Energy Systems

# Roth control station RKR 3 H/K

## Assembly Instructions


*German quality since 1947*

# Contents

# General information

## Intended use

**Before installation, the fitter or operator must read and understand these instructions.**

The Roth control station RKR 3 H/K is used for demand-based control of the inlet temperature in panel heating and cooling systems.

The inlet temperature is controlled by the integrated CC-HC climate controller, depending on the outside temperature and using a selectable heating/cooling curve.

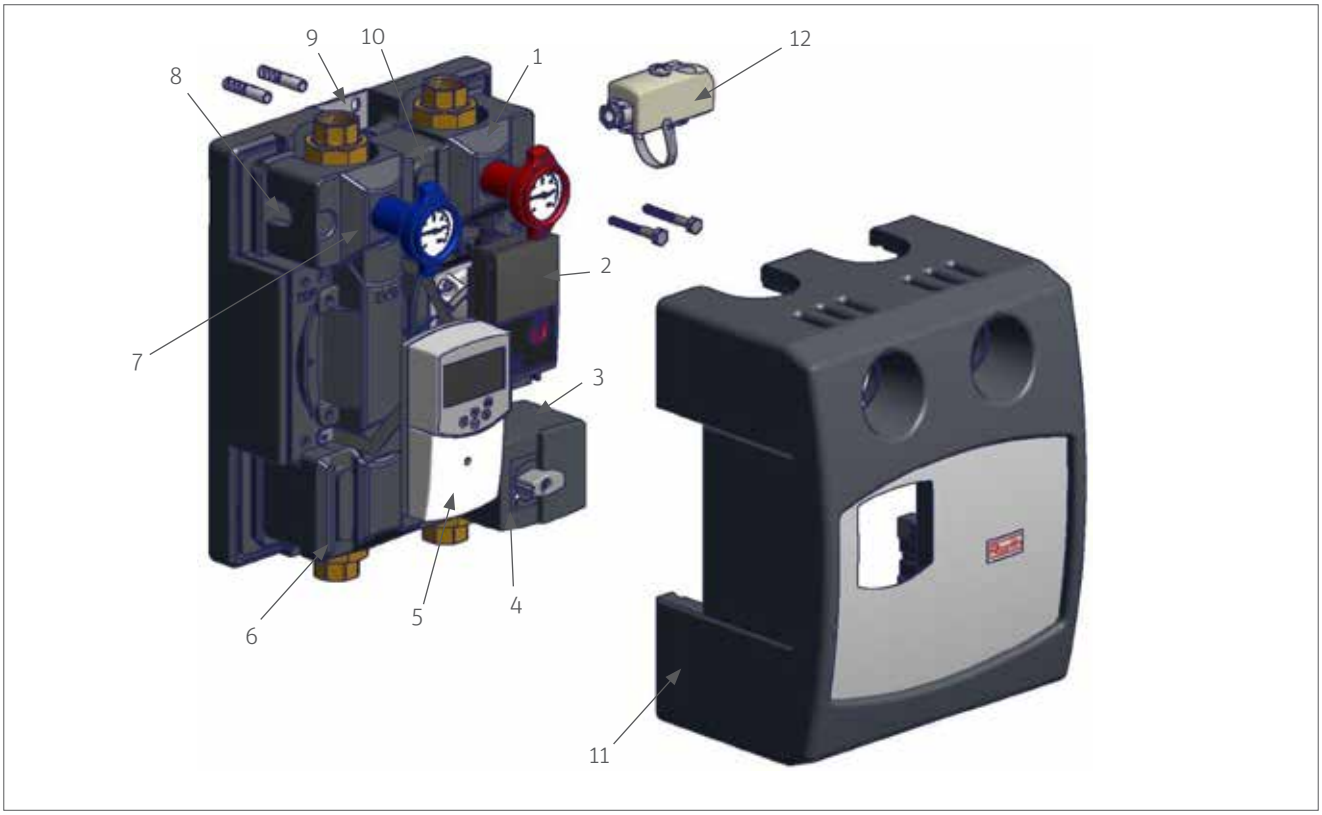
The control station is designed for installation at a central location in detached or semi-detached homes, in dry rooms, and in both a residential and industrial environment. No other use is authorised.

## Benefits

- Compact design, integrated modern controller with large display
- Fully insulated hydraulics according to EnEV specifications
- Inlet temperature control which can be set individually within a wide range (e.g. min./max. limit)
- Controller features day programming with 9 fixed and 4 individual user programs
- Suitable for heating and cooling operation, switching between HEATING / COOLING can be performed manually at the controller or via an external switching signal (e.g. from a heat pump). The factory setting for the controller is heating mode.
- 2 integrated ball valves
- Thermometer for inlet and return temperature
- Powerful, high-efficiency pump with 7 m pump head
- Suitable up to approx. 18 kW
- Satisfies energy efficiency class A and compliant with the ERP Directive for 2013 and 2015.

# General information

## Layout/Components




1 Ball valve, forward flow:
- with gravity brake
- with inlet temperature sensor connection
- red thermal handle, L = 92
- thermometer Ø 51, L = 100, 0 – 120 °C

2 Circulation pump
3 Mixer actuator NR230
4 3-way mixer
5 CC-HC climate controller
6 Return block
7 Ball valve, return:
- with return temperature sensor connection
- blue thermal handle, L = 92
- thermometer Ø 51, L = 100, 0 – 120 °C

8 Return temperature sensor
9 Wall bracket; with screws and pins
10 Inlet temperature sensor
11 Heat-insulating shell (multi-part)
12 Temperature limiter, to be attached externally on the forward flow side

# Installation

## Safety instructions

**Always unplug the system at the mains and disconnect the power supply before starting work!**

**The appliance may only be connected and put into operation by qualified personnel and in accordance with the local regulations which apply!**

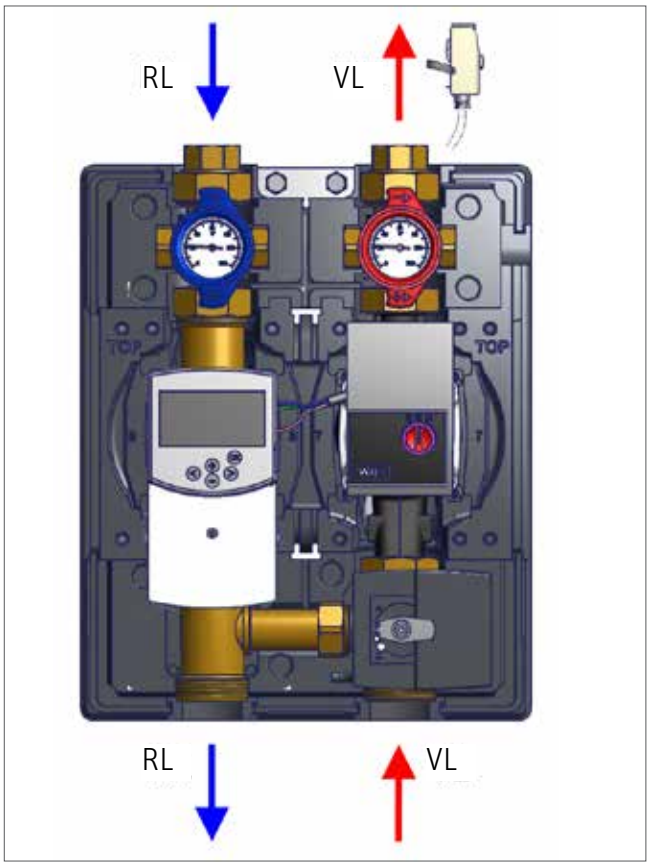
**The control station is not splashproof or impervious to dripping water and must therefore only be installed in a dry location!**

## Installation

The control station is designed to be installed directly against a dry, stable surface. To do this, remove the insulation shells and install the rear section using the wall bracket with suitable screws and pins.

It must be ensured that the forward flow and return pipes are connected correctly!
The customer should think about incorporating a shut-off device on the primary side.

During the installation procedure it is also important to ensure that the controller, pump, sensor and temperature limiter cables are not damaged, stretched or buckled. Installation is normally performed at a central location in the building.



# Electrical connection

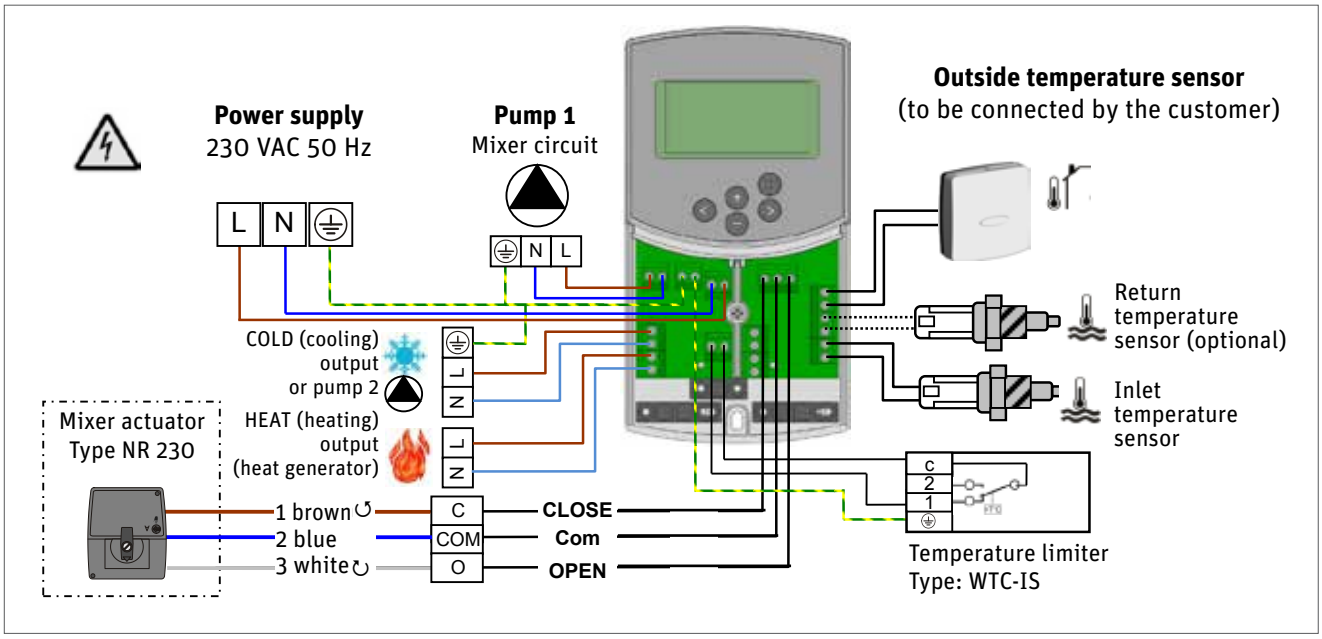
## Electrical connection

**Please refer to the operating instructions for the controller!**

The pump, mixer actuator, inlet and return temperature sensors and temperature limiter are supplied wired ex-works.
Fit the outside temperature sensor and connect it to the controller using the 2-wire cable.

Connect the power supply to the L / N / PE controller.
Connecting pipe 3 x 1,5 mm².

L = Phase 230 V (brown)
N = Neutral (blue)
PE = Protective conductor (green/yellow)




## Note/Option

In order to ensure that the pump is controlled in line with requirements, the pump output of the Roth connection module, which is available separately and which includes a pump control card, or the pump output of the Roth wireless control unit can be connected at the controller input In1.

## Temperature limiter (TL)

The TL is supplied wired ex-works and must be attached to the forward flow line for floor heating at a certain distance from the control station. In the event of a fault, the TL switches off the circulation pump, thereby preventing the floor heating from overheating. In order to prevent this from being triggered unintentionally, the temperature setting at the TL should be a few degrees higher than the desired inlet temperature.

The TL setting ex-works is a standard value of approx. 55°C.

# Technical data/Materials

| Fittings and circulation pump | |
|---|---|
| Permissible ambient temperature range | 0 - 50°C [1] |
| Permissible operating flow temperature range | 0 - 90°C [1] |
| Maximum operating pressure | 6 bar |
| Mixer Kvs value | 6,3 $m^3/h$ |
| Circulation pump | Wilo Yonos PARA RS25/7 RKA |
| Pump installation length | 180 mm |
| Operating voltage | 230 VAC |
| Pump performance | [1] See separate pump description. |

| Controller | CC-H/C |
|---|---|
| Line voltage | 230 VAC ±10%, 50 Hz |
| Operating temperature | 0 - 50°C |
| Temperature accuracy | ± 0,1°C |
| Control behaviour | Non-linear PID control<br>Intelligent control of 3-point actuators with determination of operating point |
| Degree of protection | IP 30 |
| Protection class | II |
| Pump output | Relay 250 V, 5 A |
| Valve actuator output (3-point) | 2 triacs 230 V, 2 A |
| Outside temperature sensor | NTC 10 KΩ at 25°C (Class II – IP 55) |
| Inlet temperature sensor/<br>Return temperature sensor | NTC 10 KΩ at 25°C (Class I – IP 68;<br>does not apply to plugs) |
| Software version | Is shown in the display when the controller is switched off. |

| Mixer actuator | NR230 |
|---|---|
| Voltage | 230 VAC ±15%, 50/60 Hz |
| Power consumption | 2,5 VA |
| Degree of protection | No information |
| Protection class | II |
| Connection | Cables, 3 × 0,75 $mm^2$ |
| Angle of rotation | 90° electrically limited |
| Torque | 5 Nm |
| Running time | 140 s (50 Hz) |
| Direction of rotation | Can be selected at terminals |
| Manual adjustment | Temporary or permanent disengagement |
| Position indication | Yes, via reversible scale |
| Ambient temperature | 0 - 50°C |
| EMC | CE as per 89/336/EEC |
| Low Voltage Directive | CE as per 73/23/EEC |
| Maintenance | Maintenance-free |

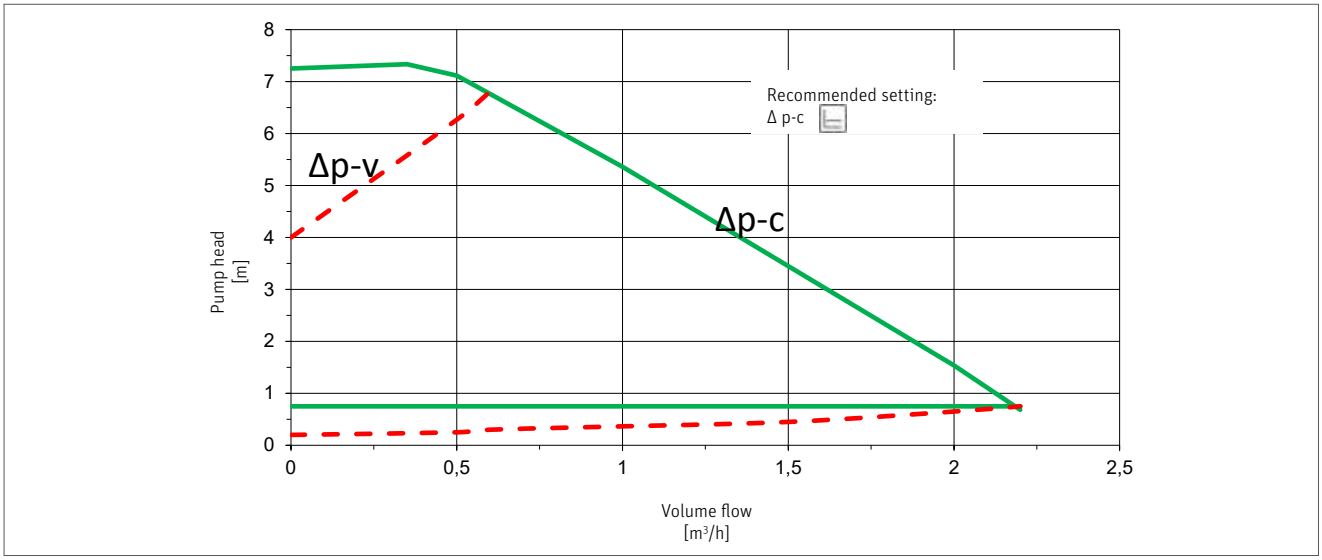
| Materials | |
|---|---|
| Fittings | Brass Ms 58 |
| Pipe parts | Steel pipe, coated |
| Plastics | Impact- and temperature-resistant |
| Flat packings | AFM 34 or EPDM |
| O-rings | EPDM |

# Technical data

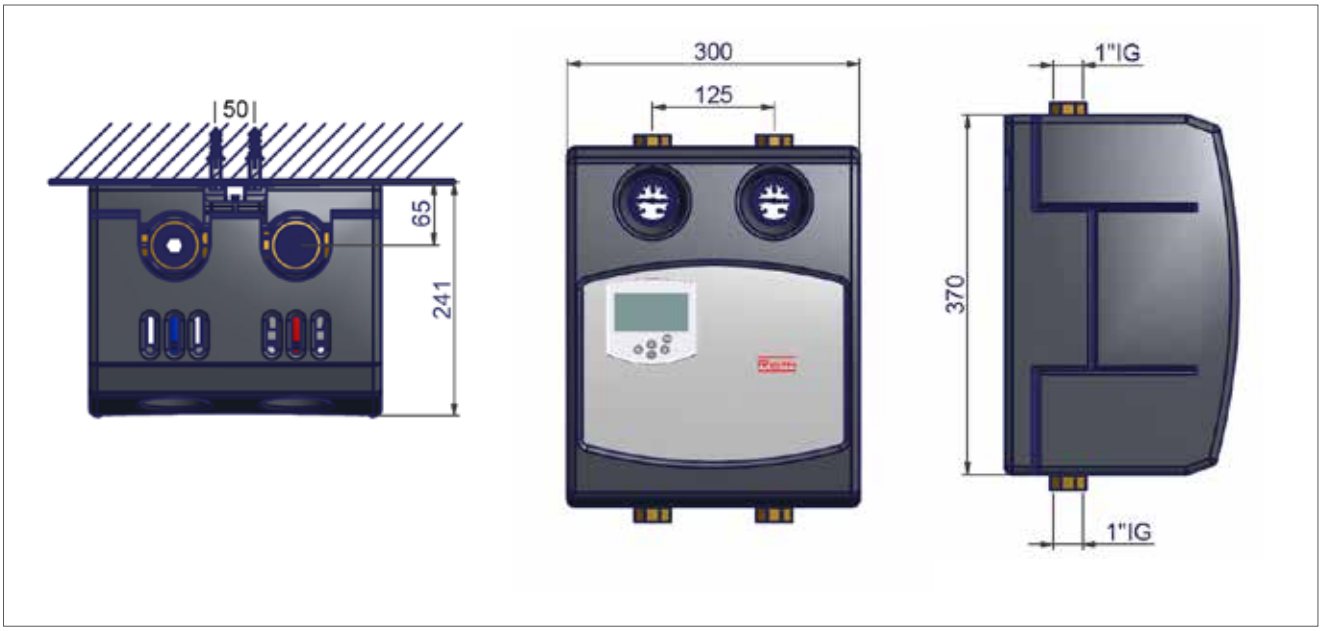
## Pump diagram

Pump characteristic curve including control station pressure loss for the Wilo Yonos PARA RS25/7 RKA high-efficiency pump.

Satisfies energy efficiency class A and compliant with the ERP Directive for 2013 and 2015.




## Dimensions



# Troubleshooting

| X. | Problem | |
|---|---|---|
| X.X | **Possible cause** | **Solution** |
| **1.** | **Heating circuit fails to heat up.** | |
| **1.1** | The temperature limiter (TL) switches off the control station pump.<br>**Cause:** The TL setting is too low. | Adjust the TL setting to approx. 10 K higher than the target inlet temperature.<br>⚠ Do not exceed the maximum permissible inlet temperature!<br>⚠ The differential gap of the TL is approx. 5 - 10 K.<br>ℹ The control station can start up again more quickly if the TL is removed for a short time in order to allow the unit to cool down to the switch-on temperature. |
| **1.2** | The TL switches off the control station pump.<br>**Cause:** The pump remains switched on, even though the heating circuits are closed. The water inside the control station heats up due to the waste heat of the pump. When the maximum temperature is reached, the TL switches off the pump! | Install the TL again at a greater distance from the control station.<br><br>Use an electrical control distributor with pump logic (relay).<br>The pump logic ensures that the pump only operates when at least one heating circuit is open. |
| **2.** | **Inlet temperature cannot be adjusted to the desired value or is subject to major fluctuations.** | |
| **2.1** | The control station forward flow and return pipes have been connected the wrong way round. | Check that all control station connections are correct. |
| **2.2** | The pump head / pump stage setting is too low. | Increase the speed or pump head / pump stage. |
| **2.3** | The heating load is too high for the control station, i.e. the heat consumption exceeds the rated output of the control station. This state may occur temporarily, e.g. when heating a "cold" floor for the first time. | Check the maximum heat requirement and compare it with the rated output. It may be necessary to distribute the heating circuit to a second control station or install a control station suited to higher power levels.<br><br>If the problem has been caused as a result of the floor heating system heating up for the first time, normal function may be achieved after the initial heating up period (2 – 3 days). This particularly applies in the case of operation within the upper rated output range. |

**ROTH UK Ltd**
1a Berkeley Business Park
Wainwright Road
Worcester WR4 9FA
Phone +44 (0) 1905 453424
E-Mail enquiries@roth-uk.com
technical@roth-uk.com
orders@roth-uk.com
accounts@roth-uk.com
roth-uk.com

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