Buderus SRC plus Individual Room Control Instruction Manual

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Buderus SRC plus Individual Room Control

Specifications

- Product Name: SRC plus
- Function: Individual Room Control
- Wireless Connectivity: Funk 868 MHz, WLAN 2.4 GHz

Operation

1. Once installed, power on the SRC plus unit.
2. Use the designated remote control or compatible mobile app to set and adjust the desired temperature for each room.
3. Monitor the temperature readings displayed on the unit or through the connected app for accurate control..

Q: Can the SRC plus be controlled remotely?
A: Yes, the SRC plus can be controlled remotely using the System Remote Control RC220 or compatible mobile apps like Buderus ProWork or MyBuderus.

Explanation of symbols and safety instructions

Explanation of symbols and safety instructions

Explanation of symbols

Warnings
In warnings, signal words at the beginning of a warning are used to indicate the type and seriousness of the ensuing risk if measures for minimising danger are not taken.
The following signal words are defined and can be used in this document:

- **DANGER**

  DANGER indicates that severe or life-threatening personal injury will occur.
- **WARNING**

  WARNING indicates that severe to life-threatening personal injury may occur.
- **CAUTION**

  CAUTION indicates that minor to medium personal injury may occur.
- **NOTICE**

  NOTICE indicates that material damage may occur.

Important information
The info symbol indicates important information where there is no risk to people or property.

General safety instructions

HNotices for the target group
These installation instructions are intended for competent persons who are skilled in dealing with water installations, ventilation, heating and electrical systems. All instructions must be observed. Failure to comply with instructions may result in material damage and personal injury, including danger to life.

- Read these instructions before starting any installation.
- Observe the safety instructions and warnings.
- Follow national and regional regulations, technical regulations and guidelines.
- Document all work carried out.

HIntended use

- Use the product only to control heating systems.

  Any other use is considered inappropriate. We take no responsibility for damage caused through incorrect use.

  Installation, operation or warnings for the components mentioned below are not part of these installation and operating instructions. This and other information can be found in the relevant documentation for the respective components (products).

Information on individual control

General description
This commissioning and user manual describes the general functionality of the individual control feature, in which combination the feature can be used and how it is activated (set). It has been created for trained specialists.

Installation, operation or warnings for the components mentioned below are not part of these installation and operating instructions. This and other information can be found in the relevant documentation for the respective components (products).
Appropriate components and settings are required to use the individual control feature, which are described in more detail below. Use the feature only in combination with the components listed in the compatibility list.
The individual control feature is only approved for Germany, Austria and Switzerland.

Use only individual control in these countries.

General description of individual control
Individual control is a feature that can be used in combination with certain wall hung condensing boilers or heat pumps to optimise the heating system as a whole in terms of Comfort, Efficiency, Planning and Commissioning.

- Comfort in every room
  - Individual room temperature-dependent control and adjustable time program (weekly profile) in every room. Everything at a glance from the comfort of your sofa or on the move with the app MyBuderus.
  - The individual controls switch automatically between Heating, Cooling, Off and Holiday mode. This means that it is no longer necessary to switch all individual controls manually.
- Efficiency through intelligent networking
  - The individual control automatically determines the optimum flow temperature and thus ensures the most efficient operation of the heat generator.
- Simple planning and commissioning
  - Automatic determination of the flow temperature eliminates the need for time-consuming determination and setting of the heating curve.
  - Even heat distribution in every room is regulated with the help of automatic hydraulic balancing. This automatic system eliminates the need for radiator-specific calculation and manual adjustment at each radiator.
  - Installation and operation is possible without the Internet. Comparable individual control or smart home systems almost always require an internet connection for installation and operation. To use the MyBuderus app, the internet connection can be set up by the end user later on.
  - The demands-based control of cooling operation according to cooling requirements and humidity ensures the highest possible condensation protection with the networked individual controls for underfloor heating system compared to systems with only one humidity sensor. This eliminates the need to think long and hard about the best position for the air humidity sensor.

Functions of the individual control
Further details on the functionalities are explained in the Chapter 6.

- App MyBuderusfor intuitive operation of the individual control at any time and anywhere (internet connection of the MX300/MX400 required)
- Individual room temperature-dependent control and adjustable time program in each room (MyBuderus app required)
- Individual controls can be grouped for convenient and quick operation
- Ventilation detection (for individual control of radiators)
- Temperature monitoring observes and compares temperatures in the system and generates an error message if, for example, a room is not warm due to a defective valve.
- Adaptive heating curve ensures high efficiency through demands-based flow temperature control
- Automatic hydraulic balancing for even heat distribution in all rooms (with individual control for radiators)
- Automatic operating mode change of the individual controls (heating, cooling, off and holiday mode)
- Rooms (e.g. bathrooms) can be automatically excluded from cooling mode or preconfigured with regard to behaviour after changing operating mode (Chapter 6.8).
- Control of cooling mode according to demand and humidity

- High condensation protection in cooling mode thanks to multiple networked humidity sensors
- Easier planning and commissioning because settings for the heating curve and radiators (hydraulic balancing) are no longer mandatory
- Particularly easy to install because individual control, installation and operation are possible without the Internet.

System overview and compatibility

Individual control is a feature that can be activated by using certain components. Individual control for underfloor heating can only be used in combination with heat pumps, and individual control for radiators can only be used with wall hung condensing boilers.
The individual control can be activated for one heating circuit. If a heating system comprises several heating circuits, the individual control can be activated in one of the heating circuits. Other control units/ remote controls can be used in the remaining heating circuits. The system remote control RC220 can also be located in the same heating circuit as the individual control(Chapter 5.3).
The configuration options, such as the number of possible heating circuits, compatibility of the remote controls or heating circuit modules, etc., depend on the system operation used. The individual control feature is basically “only” to be seen as a functionality in a heating circuit.

System overview of individual controls for radiators

1. Outside temperature sensor
2. Wall mounted condensing boiler
3. System operation (BC400)
4. MX300/MX400
5. Router / Internet connection (optional)
6. App ProWork (for commissioning and maintenance only)
7. App MyBuderus (optional)
8. Individual controls for radiators

Radio 868 MHz
WLAN 2.4 GHz

Compatible wall mounted condensing boilers

Use the individual control only with compatible heat generators. Device or country-specific adaptations can lead to deviations from the compatibility criteria described below. Before purchasing a heat generator and individual control components (Chapter 3.1.2 and Chapter 3.3) , enquire about the compatibility of the heat generator and the availability of the required components in the respective country.

The individual control for radiators is compatible with

- Wall mounted condensing boilers with system operation BC400 from software version NF49.04 (used in production from approx. 2023), required software versions of the components Chapter 3.3.
- Floor standing condensing boilers with system operation BC400 from software version NF49.10 (used in production from approx. mid 2024), required software versions of the components Chapter 3.3).
- Hybrid systems comprising
    - a hybrid-capable wall-hung or floor-standing condensing boiler with BC400 and respective software

version (see above)
- respective Buderus heat pump (hybrid package with Hybrid Manager HM200).

For hybrid applications, Outside temp.-compensated or Outside temp. with base point must be set as the control type in the relevant heating circuit. Manual heating curve settings are also required.
The current software version of the system operation (BC400) in the heat generator can be read out directly on the BC400.

Required components

- Buderus wireless module MX300 or LAN and wireless module MX400
- Individual controls for radiators
- Outside temperature sensor
- App ProWork (temporarily for commissioning)

Optional components

- App MyBuderus
- Repeater

System overview, individual control for underfloor heating system

1. Outside temperature sensor
2. Heat pump
3. System operation (BC400)
4. MX300/MX400
5. Router / Internet connection (optional)
6. App ProWork (for commissioning and maintenance only)
7. App MyBuderus (optional)
8. Individual control for underfloor heating system

Radio 868 MHz
WLAN 2.4 GHz

Compatible heat pumps
Use the individual control only with compatible heat generators. Device or country-specific adaptations can lead to deviations from the compatibility criteria described below. Before purchasing a heat generator and individual control components (Chapter 3.2.2 and Chapter 3.3) , enquire about the compatibility of the heat generator and the availability of the required components in the respective country.

The individual control for underfloor heating systems is compatible with:

Heat pumps with system operation BC400 from software version NF47.07 (used in production from approx. 2023), required software versions of the components Chapter 3.3.
The current software version of the system operation (BC400) in the heat generator can be read out directly on the BC400.

Required components

- Buderus wireless module MX300 or LAN and wireless module MX400
- Individual control for underfloor heating system
- Outside temperature sensor
- App Buderus ProWork (temporarily for commissioning) 3.2.3 Optional components
- App MyBuderus
- Repeater

Components

Before commissioning the device

- Professional installation of all required components by a specialist.
  During installation and commissioning, the installation instructions, operating instructions and, for example, warning notices for the individual components must be observed. This and other information can be found in the relevant documentation for the respective components.
- Search for Buderus ProWork in the relevant app store, select and install on the smartphone.

The required pairing functionality can be found in the part of the Buderus ProWork app free of charge; a licence is not required.

- Plug the MX300/MX400 into the heat generator.
- It is not possible to activate (set) the individual control feature if the
- MX300/MX400 is not plugged in. The required menus are only displayed
- if a corresponding MX300/MX400 is connected to the system.

Commissioning
Only the settings relevant to the individual control feature are described below with regard to commissioning

System operation settings Logamatic BC400

- Carry out system operation Logamatic BC400 on the system control unit as usual.
- Select the desired heating circuit Remote control type > Single Room Control.

After selecting individual control as remote control, a new menu entry appears in the relevant heating circuit menu Configure Single Room
Control. Important settings relevant to individual control are summarised here.

- Select the desired control type in the relevant heating circuit under Control type (also found in the menu Configure Single Room Control):
  - Single room-dependent
  - Outside temp. with base point
  - Outside temp.-compensated

Further settings are required depending on the selected control type. The control type Single room-dependent calculates the flow temperature automatically (Chapter 6.4) and does not require any heating curve settings in comparison to the Outside temp.-compensated control type.

The maximum heating circuit temperature for heating mode or for a possible cooling mode, the minimum flow temperature and the distance to the dew point must be set in all cases.
For hybrid applications Chapter 3.1.1), only set the weather-compensated or outdoor temperature with base point control type and carry out manual heating curve settings.

- Activate or deactivate automatic hydraulic balancing Chapter 6.7).
  The function is only possible in combination with individual control radiator.
- Activate or deactivate temperature monitoring Chapter 6.5). The function is only possible in combination with underfloor heating individual control and control type Single room-dependent.

Connecting the individual control to the system
The smartphone (App ProWork) is connected directly to the system (MX300/MX400) via WLAN.

- In system controller BC400 select the Configure Single Room Control menu.
- Select connection to individual control.
- In combination of a MX400 with a wall mounted condensing boiler (system operation BC400, software version lower than NF49.09) or a heat pump (system operation BC400, software version lower than NF47.11), the menu Connection to individual control is not displayed. In this case:
- Open the WLAN hotspot via the buttons on MX400 Instruction MX400) and scan the QR code with the App ProWork directly from MX400.
- Activate Establish connection.
- As soon as Establish connection is active, MX300/MX400 opens a WLAN hotspot to which the smartphone can be connected. The system controller Logamatic BC400 displays a QR code that can be scanned with the ProWork app.
- For data protection reasons, the WLAN hotspot is automatically closed after a certain time; the remaining time is displayed accordingly in the system controller Logamatic BC400. The WLAN hotspot can also be closed manually.
- Start the ProWork app.
- Select Single Room Control in the menu.
- Follow the instructions in the app.
- The application for connecting the individual controls in the ProWork app does not require a permanent WLAN connection to the system. You can move freely around the building while scanning the QR codes and assigning the rooms. A WLAN connection is only required again for the final data transfer from the ProWork app to the system. If there is no WLAN connection at the start of the data transfer, the app automatically informs you how the connection can be re-established.
- Scan the QR codes of the individual controls.
- Assign individual controls and repeaters to the rooms using the ProWork app.
- Transfer data to the system.
- After transferring the data (QR code and room data) from the ProWork app to the system, it is then necessary for the individual controls and, if applicable, the repeater to actively report to the system via radio (868 MHz) for final integration. To do this, a button must be pressed on the individual control and repeater.
- Follow the instructions in the app.
- The individual controls and, if applicable, the repeaters then report their QR code data to the system, which synchronises the data. If the synchronisation is positive, the relevant individual control is integrated into the system.

- The device overview in the app can then be used to check the status of the respective devices and whether the connection was successful. The device overview shows a list of all individual controls and repeaters that are connected to the system.
- If the connection process has not yet been completed, Prepared for connection is displayed in the app. In this case, select the relevant device in the app and follow the instructions of the app.

Recommendation for use of repeater
The wireless range within a building depends on structural (concrete ceilings, thick walls, etc.) and local conditions (Item MX300/MX400, …). Therefore, no generalised distance can be specified for indoor areas.

- The range of WLAN (2.4 GHz) and radio (868 MHz) differ greatly. Radio generally has a significantly greater range than WLAN.
- The radio symbol in the app shows how strong the wireless connection between the individual control and the system (MX300/MX400) is.
- If the wireless range is not sufficient, the range can be extended by using the repeater. Even if the wireless connection to one or more individual controls is weak, we recommend the use of a repeater for stability reasons.
- Design conditions affect the wireless range. For example, closing a door can lead to a loss of connection if this individual control already only had a weak wireless connection when the door was open.
- The strength of the wireless connection can be easily checked using the ProWork app. This is possible using the device overview. This is always displayed after the app has transferred the data from the individual controls to the system. Optionally, the device overview can also be called up separately in the app.

Commissioning with the MyBuderus app

- The system must first be configured accordingly (Chapter 4.1 and 4.2). If the individual control is not activated in the system operation, it cannot be displayed and used in the MyBuderus app.
- Use of the MyBuderus app is optional, but opens up additional functions and options (Chapter 6.3).
- To use the MyBuderus app, MX300/MX400 must be connected to the Internet and the MyBuderus app downloaded from the relevant app store Installation instructions for MX300/MX400).

Connecting individual controls to the system with the MyBuderus app

- The MyBuderus app also allows you to connect individual controls and repeaters to the system, manage them and make changes, for example to the room name or room assignment:
- Follow the instructions in the MyBuderus app.

System schematics

- The following system examples give an impression of possible areas of application for the individual control. The individual control feature can only be used in one heating circuit. It is not possible to activate the feature in 2 or more heating circuits at the same time. However, the heating system can consist of several heating circuits. In this case, the individual control feature can be used in one of the heating circuits and the other heating circuits can be operated with other remote controls (e.g. RC100) or also without other remote controls.
- Further configuration options (e.g. number of possible heating circuits, compatibility of the remote controls or

heating circuit modules, etc.) depend on the components used, the system operation and the wall hung condensing boiler or heat pump. The individual control feature is basically “only” to be seen as a remote control in a heating circuit and can therefore be used in a variety of ways.

- If other heat generators are integrated (e.g. external heat generators such as pellet boilers integrated via the buffer cylinder), the control type in the relevant heating circuit should be Outside temp.-compensated or Outside temp. with base point and not Single room-dependent. This is because the heating curve only adapts if one of the heat generators listed in chapter 3 is active (generates heat). In systems with other heat sources (e.g. buffer cylinder with thermal solar integration) and the control type Single room-dependent, there may therefore be a delayed adjustment of the heating curve.
- In general, the planning documents for the devices must be observed when selecting the hydraulics.

RC120 RF and individual control are incompatible and therefore cannot be used together in one system.
In general, the planning documents for the devices must be observed when selecting the hydraulics.

Individual control for radiators with wall-mounted gas condensing boiler

1. Individual controls for radiators
2. Hydraulic separation (e.g. low loss header, bypass, buffer cylinder, buffer cylinder with thermal solar integration)
3. Wall mounted gas condensing boiler

- A unmixed radiator heating circuit connected directly to the wall hung gas condensing boiler
- B unmixed radiator heating circuit
- C mixed radiator heating circuit
- D several radiator heating circuits and underfloor heating systems

Individual control for radiators with floor-standing condensing boiler

1. Individual controls for radiators
2. Floor standing condensing boilers

- A unmixed radiator heating circuit connected directly to the floor standing condensing boiler
- B mixed radiator heating circuit
- C several radiator heating circuits and underfloor heating systems

Individual control for underfloor heating system with heat pump

1. Individual control for underfloor heating system
2. Hydraulic separation (e.g. low loss header, bypass, buffer cylinder, buffer cylinder with thermal solar integration)
3. Heat pump

- A unmixed underfloor heating circuit/underfloor cooling circuit connected directly to the heat pump
- B unmixed underfloor heating circuit/underfloor cooling circuit

- C mixed underfloor heating circuit/underfloor cooling circuit
- D several radiator and underfloor heating system/underfloor cooling system heating circuits

individual control in combination with RC220
The individual control feature and the RC220 (from software version PF21.04, produced from approx. 11/2023) can also be used in the same heating circuit. This is an exception, as other remote controls can otherwise only be used in other heating circuits (Chapter 3). If the individual control and RC220 are assigned to the same heating circuit, this heating circuit is controlled by the individual control (e.g. flow temperature). With regard to functions and displays of the RC220 Operating instructionsRC220).

There is no provision for operating the individual control (e.g. changing the set room temperatures) using RC220. This is possible with the MyBuderus app (Chapter 6.3).

Commissioning sequence for individual
control and RC220 If the individual control and RC220 are to be assigned to the same heating circuit, proceed as follows during installation and commissioning:

- Select BC400 in the desired heating circuit Remote control > Individual control (Chapter 4.2.1).
- Then start the RC220 configuration, select RC220 in the same heating circuit and continue commissioning (Operating instructions RC220).
- The RC220 recognises the individual control when commissioning is started and carries out a pre-configuration.
- If the RC220 and the individual control are assigned to the same heating circuit, the RC220 can no longer work as a remote control for a second heating circuit. For this purpose, assign the RC220 to a heating circuit that is not configured for individual control.
- If the RC220 was already configured before the individual control was configured and the individual control and the RC220 are to be assigned to the same heating circuit, the RC220 must be reset to the factory settings:
- Reset RC220 on RC220 to factory settings (Operating instructions RC220).
- Select BC400 in the desired heating circuit, Remote control > Individual control (Chapter 4.2.1).
- Then start the RC220 configuration, select RC220 in the same heating circuit and continue commissioning (Operating instructions RC220).
- If the individual control and RC220 are assigned to different heating circuits, no specific procedure needs to be followed during installation and commissioning.

Detailed functional description

Individual room temperature-dependent control
The individual controls control the room temperature by regulating the heating water volume flow in the respective radiators or the underfloor heating system.
The individual controls have 2 operating modes for room temperature-dependent control, Manual a~nd Auto.
These can be set individually for each individual control or group of room controls (individual controls grouped in one room, e.g. 3 units).

- Manual:
  in manual mode, the room temperature-dependent control is controlled according to the set room temperature set for each Individual control or group of individual controls. The set room temperature can be set directly on the Individual control or in the MyBuderus app.
- Auto:
  in automatic mode, the room temperature-dependent control is controlled according to the set time program

(weekly profile). The time program can be set individually in the MyBuderus app for each individual control or group of individual controls. The set room temperature can be changed manually at any time directly on the individual control or in the MyBuderus app. The manual temperature change remains active until the next switching point of the time program is reached.

Grouping individual controls
The ProWork app or the app MyBuderus can be used to group individual controls in a room. For this purpose, the corresponding individual controls must simply be assigned to the same room. All individual controls in the same assigned room automatically synchronise their settings (e.g. set room temperature, time program, operating mode, button lock, etc.).

If, for example, the set room temperature is changed on an individual control in a group (room), this new set room temperature is transferred to all individual controls in this group (room). It is not necessary to make the setting individually on each individual control. If the set room temperature is changed in an app, this change always applies room by room for all individual controls in this group (room).

App MyBuderus
You must be connected to the Internet to use the app MX300/MX400.

With the MyBuderus app, you have an overview of the entire individual control and can make settings from the comfort of your sofa.
The app can be downloaded from the relevant app store (search for MyBuderus).
Use of the MyBuderus app is optional, this however opens up additional functions and options.

- Connect and manage individual controls with the system
- Group individual controls in a room
- Change room names and room assignment of the individual controls
- Change set room temperatures
- Change time program (weekly profile)
- display measured room temperatures
- display measured humidity (for individual control underfloor heating system)
- Activate keylock (child safety lock)
- Change operating mode (auto/manual/off)
- for individual control underfloor heating system: exclude rooms from cooling mode, e.g. bathroom

Apps are constantly being customised. Changes and extensions are therefore possible at any time.

Detailed functional description

Adaptive heating curve
If the Single room-dependent control type is selected, the adaptive heating curve function is active. The flow temperature is determined automatically and according to demand.

- Automated
  Classic heating curve parameters such as the base and end point do not need to be entered.
- Demand-controlled
  The system determines the required heating curve automatically and continuously in order to guarantee the desired set room temperatures and operate the heat generator with the best possible efficiency. If boundary

conditions change, the system always adapts to the new circumstances.

The flow and return temperatures play a key role in the efficiency of heat generators. Depending on the type of heat generator, heat pump or wall hung condensing boiler, the flow and return temperatures have a different significance.

- The flow temperature has a major influence on the efficiency of heat pumps.
  - Reducing the flow temperature by just 1 K increases the efficiency of an air-to-water heat pump, for example, by around 2
  - 4 % (depending on the device).
  - Reducing the return temperature by 1 K only increases efficiency by around 1 % (depending on the device).
- Condensing boilers are particularly efficient if they operate in the condensing range and thus utilise the condensing effect. To achieve this, the return temperature must be as low as possible. Reducing the return temperature by 5 K increases the efficiency of a condensing boiler by around 2 % (depending on the device). The return temperature is therefore has a particular significance.

The following is derived from this as the aim of the control for efficiency and comfort:

- Heat pump efficiency: keep the flow temperature as low as possible
- Wall hung condensing boiler efficiency: operate in the condensate range as far as possible
- Comfort: flow temperature as high as necessary to ensure comfort.

The set room temperatures set by the user in the respective rooms are achieved by the system adjusting the flow temperature accordingly. If the user increases the set room temperature from 20 °C to 21 °C, for example, a slightly higher flow temperature is required. The flow temperature changes at this moment from 30 °C to 32 °C, for example. A reduction in the set room temperature from 20 °C to 19 °C, for example, would, conversely, result in a reduction in the flow temperature from 30 °C to 28 °C, for example.
After start-up, the system learns the optimum heating curve for each room (individual control) individually. The starting point (heating curve before adaptation) is always the same:

- Base point: TVL = 20 °C at TA = 20 °C
- End point: maximum heating circuit temperature at TA = -15 °C (e.g. 45 °C, adjustable in the system controller Logamatic BC400)
- Design room temperature: 20 °C

Based on the data from the heat generator (e.g. current flow temperature) and the data from the individual control (e.g. set room temperature and measured room temperature), the heat energy demand and therefore the required flow temperature is taught.in for each room. Normally, the initial learning process is completed after just a few days.

- VL Flow temperature
- A Outdoor temperature

1. Heating curve before adaptation
2. Example of heating curve after adaptation

Comparison, classic / adaptive heating curve

A classic heating curve should not be set too low in relation to the flow temperatures, but also not too high.

- If the heating curve is set too low, the desired room temperatures may not be achieved.
- A heating curve that is set too high can lead to inefficient operation of the heat generator (especially with heat pumps) and therefore to higher operating costs.

The heating curve should therefore always be determined as accurately as possible. In new buildings, the data required for the calculation is usually available. There are often discrepancies between the planning and the actual design. In existing buildings, there is frequently no data from the construction phase. Here, it is often necessary to rely on estimates or guide values Fig. 18).
This shows that there is basically inevitably a deviation between the set heating curve and the required heart curve. In practice, the tendency is to set the heating curve slightly higher than the actual demand.
The adaptive heating curve automatically determines the flow temperature required for the respective building according to demand, with the aim of operating the heat generator with the best possible efficiency. The adaptive heating curve is based on real measurement data as well as set values (e.g. set room temperature) and thus considers the actual structural design and user behaviour (desired set room temperatures).
Because in practice the heating curve is frequently set slightly higher than actually required, the adaptive heating curve often allows the system to be operated with lower flow temperatures compared to the classic heating curve.

- VL Flow temperature
- A Outdoor temperature

1. Heating curve based on estimated values
2. Heating curve real required

Comparison of heat-up factor classic / adaptive heating curve

A classic heating curve must be set so that the flow temperature is sufficiently high. On the one hand, high enough for the rooms to maintain the current room temperature and, on the other hand, high enough so that the rooms can be heated from 18 °C to 20 °C, for example ([3] in Fig. 19).
At an outside temperature of 0 °C, a flow temperature of 35 °C would be sufficient to keep the rooms at a temperature of 20 °C. Due to the heat-up factor, however, 40 °C is set instead of 35 °C, for example ([1] in Fig. 19).
The adaptive heating curve has learnt the respective heat energy demand and can react accordingly. As with the classic heating curve, the system would work with comparable temperatures (40 °C) after the setback mode. Once the set room temperatures (20 °C) are reached, the flow temperature is reduced to 35 °C ([2] in Fig. 19).
Compared to the classic heating curve, the adaptive heating curve in this example would work for many hours with a flow temperature that is 5 K lower.

- VL Flow temperature
- R Room temperaturet Time

1. Flow temperature heating curve including heating factor at constant 0 °C outdoor temperature
2. Adaptive heating curve at 0 °C outdoor temperature (simplified)
3. End of setback mode
4. Set room temp.
5. Measured room temperature

Comparison of rooms with different heat energy demands classic / adaptive heating curve
A classic heating curve must be set to the room with the highest heat energy demand. This means that the room that requires the highest flow temperature is decisive for the setting of the heating curve.
Example with 3 rooms (Fig. 20): at –15 °C outside temperature, the following required flow temperatures result from the heating load calculation:

- Bedroom: 36 °C
- Bathroom from 45 °C
- Children’s bedroom 38 °C.

The set value for the heating curve at -15 °C outside temperature would therefore be 45 °C in this example, regardless of whether the bathroom currently requires heat.
The adaptive heating curve recognises whether a room currently requires heat or not. To determine the flow temperature, only the rooms with an active heat energy demand are considered. In the example (bathroom: “measured room temperature” is greater than the “set room temperature”), the bathroom would not be considered until a heat energy demand is registered.
Compared to the classic heating curve, the adaptive heating curve in this example would work for a few hours with a flow temperature that is 7 K lower because, in contrast to the classic heating curve, the children’s room would be decisive at 38 °C and not the bathroom.

- A Outdoor temperature
- RG Measured room temperature
- RS Set room temp.
- VL Flow temperature

1. Classic heating curve
2. Adaptive heating curve

Influence of the set room temperature on efficiency
The adaptive heating curve aims to supply heat according to demand. The system always attempts to fulfil desires of the user. A high set room temperature naturally requires a correspondingly higher flow temperature. Depending on the design of the underfloor heating system or the radiators, a room temperature that is 1 K higher causes the flow temperature to rise by 1 K to 4 K or even more, for example, which can lead to inefficient operation of the heat generator.
Conversely, a reduction in the set room temperature results in a reduction in the flow temperature. This leads to more efficient operation of the heat generator and also to lower heat losses.
Example: lowering the set room temperature

- Reduction from 21 °C to 20 °C
- This results in a reduction of the flow temperature by 2 K.
- This results in an increase in efficiency of 6 % (assuming an air-to-water heat pump with an efficiency influence of 2-4 %/K).
- In addition, heat losses through the building envelope to the environment are reduced.

It is a particular benefit in rooms such as bathrooms if the set room temperature is not 21 °C all day, for example, but only in the morning and evening. During the day, the temperature can be lowered to 20 °C, for example. This is conveniently possible with the time program, which can be set individually for each individual control in the MyBuderus app.

Influence of the sizing of the heat exchanger on efficiency
In addition to the set room temperature, the sizing of radiators or the underfloor heating system is a decisive factor

for efficiency.
Large radiators and underfloor heating systems with a large surface area and narrow installation spacing of the underfloor heating layer in the floor tend to lead to low flow and return temperatures and therefore to a higher efficiency of the heat generator. Small heat transfer surfaces lead to higher flow and return temperatures and therefore to lower efficiency.

It is therefore a benefit if all rooms have as large a heat transfer surface as possible (in relation to the required heating capacity). Particular attention should be placed on bathrooms, as these rooms frequently have a relatively limited area for installing underfloor heating or radiators. In addition, these are usually the rooms with the highest set room temperatures.

Influence of heat transfer to the outside or into neighbouring rooms
The individual control system endeavours to regulate to the desired set room temperature. Excessive uncontrolled heat transmission can have a negative impact on comfort and efficiency.
The simplest example is an open window over a long period of time (several hours). Heat is lost to the outside through the open window (heat transmission to the outside) and the room temperature drops. The system attempts to compensate for this heat loss and for the room temperature falling below the set room temperature. For this purpose, the heating water flow rate into the room affected is increased and, if necessary, the flow temperature is also increased, which in turn has a negative effect on the efficiency of the heat generator.

- A Outdoor temperature
- RS Set room temp.

Heat transmission
Another example is the open door between the bathroom and the hallway. Heat flows from the bathroom (21 °C) into the hallway (17 °C) through the open door. This causes the room temperature in the bathroom to drop. The system attempts to compensate for this heat loss and for the room temperature falling below the set room temperature, with the negative consequences for efficiency described above. In this case, it would be a benefit to keep the door closed or to equalise the set room temperatures.

Temperature monitoring
This function monitors whether one or more rooms do not reach the set room temperature over a longer period of time.
This may be the case, for example, if the valve or actuator of the underfloor heating system is defective and therefore no heating water flows through the underfloor heating system in the room affected. As a result, the room is no longer supplied with sufficient heat and is therefore not properly heated.
This monitoring function is intended for use in combination with heat pumps and with the selected control type “Individual control”. There are two reasons for this:

- The system adjusts the flow temperature if the current flow temperature is not sufficient to reach the set room temperature. In the event of a defective valve or actuator, the system would gradually increase the flow temperature.
- The flow temperature has a major influence on the efficiency of heat pumps.

If the system has recognised this state (set room temperature is not reached over a longer period of time), an error message is displayed. The room (individual control) is no longer considered for the time being when determining the flow temperature (adaptive heating curve). Once the error has been rectified, a reset on BC400 (Reset room temperature monitoring) can be carried out. The room is then considered again when determining the flow temperature. If the system recognises that the room temperature has been reached again, e.g. because a jammed valve has released itself, the system automatically resets the room temperature monitoring for the room affected.

Ventilation detection
The individual control for radiators can detect a rapid drop in the room temperature, such as occurs during

ventilation in winter. In this case, the individual control automatically reduces the temperature. The set room temperature is lowered for a few minutes and an open window is shown on the display.

Automatic hydraulic balancing
Automatic hydraulic balancing is based on an adaptive (self-learning) thermal process. As with static (classic) hydraulic balancing, the aim is to ensure that all rooms are supplied evenly with the required amount of heat.
In simple terms, the static procedure is based on a calculation and subsequent adjustment of the heating water flows for each radiator.
With automatic hydraulic balancing, this radiator-related calculation and adjustment is no longer necessary. The system takes care of this. A central element here is the room temperature, which is constantly recorded by the individual controls and passed on to the system.

- Calibration is carried out by determining the heat-up times of the individual rooms (individual controls).
- Subsequently, the heat-up times of all rooms are continuously equalised
    - in rooms that heat up more quickly than other rooms, the volume flow is reduced (throttling in the valve)
    - in rooms that heat up more slowly than other rooms, the volume flow is reduced less or not at all

The benefit compared to the static method is the continuous optimisation and thus permanent adaptation to changing boundary conditions, such as a change in user behaviour or insulation of the building.
When and where can automatic hydraulic balancing be used?The prerequisite is always that the heating system has been properly and professionally designed and installed. Then automatic hydraulic balancing can be used with the following boundary conditions:

- 2-pipe heating circuit with radiators
- up to 16 free-standing or freely suspended radiators (not concealed)
- all radiators equipped with networked individual controlled radiators

Automatic hydraulic balancing does not replace the correct design and setting of the heating circuit pump. Balancing is carried out on a radiator-specific basis.

Special features to be considered
If one or more radiators are undersized, radiators that are correctly designed can be throttled unnecessarily. This would significantly reduce the heating capacity (heat-up speed) in these rooms.
If the radiator(s) in a room have been designed to be larger than normally required for particularly rapid heating, the radiators can be throttled back relatively sharply. This would noticeably reduce the heating capacity (heat-up speed) in this room.

Automatic operating mode change
The individual controls follow the operating mode of the heating/cooling circuit to which the individual controls are assigned. It is not necessary to manually change the operating mode of each individual control, which is the case with non-networked systems. The individual controls switch automatically between Heating, Cooling, Off , and Holiday mode.

- Heating circuit in Heat. mode HC1 = all individual controls in heating mode
- Heating circuit in Cooling mode = all individual controls in cooling mode.
- Heating circuit Off (e.g. wall hung condensing boilers in summer mode) = all individual controls in OFF mode.

OFF appears in the display of the individual control. In this case, operation of the individual control is blocked to a large extent as no heating water is supplied by the wall hung condensing boiler, for example.

- The respective settings ((Auto or Manual plus set for set room temperature or Off) for the respective operating

mode (heating or cooling mode) are saved for each individual control. If, for example, an individual control is in Heat. mode HC1 and operating mode Auto is active, but was previously in Cooling mode in Off operating mode, the operating mode of this individual control changes from Auto to Off when the operating mode changes from Heat. mode HC1 to Cooling mode. The MyBuderus app can be used to configure in advance, if the corresponding operating mode is not yet active, which operating mode the respective individual controls should adopt.

- Heating circuit in Holiday mode = all individual controls in holiday function.
  The set room temperature of the individual controls corresponds to the set room temperature set for the holiday function.

If the Holiday mode is active, changes to the set room temperature (e.g. manual change on the individual control) are automatically reset by the individual control system to the set room temperature set for the holiday function after a short time.

Cooling mode controlled according to demand and humidity
When the heating circuit/cooling circuit is in cooling mode, the flow temperature is determined according to demand, when considering the current humidity and certain setting parameters in the BC400. The aim is to operate the cooling mode as efficiently as possible and free of condensation.

Demand-controlled
If no room (individual control) requests cooling capacity, no request is sent to the heat pump and the heat pump therefore remains switched off.
In a non-networked system, the heat pump produces cold water regardless of whether cooling capacity is required in the rooms and therefore consumes electricity.

Condensation protection
Each individual control for the underfloor heating system has an air humidity sensor. If this sensor measures a relative humidity of more than approx. 70 %, the individual control of the underfloor heating system stops the cooling in the room affected (closes the relevant underfloor heating system valve).
To determine the flow temperature, the relative humidity and the measured room temperatures of all individual controls with an active cooling requirement are considered. The dew point is calculated from the measured relative humidity and the room temperature. The room (individual control) with the highest dew point is decisive for determining the flow temperature. This is because the probability of condensation is highest in this room compared to the other rooms.

A safety margin is added to the dew point. If this sum is higher than the minimum flow temperature it is used as the set flow temperature.

Example

- Dew point temperature 16 °C
- Safety margin 5K
- Minimum set flow temperature = 20 °C

The sum of the dew point temperature and safety distance is 16 °C + 5 K = 21 °C. This temperature is above the minimum set flow temperature and is therefore the set flow temperature.
The safety distance and the minimum set flow temperature can be set via BC400.

Compared to systems with only one humidity sensor, dew point monitoring takes place in all rooms with networked individual controls and therefore offers significantly greater security against condensation.

ErP class

The class of the temperature control is required to calculate the room heating energy efficiency of an integrated system and is for this reason incorporated into the system data sheet.

1. Radiator or underfloor heating system

   Table 2 Classification of the control system according to ErP (EU 811/2013; (EU) 2017/1369)

Fault displays and troubleshooting

In the event of a fault in the individual control feature, a fault display is shown on the control panel of the heat generator (BC400).

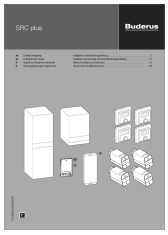
The following only deals with fault displays that relate directly to the “individual control” function. Other fault displays from the heat generator or products such as the individual controls are not part of this chapter. These can be found in the documentation for heat generators and components.

Fault displays

Troubleshooting
This chapter deals with possible problems and their rectification that are not directly indicated by a fault display. The following list of possible problems cannot be considered complete, as it is not possible to list all possible problems or possible remedial measures in advance. The causes and remedial measures described cannot be considered as complete either. Other causes and remedial measures are also possible for the possible problems described.

Fault displays and troubleshooting

Documents / Resources

	Buderus SRC plus Individual Room Control [pdf] Instruction Manual SRC plus Individual Room Control, SRC plus, Individual Room Control, Room Control, Control

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- User Manual

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