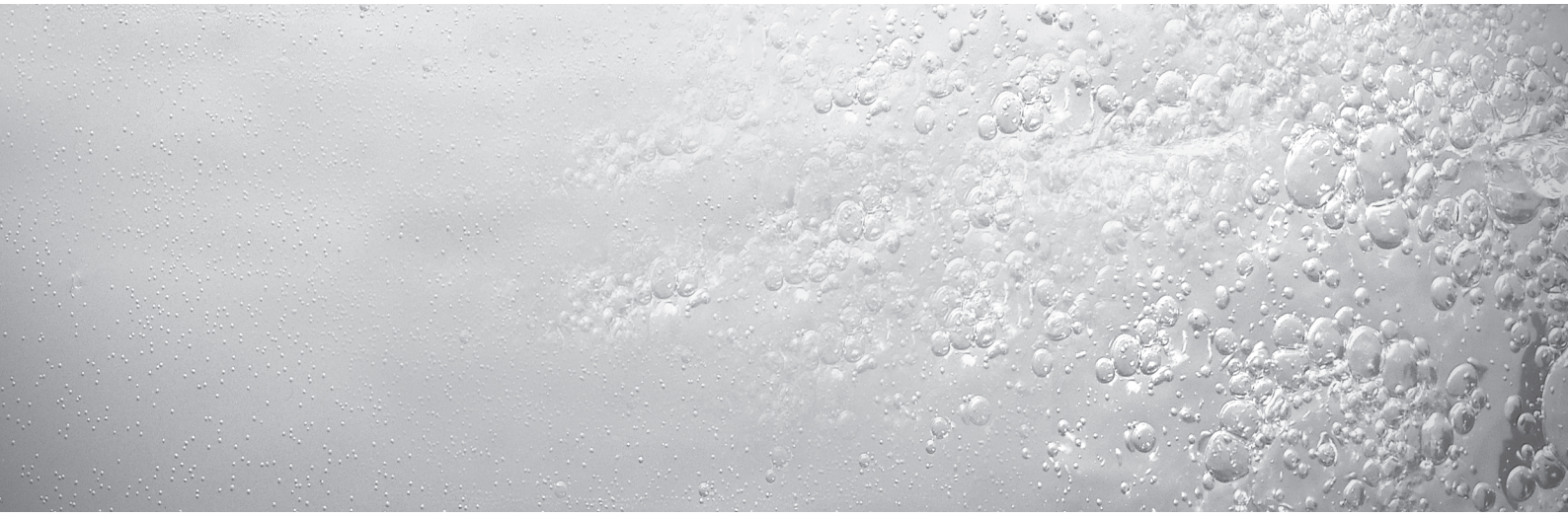
For heating engineer/owner

Operating and Installation Manual

VR 90 Remote control unit



Bus-modular control system

VR 90

GB

For the operator

Operating manual

VR 90 Remote control unit

Bus-modular control system VR 90

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1 Notes on the documentation

The following instructions are intended to help you throughout the entire documentation.
Further documents apply in combination with this operating and installation manual.
We accept no liability for any damage caused by non-observe these instructions.

1.1 Other applicable documents

For the operator
When operating the system, the individual operating manuals for the various components in the installation must be observed.

For the heating engineer:
When installing the remote control unit, observe the installation instructions for all the assemblies and components in the system.
These installation instructions are included with the individual assemblies in the system and the additional components.

1.2 Storing the documents

Please keep this operating manual and all other applicable documents in good condition, so that they are available when required.

1.3 Symbols used

Please observe the safety instructions in this manual when using the device!

Danger!
Immediate risk of serious injury or death!

Danger!
Danger of death by electric shock!

Danger!
Danger of burning and scalding!

Caution!
Potentially dangerous situation for the product and environment!

Note!
Useful information and instructions.

- Symbol for a necessary task

1.4 Applicability of the manual

This operating manual applies exclusively to units with the following part numbers:
- 0020040079
- 0020040080
- 0020045456.

The type designation for your unit can be found on the identification plate.

1.5 CE mark

CE labelling shows that the appliances according to the model overview comply with the basic requirements of the applicable directives.

2 Description of the device

The VR 90 remote control unit is used for the individual setting of a heating circuit within a heating system with auroMATIC 620, VRC 630 or geoTHERM. Independent of the use of this remote control device, all settings for this heating circuit can be carried out using the central controller.
Please note that only the following numbers of remote control devices may be fitted in a control system to ensure the correct supply voltage to the system:
- auroMATIC 620 – maximum of 7 remote control units
- VRC 630 – maximum of 8 remote control units
- geoTHERM – maximum of 6 remote control units

2.1 Intended use

The VR 90 remote control device is a state-of-the-art appliance which has been manufactured in accordance with recognised safety regulations.
Nevertheless, there is a risk of death or serious injury to the user or others or of damage to the unit and other property in the event of improper use or use for which it is not intended.

The VR 90 remote control unit is a system component of the auroMATIC 620 and VRC 630 modular bus control system or the geoTHERM heat pump, used for controlling hot water central heating installations with integrated hot water generation.

Any other or extended use is considered to be improper. The manufacturer/supplier is not liable for any resulting damage. The user alone bears the risk.
Intended use also includes observing the operating and installation instructions and all other applicable documents, as well as complying with the inspection and servicing conditions.

Caution!
Any misuse is forbidden.

3 Operation

All adjustments that need to be made for the connected heating circuit can be carried out using the VR 90 remote control device. It is equipped with a graphic display for this purpose.
For ease of operation plain text is used. You can change the display language, if necessary.

3.1 Overview of operation

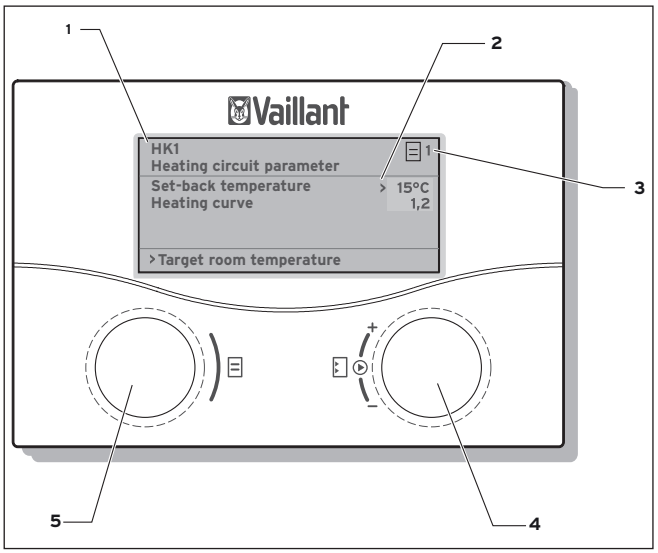


Fig. 3.1 Overview of operation

Key
1 Menu name
2 Cursor indicating the selected parameter
3 Menu number
4 ⊡ knob,
Set parameter (turn), Select parameter (press)
5 ⊟ knob,
Select menu (turn), Activate special function (press)

3.2 Operating procedure

User level

Turn the ⊟ knob	to select the menu
Press the ⊡ knob	to select the parameter to be changed
Turn the ⊡ knob	to change the selected parameter

Special functions
Only possible in the basic display (Saving, Party)

Press the ⊟ knob, up to 2x	to select the special function
Press the ⊡ knob	to select the changed parameter and to accept the selected parameter value (after changing by turning)
Turn the ⊡ knob	to set the desired value (only necessary for Saving)
Press the ⊟ knob	to end the special function

3.3 Display types

3.3.1 Basic display

Fri	17.05.02	15:37	– 15 °C
Room temperature			21 °C
Operating mode			
HK1			
Heating		› Auto	☼ 20 °C
Cooling		Auto	
	VR 90		

The display shows the current operating modes for heating and cooling and the target room temperature for the connected heating circuit. The target room temperature applies to both heating and cooling. The mode and the target room temperature can be changed here.

Note!
The "Cooling" function is only available in conjunction with a geoTHERM that supports a cooling function.

3.3.2 Sample display in the Menu level

HK1		⊟ 1
Heating parameters		
Set-back temperature	›	15 °C
Heating curve		1,2
› Select target room temperature		

User-specific settings.

3.3.3 Sample display in the Code level

HK1	C2
Parameters	
Minimum temperature	> 15 °C
Maximum temperature	90 °C
Max. preheating	0 min
> Select flow temperature	

System-specific settings to be made only by the heating engineer.

The VR 90 display varies, depending on the selection (basic display, menu displays, displays on the code level).

The current operating state and target room temperature for the heating circuit are shown in the basic display. You can also change these settings in the basic display. The possible displays are shown as examples in the list (see Section 3.3).

You can go to the menu displays, where settings relevant to the user, such as heating times, set-back temperatures and heating curves can be accessed, by turning the left-hand ⊟ knob. These menus are identified with a number at the top right of the display (see Fig. 3.1). The numbers make it easier to find individual menus during programming.

You can go to the Code level by turning the ⊟ knob further.
The code level should only be accessed by the heating engineer because of the types of parameters which are displayed. A password is required to access the code to protect the system from accidental changes to the settings.
The following parameters can be displayed in the individual menus, but cannot be changed if no password is entered, i. e. access to the code level is disabled. This level is indicated by numbers with a prefix C (C1, C2, C3, ...).
Furthermore it is possible to display and select special functions, such as the energy saving function and heating engineer-specific service functions. The required operating procedure is described in Section 3.2.

3.4 Knobs

All the programming of the remote control unit is carried out using only two knobs (⊡ and ⊟, see Section 3.1).
The ⊡ knob is used to select the parameter (by turning and then pressing) and to adjust the parameter (by turning).
The ⊟ knob is used to select the menu (by turning) and to activate special functions (by pressing).

3.5 Operator guidance

The operating principle is based on the Vaillant "click and turn" operating concept as well as a plain text display for the unambiguous identification of the programming performed. Sections 3.1 and 3.2 show the basic structure of the display and the operating procedure for the user or heating engineer.

The required operating steps are described in the following. You can read off which menu you should select from Table 3.1 to display or adjust the required parameter.

3.5.1 Menu selection

The first menu you see is the basic display on which the current operating modes and the target room temperature of the heating circuit are displayed.
You can move the cursor to the desired parameter by turning the ⊡ knob. The cursor only goes to parameters which can be changed on this menu display. At the same time the changes which can be made by turning the ⊡ knob, e.g "Select operating mode", appear in the line.
Select change in the parameter by pressing the ⊡ knob.
The parameter is changed immediately when you turn the ⊡ knob and the changed value appears immediately on the display of the controller and confirmed by pressing the ⊡ knob.

3.5.2 Tables for the menu level

To adjust the parameters, proceed according to the description in 3.5.1. The editable parameters are displayed in Table 3.1 on a grey background for clarity. Explanations of the parameters can be found immediately beside the individual display images or in Section 6 of the Installation Manual, "Overview of Functions".

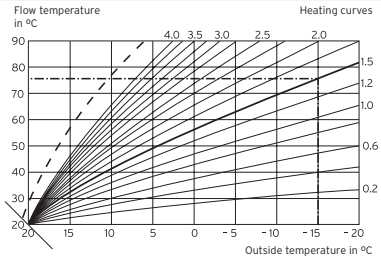
Displayed menu	Explanation and setting options
Fri 17.05.02 15:37 – 15 °C Room temperature 21 °C Operating modes HK1 Heating > Auto 20 °C Cooling Auto > Select mode	The following information is displayed on the basic display: the current date and time, the outside temperature (if room modulation is activated), the current room temperature, the current operating mode and the target room temperature. Each heating circuit or hot water circuit is controlled separately according to the operating mode. The "Cooling" line only appears in conjunction with a geoTHERM that supports a cooling function. The following modes are valid for the Heating parameter: **Auto** The selected circuit is operated automatically between the desired set point and set back temperatures according to the on and off time programmes. **Eco** The selected circuit is operated automatically between the desired set point and Off according to the on and off time programmes. In this case the heating circuit is completely switched off during the set-back period, provided the frost protection function (dependent on the outside temperature) is not active. **On** The selected circuit operates continuously "On" at the desired "On" temperature set point, regardless of the programmed times. **Energy save** The selected circuit operates continuously "On" at the desired "Off/setback" temperature set point, regardless of the programme times. **Off** The selected circuit is not heated, except for when frost protection (dependent on the outside temperature)is activated. The following modes are valid for the Cooling parameter: **Auto** The selected circuit is operated automatically between the On (cooling) and Off modes according to the preset timer programme. **On** The selected circuit is regulated at the cooling mode flow temperature, independently of any timer programme. **Off** The selected circuit is not cooled.
	A further adjustable parameter is the target room temperature, which can also be set separately for each heating circuit. The target room temperature is taken into account for the calculation of the heating curve. Increasing the target room temperature moves the heating curve parallel on a 45° axis and the flow temperature is accordingly adjusted by the control. The diagram on the left shows the relation between the target room temperature and the heating curve.
HK1 1 Heating parameters Set-back temperature > 15 °C Heating curve 0,90 > Select target room temperature	The following apply for heating mode: The set-back temperature and heating curve parameters can be set on the heating circuit parameter display. The set-back temperature is the temperature to which the heating is regulated during the set-back period.

Table 3.1 Settable parameters

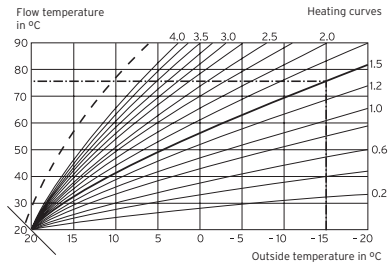
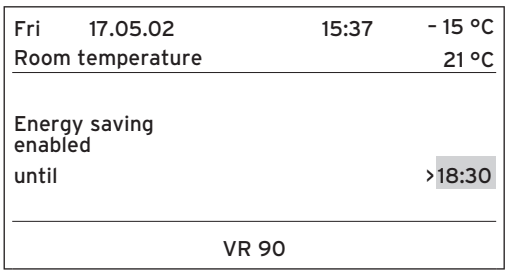
Displayed menu	Explanation and setting options
HK1 ⊟ 2 Cooling parameters Max. limit outs. temp › 21 °C ØAT 24h cooling start 24 °C ØAT 24h current 18 °C › Select	The following apply for cooling mode with geoTHERM: **Maximum limit outside temperature:** Temperature limit for shutting off heating mode (summer function). **ØAT 24h cooling start:** Is the average outside temperature at which the cooling is activated. Both a Maximum limit outside temperature and an ØAT 24h cooling start can be set for each heating circuit. **ØAT 24h cooling current:** Display of the currently calculated 24-hour average outside temperature.
HK1 ⊟ 3 Timer programme › Mon-Fri 1 08:00 - 14:00 2 16:00 - 22:00 3 - › Select target room temperature	You can set the heating times for the heating circuit in the "Time programme" display. Up to three heating times can be programmed per day or block. The control system operates according to the heating curve and the target room temperature. The heating circuit has a standard basic programme. The basic programme can be found in the documentation for the particular main controller (VRS 620, VRC 630 or geoTHERM).
HK1 ⊟ 3 Cooling timer programme › Mon-Fri 1 08:00 - 14:00 2 16:00 - 22:00 3 - › Select target room temperature	The following apply for cooling mode with geoTHERM: You can set the cooling times for the heating circuit in the "Timer programme" display. Up to three cooling times can be programmed per day or block. The temperature is controlled at the target value set for the room. The heating circuit has a standard basic programme. The basic programme can be found in the documentation for the particular main controller (VRS 620, VRC 630 or geoTHERM).
Holiday programming for HK1 ⊟ 4 Periods 1 › 18.07.03 - 31.07.03 2 26.09.03 - 05.10.03 Target temperature 15 °C › Select start day	It is possible to programme the heating circuit for two holiday time periods with date entry. In addition, here you can adjust the desired set-back temperature i.e. the value of the heating circuit to which it should be set during the time of absence. After the holiday time has elapsed, the controller automatically reverts to the previous operating mode. The holiday programme can be activated only in auto and eco mode.
	The heating curve depicts the relationship between the outside temperature and the flow temperature for heating operation. The room temperature of your system depends to a great extent on the selection of the right heating curve. If the selected heating curve is too high, the temperatures in the system will also be too high, resulting in higher energy consumption. If the selected heating curve is too low, the desired temperature level may only be reached after a while or not reached at all.
Code level enabling ⊟ 8 Code number: › 0 0 0 0 Standard Code: 1 0 0 0 › Adjust numeric character	The last display of the user level is the entry of the code for the installer level. This level is protected against accidental changes by an access code, since the settings there should be made only by the engineer. To view setting parameters without entering the code, you must press the ⊟ knob once. You can then view all parameters of the code level by turning the ⊟ knob but not change them. In the entire control system there is only one Code which can, if required, be changed in the central controller.

Table 3.1 Settable parameters (continued)

3.5.3 Special functions

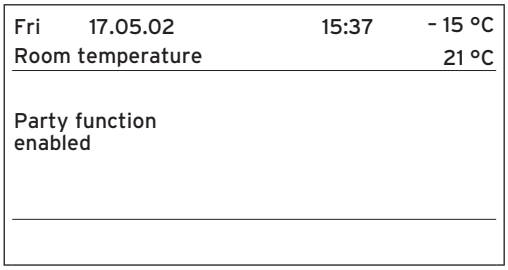
Special functions can be selected only from the basic display. To do so, press the knob. The following special functions can be selected:

Energy saving function



Press the ⊟ knob 1 x. The Energy saving function allows you to lower the temperature for an adjustable period during the heating times.
In addition, you must enter the time of day up to which the Saving function (setting to set-back temperature) is to be applicable. In order to set the time, push the ⊡ knob and select the desired time (Hour:Minute) by turning. Push the ⊡ knob again to accept the value.

Party function:



Press the ⊟ knob 2 x.
The Party function allows you to continue the heating time beyond the next switch-off time up to the next heating start.
After 5 seconds the display reverts to the basic display. After the function ends (time expired) or if the ⊟ knob is pushed again, the basic display shows the original operating mode of the heating circuit again.

4 Error messages

Error messages are displayed on the central controller in the event of malfunctions to the system. They are displayed in plain text.
Please call your engineer for troubleshooting. The telephone number will be displayed if the engineer has programmed it.

5 Warranty and customer service

5.1 Vaillant warranty

We only grant a Vaillant manufacturers warranty if a suitably qualified engineer has installed the system in accordance with Vaillant instructions. The system owner will be granted a warranty in accordance with the Vaillant terms and conditions. All requests for work during the guarantee period must be made to Vaillant Service Solutions (0870 6060 777).

5.2 Vaillant Service

To ensure regular servicing, it is strongly recommended that arrangements are made for a Maintenance Agreement. Please contact Vaillant Service Solutions (0870 6060 777) for further details.

For the heating engineer

Installation instructions

VR 90 Remote control device

Bus-modular control system VR 90

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1 Notes on the documentation

These installation instructions are intended for the heating engineer.
The following notes are intended to guide you through the documentation. Further documents apply in combination with these installation instructions. We accept no liability for any damage caused by non-observe these instructions.

1.1 Other applicable documents

When installing the VR 90 remote control unit, observe the installation instructions for all assemblies and components of the system, e.g., auroMATIC 620, calorMATIC 630 or geoTHERM. These installation instructions are included with the individual assemblies in the system and the additional components.

For the operator
When operating the system, the individual operating manuals for the various components in the installation must be observed.

For the heating engineer:
When installing the remote control unit, observe the installation instructions for all the assemblies and components in the system.
These installation instructions are included with the individual assemblies in the system and the additional components.

1.2 Storing the documents

Pass these installation instructions and all other applicable documents and, if necessary, any required aids to the system operator. He will be responsible for storing them so that the instructions and aids are available when required.

1.3 Symbols used

Please observe the safety instructions in this installation manual when installing the device!

Danger!
Immediate risk of serious injury or death!

Danger!
Danger of death by electric shock!

Danger!
Danger of burning and scalding!

Caution!
Potentially dangerous situation for the product and environment!

Note!
Useful information and instructions.

- Symbol for a necessary task

1.3 Applicability of the manual

These installation instructions apply exclusively to units with the following part numbers:
- 0020040079
- 0020040080
- 0020045456

1.4 CE mark

The CE mark certifies that the VR 90 remote control unit in conjunction with Vaillant boilers fulfils the basic requirements of the following directives:
- Directive relating to electrical equipment designed for use within certain voltage limits (2006/95/EWG)
- Directive relating to electromagnetic compatibility (2004/108/EWG)

1.5 Intended use

The Vaillant VR 90 remote control unit is a state-of-the-art appliance which has been manufactured in accordance with recognised safety regulations.
Nevertheless, there is a risk of death or serious injury to the user or others or of damage to the device and other property in the event of improper use or use for which it is not intended.

The VR 90 remote control unit is a system component of the auroMATIC 620 or VRC 630 modular bus control system, used for controlling hot water central heating installations with integrated hot water generation.
Please note that a maximum of 8 remote control devices can be incorporated. The unit can also be combined with the geoTHERM heat pump.

Any other or extended use is considered to be improper. The manufacturer/supplier is not liable for any resulting damage. The owner alone bears the risk.
Intended use also includes observing the operating and installation instructions and all other applicable documents, as well as complying with the inspection and servicing conditions.

Caution!
Any misuse is forbidden.

2 Safety instructions and regulations

The assembly, electrical connection and the settings in the control as well as the commissioning must be carried out only by a suitably qualified heating engineer!

At a glance: What you have to do to install the VR 90 remote control unit.

1. Preparation:
   - Read the installation instructions.
   - Check the scope of delivery.

2. Installation of the control:
   - VR 90 remote control device
   - Carry out the electrical installation.

The control must be installed by a qualified engineer, who is responsible for adhering to the prevailing standards and regulations. We accept no liability for any damage caused by failure to observe these instructions.

2.1 Safety instructions

Danger!
Risk of fatal electric shock from touching live connections.
Before carrying out work on the unit, switch off the power supply and secure it against being switched on again.
Only remove the control from the wall box or from the plinth when it is potential free.

2.2 Regulations

The regulations of the power supply company must be observed for the electrical installation.

Use standard cable for the wiring.
Minimum cross-section of the conductors: 0.75 mm^2

The following maximum wire lengths may not be exceeded:
- Bus lines 300 m

Where lengths are greater than 10m, route the connection cables carrying 230V separately from the sensor or bus cables.

The control must only be installed in dry rooms.
All wiring must be in accordance with Building Regulations Part P and BS 7671 (IEE Wiring Regulations), and must be carried out by a suitably qualified person.

3 Installation

The VR 90 can be installed on the wall in any room which is included in the heating system.

3.1 Installation location

Please note that, when selecting the installation location, you need to take into account whether room temperature recording is required (selection of the controlling room).
If recording is required, the remote control device must be installed in such a way that perfect recording of the room temperature is ensured (avoiding stagnant heat, not installed on a cold wall, etc.).

The best place for installation is usually on an inside wall of the main living room at an approximate height of 1.5 m.

The remote control device should be able to record the circulating air, unhindered by furniture, curtains or other objects. Choose a location where the remote control device is not affected by draughts from doors or windows, or by heat sources such as radiators, chimney walls, television sets or direct sunlight. All radiator valves must be fully open in the room in which the remote control device is installed if room temperature modulation is activated.

3.2 Installing the remote control

Danger!
Risk of fatal electric shock through contact with live connections!
Before carrying out work on the unit, switch off the power supply and secure it against being switched on again.

The connection to the boiler is via twin-core Bus cable (eBus). Lay the electrical lines up to the boiler to your advantage before installing the remote control device.

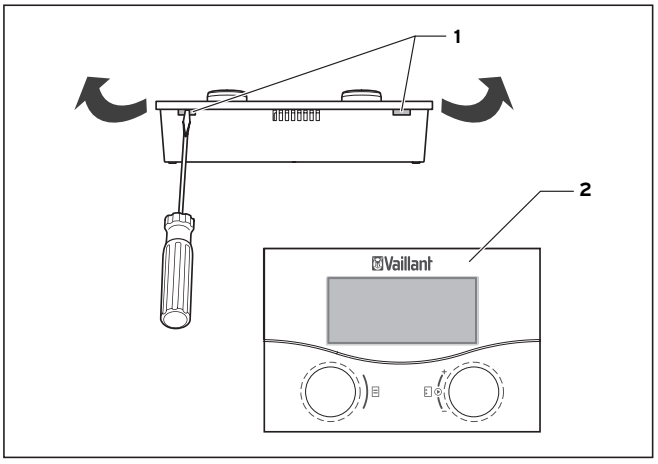


Fig. 3.1 Opening the remote control unit

- Switch off the power.
- Secure the power supply against being switched on again.
- Open the unit (**2**) using a screwdriver in the two notches (**1**) on the underside as shown in Fig. 3.1.
- Remove the housing cover.
- Drill two fixing holes (**3**), diameter 6 mm, as shown in Fig. 3.2 and insert the supplied wall plugs.
- Guide the connection cable through the duct (**4**).
- Attach the wall plinth to the wall with the two screws provided.

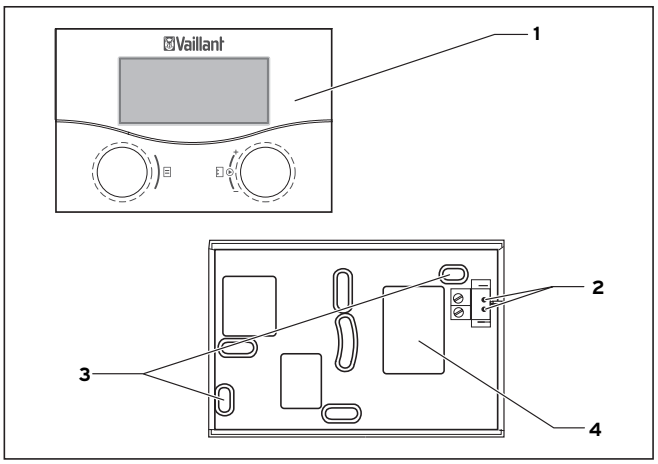


Fig. 3.2 Installation as a remote control device

- Connect the connecting cable as shown in Fig. 4.1.
- Place the remote control device (**1**) on the mounting box so that the pins on the back of the top part fit into the recesses (**2**).
- Push the remote control device onto the mounting box until it engages.
- Switch the power on again.

4 Electrical installation

The electrical connection may only be carried out by a suitably qualified heating engineer.

Danger!
Risk of fatal electric shock through contact with live connections!
Before carrying out work on the unit, switch off the power supply and secure it against being switched on again.

4.1 Connecting the remote control

The remote control device communicates with the central controller via the eBus. They can be connected to any interface in the system. It simply has to be ensured that the bus interfaces are eventually connected to the central controller.

The structure of the Vaillant system allows you to lay the eBus from component to component. This means that the wires can be swapped without impairing communication.

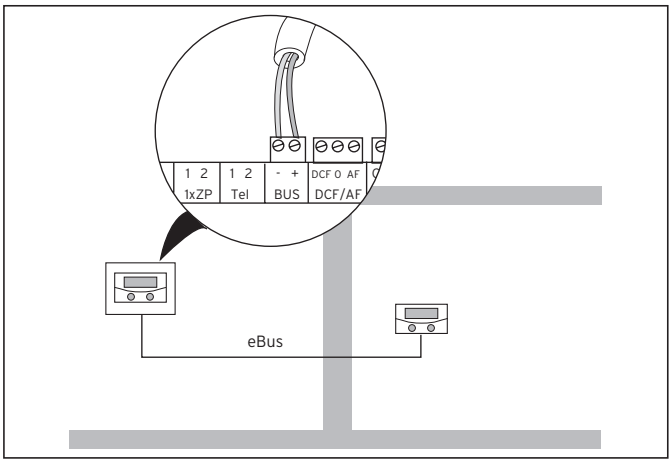


Fig. 4.1 Connecting the remote control

All eBus connector plugs are designed to allow you to wire at least 2 x 0.75 mm² per connection terminal. We therefore recommend using 2 x 0.75 mm² eBus lines.

4.2 Setting the Bus address

Communication within the system is by means of an eBus. To ensure correct communication between all the components, it is necessary to give the remote control unit an address that suits the heating circuit being controlled.
Correct addressing for the individual system components can be seen in Table 4.1.

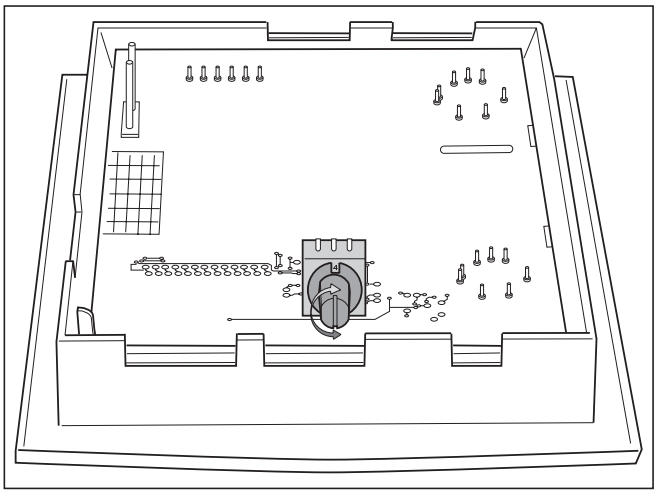


Fig. 4.2 Setting the Bus address

System component	Address of the component	Bus address to be set in the VR 90
Heating circuit 1 auroMATIC 620/ VRC 630		1
Heating circuit 2 auroMATIC 620/ VRC 630/ geoTHERM VWL/VWS/VWW		2
Heating circuit 3 VRC 630		3
VR 60, Address 4	HC 4 HC 5	4 5
VR 60, Address 6	HC 6 HC 7	6 7
VR 60, Address 8	HC 8	8

Table 4.1 Bus addresses to be set

5 Start-up

Start-up is carried out in conjunction with the start-up of the central controller. To do this, proceed in accordance with the instructions in the manual for the auroMATIC 620 or calorMATIC 630 main controller or the geoTHERM heat pump.

5.1 Setting heating circuit parameters

Setting the heating circuit parameters takes place in the Code level. You can also call up various system values here. The code level is protected against unauthorised access by a service code and is enabled for 60 minutes after entering the right code.
You can access the code level by turning the ⊟ knob on the left until the "Code layer enabled" menu is reached. In this menu you must enter the code which allows you to change the following heating circuit parameters. If you do not enter a Code the parameters in the following menus are displayed, but you cannot change them. The standard Code setting is 1 0 0 0.
It can only be changed on the central operating section for the VRS 620/VRC 630 or geoTHERM.
The operation of the Code level is the same as that of the user level. You can select the parameters also by turning and pushing the ⊡ knob.

All accessible Code menus and their parameters can be seen in Table 5.1.

Table 5.1 lists all the menus accessible in the Code level, together with the parameters or displayed values. The editable parameters are displayed on a grey background.

Further information on the individual functions can be found in the overview of functions in Section 7 of this document.

Displayed text	Adjustable parameters	Setting range	Default setting
Basic data C1 Language selection Language > GB English > Select language			
HK1 C2 Parameters Type: Burner circuit Set-back temperature > 15 °C Switch-on room temperature none Minimum temperature 15 °C Maximum temperature 75 °C Max. preheating 0 min Flow temp. Target 55 °C Flow temp. Actual 45 °C Pump status > Select	Set-back temperature Switch-on room temperature Minimum temperature Maximum temperature Max. pre-warm-up time	5 – 30 °C none/room temp./thermostat 15 – 90 °C 15 – 90 °C 0 – 300 minutes	15 °C none 15 °C 90 °C 0
HK2 – HK8 max. C2 Parameters Type: Burner circuit Set-back temperature > 15 °C Switch-on room temperature none Minimum temperature 15 °C Maximum temperature 75 °C Max. preheating 0 min Flow temp. Target 55 °C Flow temp. Actual 45 °C Pump status Mixer status Open > Select	Set-back temperature Switch-on room temperature Minimum temperature Maximum temperature Max. pre-warm-up time	5 – 30 °C none/room temp./thermostat 15 – 90 °C 15 – 90 °C 0 – 300 minutes	15 °C none 15 °C 75 °C 0

Table 5.1 Settings in the Code level

Displayed text	Adjustable parameters	Setting range	Default setting
Tool C12 Temperature correction Current room temperature > 0.0 K Display contrast 16 > Select correction value	Temperature correction: Current room temperature Display contrast	 -3 ... +3 K 0 – 25	 0 K 16
Software version C15 VR 90 01 1.05			

Table 5.1 Settings in the Code level (continued)

5.2 Handing over the control to the owner

The user must be trained in the handling and function of his control.

- Hand over the manuals and documents intended for the owner.
- Go through the operating manual with the owner and answer any questions.
- Draw special attention to the safety instructions which the owner must follow.
- Tell the owner to keep the manuals nearby the control.

6 Overview of functions

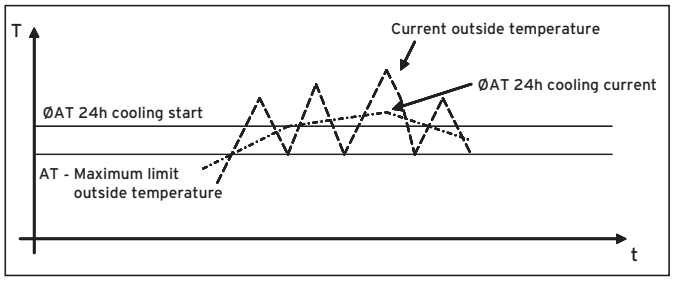
Function	Meaning / Explanation
Set-back temperature	The set-back temperature is the temperature to which the heating is regulated during the set-back period. It can be set separately for each heating circuit.
Maximum limit outside temperature	The maximum limit outside temperature is the outside temperature value at which the weather compensated heating shutdown (automatic shutdown in summer) takes effect. The Maximum limit outside temperature can be set independently for each heating circuit.
ØAT 24h cooling start	These parameters are only displayed on systems with a cooling function (geoTHERM). **ØAT 24h cooling start:** Is the average outside temperature at which the cooling is activated. Both a Maximum limit outside temperature and an ØAT 24h cooling start can be set for each heating circuit.
ØAT 24h cooling current:	**ØAT 24h cooling current:** Display of the currently calculated 24-hour average outside temperature. The control system demands outside temperature dependent heating or cooling for the heating circuit. In heating mode, the current outside temperature in conjunction with the preset max. limit outside temperature is taken into account, as described for the "Max. limit outside temp." function in this table. In cooling mode, it is the 24-hour average of the outside temperature that is relevant. If the 24-hour average of the outside temperature (**ØAT 24h cooling current**) is above the preset cooling start temperature (**ØAT 24h cooling start**), cooling is requested.  To prevent switching between heating and cooling too quickly, the changeover from heating to cooling and vice versa always takes place with an intervening wait period. Neither heating nor cooling occurs during the wait period. The wait period for the changeover from heating to cooling is at least 6 hours. For the changeover from cooling to heating, the wait period is at least 12 hours. Note: – If both the condition for heating, by virtue of the current outside temperature, and the condition for cooling, by virtue of the 24-hour average outside temperature are met, the requirement for heating takes priority. – If a remote control unit is in use, the wait period for the changeover from heating to cooling can be reduced as a result of the influence of the room temperature. Too soon a changeover to heating by virtue of the outside temperature is likewise prevented provided the room is still warm. See more about this in the description of the "Switch on room temp. (systems with cooling function)" function in this table.

Table 6.1 Overview of functions

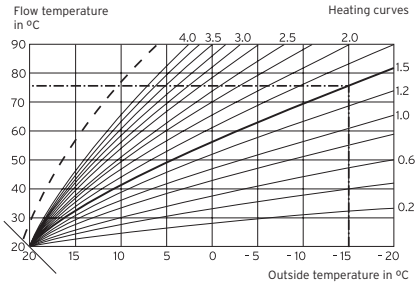
Function	Meaning / Explanation
Cooling parameters	For more information, see: – ØAT 24h cooling start – ØAT 24h current
	The heating curve represents the relation between the outside temperature and target flow temperature. The setting is made separately for each heating circuit.
Maximum preheating	With this function the activation of the heating circuit before the heating window is made possible, with the aim of accessing the set day value at the beginning of the heating window. The function is only performed for the first heating window of the day. The beginning of heating is established, depending on the outside temperature: Preheating period setting parameter: 0 ... 300 minutes, basic value 0 Influence of outside temperature: Outside temp. ≤ –20 °C: set preheating period Outside temp. ≥ +20 °C: no preheating period The period of time is calculated linearly between the two reference values. If the preheating has been started it is only ended when the time window is completed (no ending if, in the meantime, the outside temperature increases).
Maximum temperature of heating circuit	The calculated target flow temperature for the heating circuit is limited to this value.
Minimum temperature of heating circuit	This value represents the minimum value for the target flow temperature. Any time a target value > 0 is calculated for the heating circuit, the value set here will be the minimum value specified.
Mixer status	Activation of the mixer. Open = mixer opens Closed = mixer closes Off = mixer remains in its current position
Switch-on room temp. (systems without cooling function)	The switch-on room temperature is used to include the current room temperature in a reference room in the calculation of the flow temperature. When the function is active, the room sensor in this VR 90 is used.

Table 6.1 Overview of functions (continued)

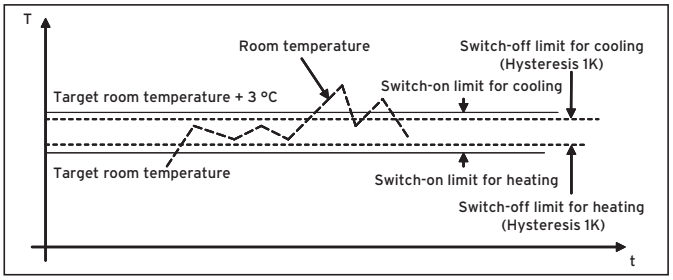
Function	Meaning / Explanation
Switch-on room temp. (systems with cooling function)	**None:** The measured room temperature has no influence on heating or cooling operation. **Thermostat:** In heating mode, the heating curve is displaced according to the difference between the measured and the desired room temperature. Thus the target flow temperature for the corresponding circuit is increased or reduced, taking the current outside temperature into account, in order to achieve a temperature change in the required direction in the room. Furthermore, heating is stopped when the measured room temperature is more than 1 K above the current target room temperature. The heating mode is started again when the measured room temperature falls below the current target room temperature. Cooling mode is requested when the room temperature rises more than 3 °C above the daytime target temperature for the room. Cooling is stopped when the measured room temperature is less than 2 °C (1 K hysteresis) above the daytime target temperature for the room. The previously mentioned 3 °C for the requirement for cooling can be increased to up to 5 °C via remote access. The hysteresis can not be changed. To prevent a cooling requirement by virtue of the measured room temperature, e.g., if a fireplace is used in winter, this is disabled if the 24-hour average outside temperature is more than 5 K below the preset "ØAT 24h cooling start" limit. The following graphic shows the limits for a heating or cooling demand resulting from the room temperature:  The request from the measured room temperature (heating or cooling or no requirement) is balanced against the request resulting from the measured outside temperature and its 24-hour average. The following applies here: – If cooling is requested as a result of the room temperature under the conditions described, this will also correspond to the overall requirement for this heating circuit. – If there is no requirement resulting from the room temperature present, there will be no heating but cooling will take place provided this is required as a result of the outside temperature or its average value. – If heating is requested as a result of the room temperature under the conditions described, this will only correspond to the overall requirement for the circuit if there is also a heating requirement due to the outside temperature present. Note also the wait periods when changing between outside temperature dependent heating and cooling requirements.
Current room temperature correction	The measured value of room temperature can, if required, be adjusted upwards or downwards by +/-3 °C.
Target inlet temperature	Represents the inlet temperature in a heating circuit calculated by the controller on the basis of the pre-set parameters.
Actual inlet temperature	The actual inlet temperature in a heating circuit.

Table 6.1 Overview of functions (continued)

7 Technical data

Designation	Units	VR 90
Operating voltage	V	9 .. 24
Shortest switching interval	mins	10
Power reserve	mins	15
Maximum permissible ambient temperature	°C	40
Minimum cross section of the connection wires	mm^2	0.75
Dimensions of the wall box		
Height	mm	97
Width	mm	146
Depth	mm	32
Level of protection		IP 30
Protection class for controller		III

Table 7.1 Technical data

8 Warranty and customer service

8.1 Vaillant warranty

We only grant a Vaillant manufacturers warranty if a suitably qualified engineer has installed the system in accordance with Vaillant instructions. The system owner will be granted a warranty in accordance with the Vaillant terms and conditions. All requests for work during the guarantee period must be made to Vaillant Service Solutions (0870 6060 777).

8.2 Vaillant Service

To ensure regular servicing, it is strongly recommended that arrangements are made for a Maintenance Agreement. Please contact Vaillant Service Solutions (0870 6060 777) for further details.

9 Recycling and disposal

Both the Vaillant VR 90 remote control unit and its associated transport packaging consist predominantly of recyclable raw materials.

Unit

As with all accessories, the Vaillant VR 90 remote control unit has no place in the household waste. Make sure that the old unit and, if necessary, any accessories and their packaging are taken to a proper disposal facility.

Packaging

The disposal of the transport packaging will be handled by the heating engineer who installed the unit.

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