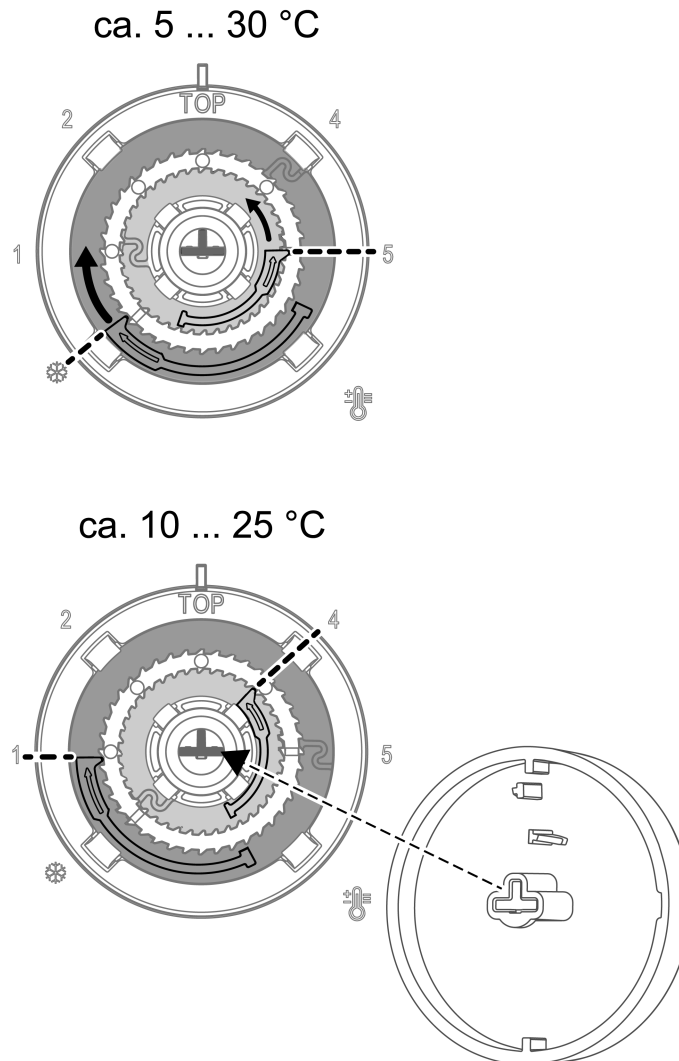


Image 4: Setting the temperature limit (before/after)

- Pull the control knob off the central plate so that the adjustment rings are visible (see figure 4).
- i** Pulling off is done by hand or with a suitable tool, e.g. vacuum lifting tool or key cap puller.
- Turn the large blue adjustment ring clockwise to the desired minimum temperature. Each notch corresponds to a change of about 1 °C.
- Turn the small red adjustment ring anticlockwise to the desired maximum temperature.
- i** The respective adjustment ring can only be turned in one direction. To return to the original setting, continue turning to the respective position.
- Replace the control knob, observing the coding (Fig. 4, bottom) of the control knob and rotary axle.

## Setting the offset

This function allows the adjustment of the position of the control knob so that it corresponds to the room temperature. Thus, the indication of the temperature via the control button is comparable in different rooms. An adaptation of up to +/- 3 °C is possible.

- i** This setting is only possible if the lower temperature limit has not been raised by the blue setting ring (see Setting the temperature limits).

Precondition: The desired setpoint temperature has been reached in the room.

- Turn the control knob to 5 °C (left stop) and press twice in quick succession (double-click).  
The LED flashes quickly, alternately **red** and **green**.
- Turn the control knob to the desired position for the current room temperature and press it for longer than one second.  
The control knob position is saved and the LED lights up **green** for 5 seconds.

If the LED flashes **red** for 5 seconds, the change was greater than +/- 3 °C and the adaptation is discarded.

## 8 Technical data

Rated voltage	AC 24 V SELV (± 10%)
Mains frequency	50 / 60 Hz
Standby power	max. 0.1 W
Connected load	max. 24 W
Connection: Thermal valve drive 24 V~, art. no. TSA24NCWW	
Number valve drive	1 ... 5
Ambient temperature	-5 ... +45 °C
Storage/transport temperature	-25 ... +70 °C
Cable length inputs	max. 100 m
Controller class (EU 811/2013)	IV
Contribution to energy efficiency	2%

## 9 Warranty

The warranty is provided in accordance with statutory requirements via the specialist trade.

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