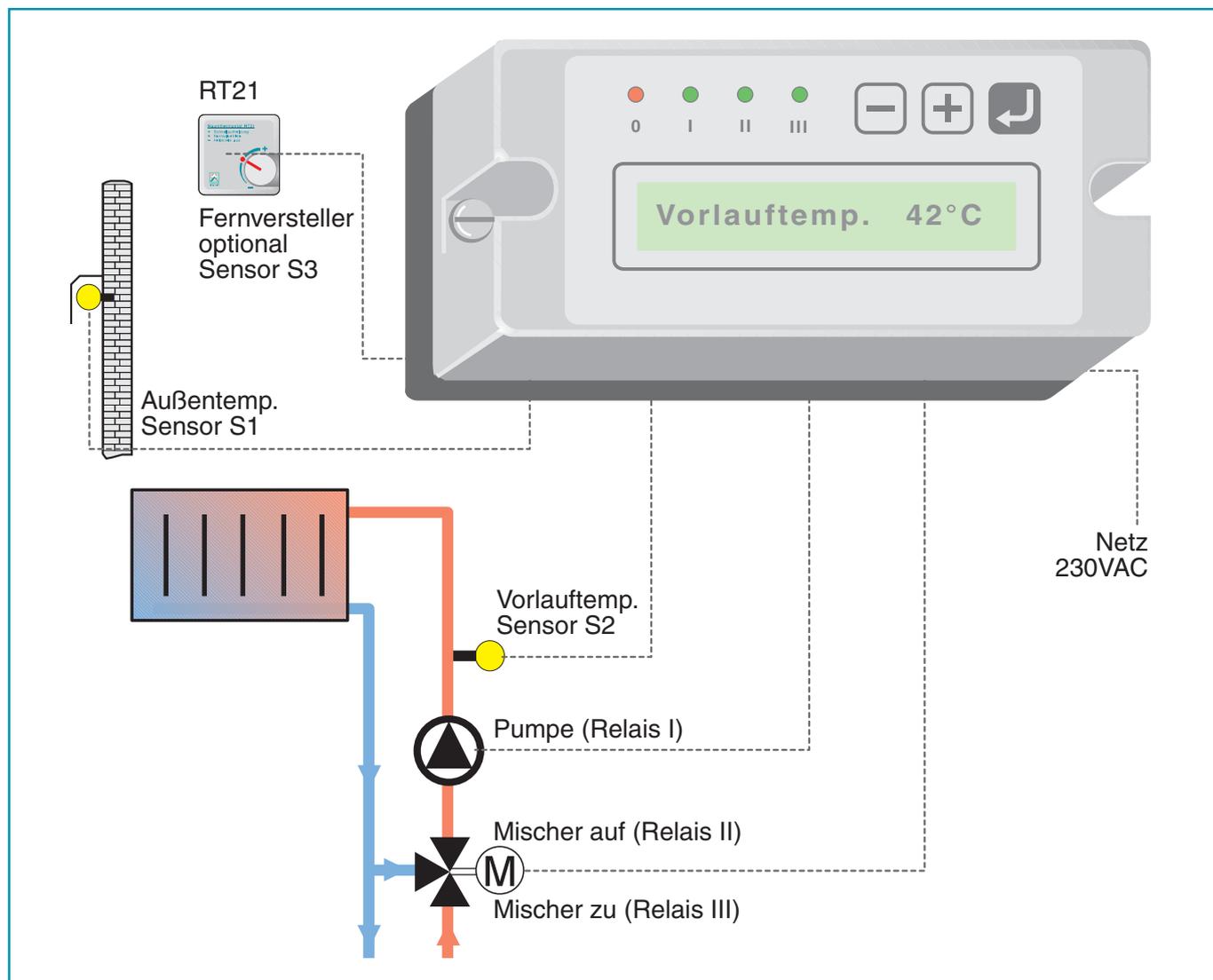


Heating circuit controller HR3

Assembly and operating instruction

The heating circuit controller HR3 serves to control a floor heating or a radiator heating control by atmospheric conditions. Depending on the outdoor temperature, the desired flow temperature which is being calculated by the device varies. The HR3 switches the heat circuit pump and sets the heating circuit mixer to the correct position. The heating circuit temperature may comfortably and simply be influenced from the living room by the optionally connectable remote control RT21.



1. Controller description

The HR3 is a microprocessor controlled temperature control with 3 sensor inputs and 3 relay outputs to control a heating circuit by atmospheric conditions.

The 16-digit display and the 3 buttons allow a menu and user prompt in different languages.

With the three hand actuated auxiliary switches  Plus, Minus, Enter, settings are performed in the selected menu and the desired values such as current temperature, operating hours or plant parameters are being displayed. With a menu interlock, the settings of the controller may be protected against involuntary misadjusting.

With a comprehensive control software, a correction of days, an overnight lowering as well as a comfort temperature rising may be adjusted in addition to the heating characteristic line. The device is equipped with an internal clock and up to 3 day/comfort/overnight operating times are available for each day of the week. In this way, the device may be adapted to the local circumstances and to the personal requirements.

The light-emitting diode (LED) at the front side of the HR3 controller shows the current operating status of the installation:

-  LED 0 (red):
 - gives light for the automatic operation when no relay is active.
 - flashes slowly to indicate that operating mode „manual“ or „off“ is selected.
 - flashes rapidly as a warning if there is a malfunction such as a defective temperature probe.
-  LED I (green):
 - gives light when the relay R1 switches on = heating pump activated
-  LED II (green):
 - gives light when the relay R2 switches on = mixer runs/clocks up
-  LED III (green):
 - gives light when the relay R3 switches on = mixer runs/clocks down

The KTY81210 probes allow a precise collection of temperatures and controlled switching behaviour of the whole working area.

Please read this manual completely before commissioning!

2. Assembly of the controller HR3

2.1 Wall mounting

Simple wall mounting of the base with a 2-point fixture by means of fastening screws (4x6) and plugs (M6).

2.2 Electrical connection

The installation is to be performed according to VDE or to the applicable local regulations by qualified specialist staff!

The connecting base is divided in extra-low voltage and line voltage by a separation panel. The live supply lines are introduced into the right base side and are fixed with the joined strain reliefs. The probe and extra-low voltage lines are to be inserted into the left side of the connection base.

The protective conductors of the supply main and the plugged consumer are to be connected to the 3-pole *earthing terminal strip!*

Then, the wires are to be laid on according to the plan of terminal connections in the following order:

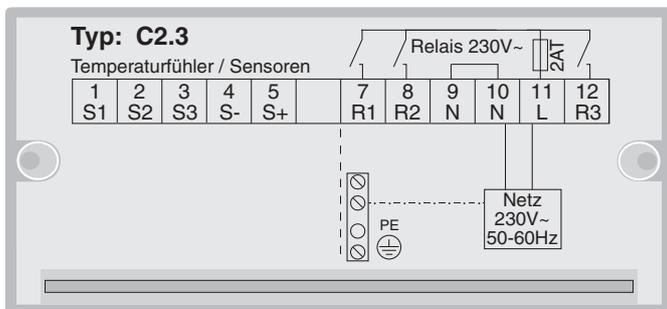
Left base side: Probe connection clamps (5V DC)

- Kl. 1/4 temperature probe „S1“ -outside probe
- Kl. 2/4 temperature probe „S2“ -flow probe
- Kl. 3/4 temperature probe „S3“ -RT21/remote control (optional)
- Kl. 5 remains unused

Right base side: mains supply clamps (230V AC 50Hz)

- Kl. 7 relay output „R1“ for the heating pump
- Kl. 8 relay output „R2“ for the heating mixer „Open“
- Kl. 9 zero conductor N for heating pump and heating mixer
- Kl.10 zero conductor N of the supply main and circulation pump
- Kl.11 external conductor L of the supply main
- Kl.12 relay output „R3“ for the heating mixer „closed“

The connection of all protective conductors PE is performed on the 3-pole earthing terminal strip.



23 Cable installation

The temperature probe wires are to be laid separate from the supply lines in order to prevent from interference impulses (e.g. by induction). For the extra-low voltage wires the safety regulations of the VDE 0100 part 410 for the protection of extra-low voltage are to be followed. If required, the cables of the temperature probes may be extended up to about 50 m e.g. by a 3 x 1.5 NYM cable without influencing the measuring accuracy. In this case, please make absolutely sure that the clamping of the extension has no transition resistancies.

3. Temperature probe with KTY81-210 sensors

A correct assembly and the right placing of the probe is decisive for the total functioning of the installation. Make sure that the temperature probe is really mounted to the area which is to be measured and that the probe cable may be laid in a tube isolation on a length of about 20 cm from the measuring point and that it is in this way protected against cooling down.

4. Commissioning

Safety note: When working with the controller and the plugged consumers, the mains tension is to be disconnected for all poles as due to the electronic switching of the devices, residual current might flow.

Caution: The controller does not replace safety technical equipment in any case. Measures, such as antifreeze, protection against scald, protection against overpressure, etc. are to be performed for the installation if required. Plugging of the main module to the wall base (**idle!**).

After switching on the the supply voltage, the controller is ready for operation.

Course of the parametrizing for the specialist:

1. **Change language if required** (refer to 8.6)
2. **Set clock** (refer to 8.1)
3. **Set operating times** (refer to 8.3)
4. **Perform setting of desired values** (refer to 8.4)
5. **Check mixer running time and set if required** (refer to 8.6)
6. **Function test for manual operation** (refer to 8.5)
7. **Checking the temperature indication** (refer to 8.2)
8. **Save user settings** (refer to 8.8)
9. **If required interlocking of the manual settings** (refer to 8.7)

Error messages caused by e.g. defective probes are shown by flashing of the red LED. The error is also shown in the menu service value as clear text.

In case of an error, the service values are to be logged in order to allow the specialist staff a remote diagnostic by phone.

5. Notes for malfunctions

Before opening the device, switch off the line voltage!

The controller is protected by a fine-wire fuse 2AT. It may be checked and replaced if necessary after switching off the current and removing the pluggable module from the wall base as well as after removing the back panel. The function of the temperature probe may be controlled with an ohmmeter according to the table. If a probe which is required is interrupted, the controller will switch off the corresponding function.

6. Technical data

Temperature resistance table for KTY81-210 probes:

T./°C	-10	0	10	20	30	40	50	60	70	80
R./W	1495	1630	1772	1922	2080	2245	2417	2597	2785	2980

- Basic device: pluggable plastic housing
- Dimensions: 112 x 52 x 106 (W x H x D)
- System of protection: IP40 / DIN 40050 CE
- Operating voltage: 230 V +/- 10% / 50-60 Hz
- Own consumption: ca. 2 VA
- Total breaking capacity: 400VA
- Fuse: 2AT
- Environmental temp.: 0 to 40°C
- Display: LCD 1 x 16 alphanumeric characters
- Measuring range: -25°C ... 150°C
- Probes: KTY 81-210

7. Short overview of the menu control

The main menu of the HR3 consists of the following menu items described in short. The required menu is selected with the Plus or Minus button and it is confirmed with the Enter button.

01 Temperatures	 →	Display menu: - temperature values - desired course
 		
02 Running times	 →	Setting menu: - weekly program - daily program
 		
03 Settings	 →	Setting menu for: - desired values - summer /winter switching
 		
04 Operational mode	 →	Setting menu for: - Automatic operation - contin. day operation - contin. night operation - manual operation - setting value operation - Off
 		
05 Clock setting	 →	Setting menu for: - time - date
 		
06 Special function	 →	Special function: - voice selection - mixer running time - antifreeze function - manual offset - probe 3 (e.g. RT21)
 		
07 Menu interlocking	 →	Menu interlocking: Interlocking function against involuntary misadjusting in the menus: - 02 settings - 03 operating mode - 04 times - 05 special function
 		
08 Standard values	 →	Administration of standard values (presettings and user settings)
 		
09 Service values	 →	Display of the service values

8.1 Set current time

For a concrete function of the installation, it is required that the current time is set when it is commissioned or after several days of power failure (about 96 hours).



With the Plus / Minus buttons ( ) the value of the current cursor position is being modified. With the button Enter () you go to the following set value or you will quit the menu on the last position.

8.2 Menu "01 Temperatures"

In this menu, the current temperature values are being displayed. First, an overview of the following items is displayed: outside temperature (desired flow temperature) and actual flow temperature.

By pressing the button, any of these values and the correction value of the optionally pluggable remote controller RT21 may be displayed individually with clear text.

8.3 Menu "02 Operating times"



In this place, the heating circulation daily operation ranges are set which are performed either in daily programs (same every day) or in weekly programs (individual settings every day). Up to 3 daily operating heating circuit ranges may be selected for every day. For any daily operating range you may determine if it shall take place with or without additional comfort peaking.

Outside the daily operating times, the heating will work in the lowered overnight operation.

The daily operating hours may be selected from 0.00 to 24.00h every day. If the second or third daily operating range is not required, the starting time is to be set to 24:00h in order that no further daily operation will take place.

Daily correction, comfort peaking as well as the overnight lowering are described in detail under 8.4 Menu "03 Settings".

8.4 Menu "03 Settings"



In this menu, the settings are performed for the regulating functions and therewith for the required temperature range.

S/W day **18°C** (setting range 10...30°C)

Select the outdoor temperature at which the summer/winter switching shall take place during the heating circuit operation. Summer operation: As soon as the selected temperature value is exceeded, the mixer will shut down completely and the heating circuit pump will switch off. Winter operation: As soon as the temperature remains under the set value, the heating operation will be restarted.

S/W night **12°C** (setting range 10...30°C)

refer to S/W day, but it is valid for the heating circuit overnight operating time.

VL>HZK OFF **15°C** (setting range 7...30°C)

If the desired flow temperature remains under the value which is set here, the mixer will shut down and the heating pump will switch off.

To be followed 03 Settings on page 4

max. VL 45°C (setting range 30...80°C)

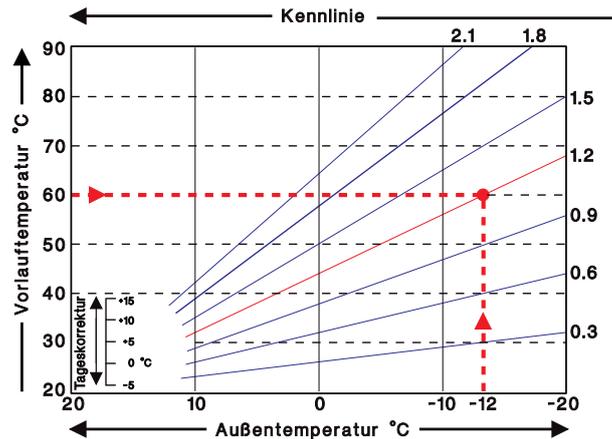
The maximum flow temperature which is set here, limits the upper characteristic line of the heating circuit, in order to prevent the heating circuit from overheating. This is especially required for floor heating systems as a too high flow temperature might cause damage of the plastic tube or of the floor covering. If the set value is exceeded, the mixer will shut down and the heating pump will switch off.

For safety purposes, beside the electronic flow temperature limitation, the floor heating systems are to be equipped with an additional limiting thermostate which will be connected to the heating circuit pump in serial connection.

Steepness 1,2 (setting range 0,0...2,1)

With the help of the characteristic line, the heat emission of the radiators is controlled depending on the outdoor temperature. The diagram below shows the influence of the selected steepness of the characteristic line on the desired flow temperature of the heating circuit. The correct characteristic line is selected by determining the point of intersection of the calculated maximum flow temperature (dimensioning temperature) at a minimum outdoor temperature.

Example: The dimensioning temperature of the radiations is 60°C flow at the lowest outdoor temperature according to the heat requirement calculation of -12°C. The point of intersection results in a steepness of 1,2 as setting value.



Daily correction 5K (setting range 0...50K)

A parallel displacement of the heating characteristic line during the daily operating hours is performed by the daily correction as it might occur that with the set characteristic line the building would not be optimally heated corresponding to the outdoor temperature. If the characteristic line is not optimized, the following situation might often occur:

- if the weather is warm - it is too cold in the room
- if the weather is cold - it is too warm in the room

In this case, the steepness of the characteristic line is incrementally lowered by 0.2 points and the daily correction is at each step raised by 2-4 °C. If required, you may repeat this proceeding several times.

Comfort peaking OFF (setting range OFF...10K)

During the daily operating hours with activated comfort peaking, this value will be added to the daily correction in order to achieve a higher temperature in the living room.

Overnight lowering -2K (setting range +10...-30K)

If a negative value is set for the overnight lowering, the flow temperature of the set characteristic line will be reduced during the times when the installation is not run in the daily operation. Mainly overnight but as well during daytime when no one is at home, the room temperature will be less in order to save energy. Example: At a daily correction of +5K and an overnight lowering of -2K results a required flow temperature during overnight operation of minus 7°C.

04 Operational mode

Selecting \oplus or \ominus confirmation with \square

8.5 Menu "04 Operational mode"

In this menu you may set the controller from automatic operation to continuously daily operation, continuously overnight operation, off, manual or target value operation.

Auto = automatic operation

The controller is running in normal operation with the described functions.

D-day = continuously daily operation

The controller is always running on the daily program with the daily correction, the operating times are disregarded. If this operational mode is activated, only the reference „daily operation“ will appear on the display.

D-night = continuously overnight operation

The controller is always running on the overnight program with the set overnight lowering, the operating times are disregarded. If this operational mode is activated, only the reference „continuous overnight operation“ will appear on the display.

OFF = standard function switched off

Any standard functions are switched off. If this operational mode is activated, the reference „operational mode OFF“ will appear from time to time and the red LED flashes as a warning.

Manual = manual operation (refer to paragraph 4.)

Any standard functions are switched off and the heating pump is switched on. The mixer will be opened and closed by pushing a button. The current flow temperature will be displayed on the screen. During the manual operation, the red LED flashes as a warning. After quitting the menu, the controller will restore the operational mode which had been last used.

Target value = Checking the fixed target value

Caution: The normal standard functions are being switched off and the installation only regulates the fixed target value which is set here for the activated heating pump. The current flow temperature will be displayed on the screen. After quitting the menu, the controller will restore the operational mode which had been used last.

8.6 Menu "06 Special function"

06 Special function

Selecting  or 
confirmation with 

Language = language selection
Please select here the language required to work on all menus.

Mixer ON time = Adapting the mixer running time
The duty cycle is preset to 1 second and may vary in a range of 0,5...4,5 seconds during steps of 0,5 seconds.

Antifreeze = Antifreeze function
If the outdoor temperature is reduced to 0°C when the antifreeze function is activated, the target flow temperature is set to at least 20°C in order to prevent the heating circuit from damages by freezing. If the outdoor temperature exceeds +2°C the normal operation is restarted. The antifreeze is preset to ON. The antifreeze function is not valid for the operational modes manual, target value or OFF.

Manu-calib. = Manual calibration of the probe
The HR3 allows to set of a correction value for each individual temperature probe, e.g. in order to equalize erroneous measurings for long probe wirings.
If the value is raised by 1 point, this will result in a correction of the displayed value of about 0,5 °C. The preset value is 0.

Type Probe3 = Selecting the type of probe3
If a room regulator (RT21) or a standard probe as an additional temperature display or an external thermostat is connected.

8.7 Menu "07 Menu interlocking"

07 Menu interlocking

Selecting  or 
confirmation with 

In order to interlock all menus where settings had been performed and to secure them in this way against unvoluntary misadjusting, the menu interlocking is to be activated.
If new settings are to be performed, the menu interlocking is to be deactivated.

8.8 Menu "08 Standard values"

08 Standard values

Selecting  or 
confirmation 

With this menu, the original presettings may be loaded and the user settings are saved and may be restored.
Recommendation: The values which had been set by the specialist when commissioning the installation, are to be saved under personal settings.

8.9 Menu "09 Service values"

In case of an error, the operational statuses and the settings of the controller may be displayed and then logged e.g. for a remote diagnostic by phone.

Programmversion	HR3 -	
Sensor S1:	/ /	
Sensor S2:	/ /	
Sensor S3:	/ /	
Sollvorlauf		
SW / Steilheit	/	
Betriebsart		
Frostschutz / S3	/	
Pumpe / Mischer	Hzk:	Mi:
Tagbetr. / Mischer-Pos.	/	

Notes: