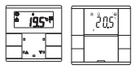
en

Schneider Electric

Room Temperature Control Unit with Display

Operating instructions



System M

Room temperature control unit with display
Art. no. MTN6241-03../MTN6241-04..

Artec/Trancent/Antique

Room temperature control unit with display
Art. no. MTN6241-4...

Necessary accessories

– You have to complete the room temperature control unit with a corresponding design frame.

For your safety

DANGER
Risk of fatal injury from electrical current.
The unit may only be installed and connected by skilled electicians. Observe the regulations valid in the country of use, as well as the valid KNX guidelines.

Getting to know the controller

The **Room temperature control unit with display** (referred to as **Controller** from here on) can be used for heating and cooling with infinitely variable KNX valve drives or for controlling switch actuators and heating actuators. The white backlit display shows e.g. time, date, temperature and operating mode. The following settings can be changed via the menu:
operating mode, setpoint, working day, display mode, time, switching time and brightness.

Four operating surfaces are also available, which are preset with room temperature control functions. The push-buttons can at a later date be locked to prevent misuse by unauthorised persons.

Functions of the room temperature control unit:

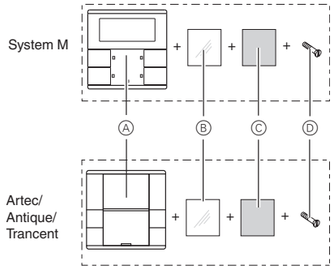
– Heating / cooling with one controller output
– Heating / cooling with separate controller outputs
– Heating / cooling with two controller outputs

Push-button functions:

– Push-button 1: Setpoint adjustment / operating mode
– Push-button 1: Setpoint adjustment / operating mode
– Push-button 3: Comfort mode / night operation
– Push-button 4: Comfort extension

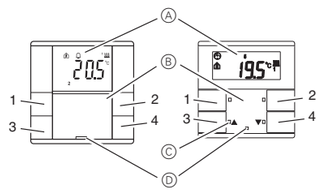
The unit is directly connected to the KNX and parameterised by the electrician using the KNX tool software (ETS).

Scope of delivery



Ⓐ Controller
Ⓑ Cover
Ⓒ Foil strip
Ⓓ Safty screw

Connections, displays and operating elements



1 - 4: Push-buttons
Ⓐ Display
Ⓑ Labeling field
Ⓒ LED
Ⓓ Status LED

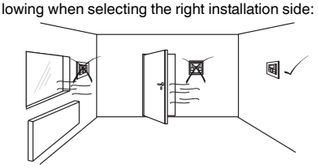
Useful information about the key field

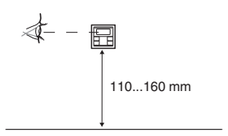
The push-buttons facing each other have been preset at the factory and can be parameterised to a limited extent:

- Push-button 1: Setpoint adjustment -0.5 K
- Push-button 2: Setpoint adjustment +0.5 K
- Push-button 3: Toggle: Comfort mode / night operation
- Push-button 4: Comfort extension

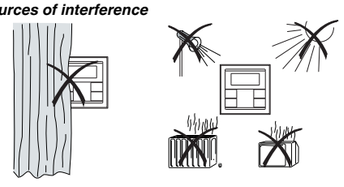
Mounting side

In order for the integrated room temperature control unit to work in the best way, you should keep in mind the following when selecting the right installation side:



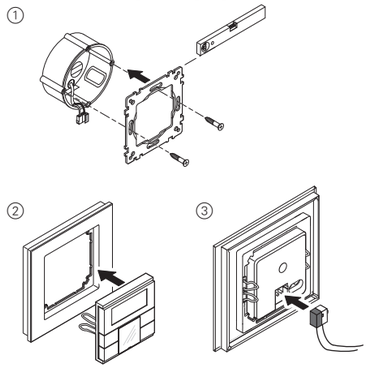


Sources of interference

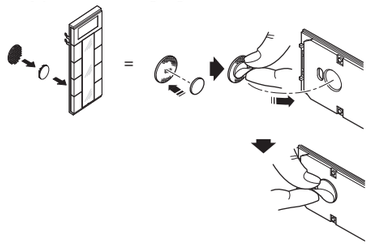


Mounting the push-button

Push-button 2-gang and 4-gang

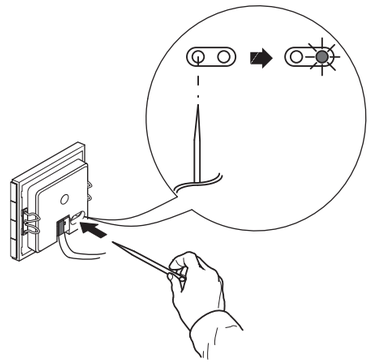


Only push-button 4-gang

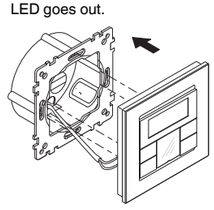


Operating the push-button

① Set the push-button to programming state



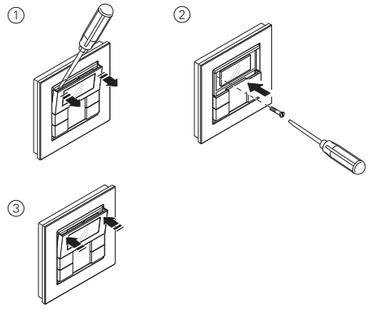
② Load the physical address and application from the ETS into the push-button: The red programming LED goes out.



Note for the electrician
Make sure that you note the settings you have made in the ETS which are important for the user in the configuration table (see „Pre-settings table“), because not all parameters that can be set are shown in the display of the push-button.

Anti-theft protection

Push-button 2-gang and 4-gang

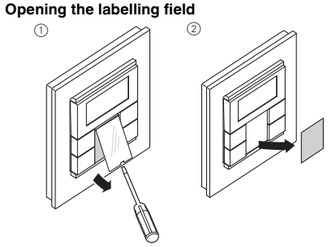


Dismantling the push-button

CAUTION
The device could become damaged.
Before removing the push-button, check whether it is secured with protection against theft. Always remove the protection against theft before removing the push-button.

Labbelling the push-button

Opening the labelling field



Creating labelled foil strips

You can also create and print corresponding foil strip templates with any layout program.

Size specifications for foils (in mm):

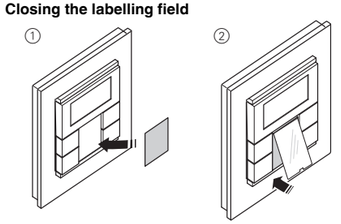
Push-button	Height	Width	Thickness
System M	24.9	23	max. 0,15
System Design	31	34.8	max. 0,15

Consult the operating instructions of your printer to find out which type of foil strips you can print.

Only use the coloured foil strips enclosed as the base, since this ensures that the push-button LEDs under the labelling field can shine through.

Two versions of coloured foil strips are provided: one with a recess in the middle for the IR receiver, and one without a recess. If you want to control the push-button via an IR remote control, you have to use the coloured foil strip with recess. Always only use one of the two coloured foil strips.

Closing the labelling field



Pre-settings

When installing the push-button, the electrician defines various settings that are necessary so you can use the push-button correctly. Most of the explanations provided on the following pages depend on these settings. The electrician enters the settings in question in a table for you (see table „pre-settings”).

If you come across this symbol ▤ when reading, it means that you can look up the corresponding value in the table.

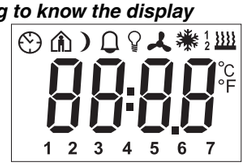
Preface room temperature control unit/ display

With the integrated room temperature control unit, you can control the temperature in various different ways.

You can read and set important information on the display:

- Setpoint temperature
- Operating mode (comfort, standby, night, etc.)
- Working day/holiday
- Display mode (setpoint temperature, actual temperature, date etc.)
- Background lighting
- Setting the time/switching time

Getting to know the display



You will see the following symbols on the display:

Comfort mode or working day. The room temperature is adjusted to the set comfort setpoint temperature ▤.

The flashing symbol means that the comfort extension is active.

Standby mode or holiday. The room temperature is adjusted to the set standby setpoint temperature ▤.

Night operation. The room temperature is adjusted to the set night setpoint temperature ▤.

Time control is active.

Constant display: The time has been synchronised.

Flashing display: The time has not been synchronised; the displayed time may not be accurate.

Alarm, symbol flashing. For 4-gang push-button: Additional acoustic warning sound possible ▤.

1 2 3 4
5 6 7 Weekday display ▤.
In combination with : Fan speed

Menu command „Setting the background lighting“ is activated.

Fan.

Heating control mode is active or controller requires power.

Cooling control mode is active or controller requires power.

Display under „Heating“ or „Cooling“ symbol.
- For heating **or** cooling:
„1“: Setpoint temperature has not yet been reached. The controller is heating or cooling.
„2“: Level 2 is activated (display only if two-step heating/cooling is set..
- For heating **and** cooling:
Two modes are available: Manual or automatic

°C Temperature display in degrees Celsius

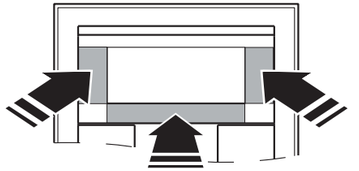
°F Temperature display in degrees Fahrenheit

88:88 Time display or value display

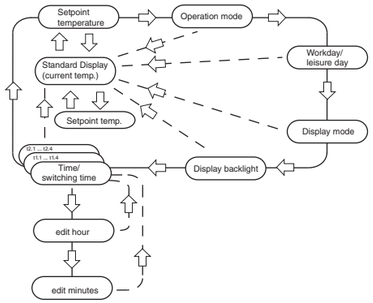
Getting to know the control menu

There is a control menu for selecting the individual functions of the room temperature controller.

A rocker is integrated in the cover of the display. It has three contacts: left, centre and right. With these push-buttons, you can access the control menu, scroll backwards and forwards and change individual values.



Overview of the menu structure



Push-button action	Function triggered
Center –	Select menu
Long push-button action*	Save Return to standard display
Center –	
Short push-button action**	Select next menu command
Left/Right –	
Short push-button action**	Change value

*Long push-button action = approx. 5 s

**Short push-button action = approx. 1 s

If you don't press any push-button within a period of about one minute, the room temperature control unit automatically returns to the standard display. The values that were set before the control menu was opened are restored; **any changes that you may have made are not saved. Exception: The temperature is saved directly.**

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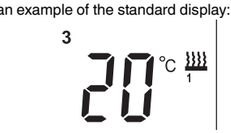
Setting the room temperature control unit/display view

Standard display

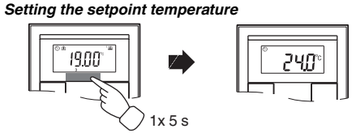
Here you see an example of the standard display:



- „Comfort“ operating mode
- Actual temperature 20°
- Heating is active in order to reach the comfort setpoint temperature .
- is constantly displayed: The time has been synchronised with the time switch (e.g. year time switch REG-K). Clock symbol flashes: The time has not (yet) been synchronised.
- Weekday display **3** = Wednesday

Note that the display of the weekday depends on the pre-settings. The electrician has set , a specific weekday to 1. In some countries the first day of the week is not Monday, but Sunday, for example. The other numbers have different meanings accordingly (e.g., 2 = Monday, 3 = Tuesday etc.).

Setting the setpoint temperature

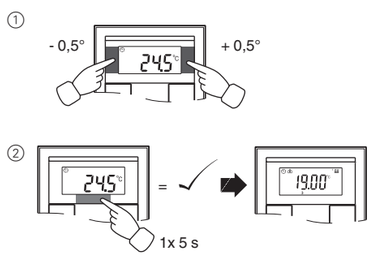


The electrician has specified three setpoint temperatures (for both heating and cooling):

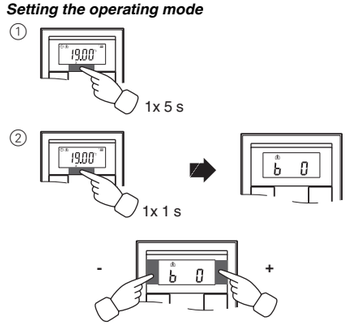
- for comfort mode
- for standby mode
- for night operation

You see the setpoint temperature of the current operating mode. You can only change this setpoint temperature. In order to change the setpoint temperature of another operating mode, you first have to switch the operating mode (see „Setting the operating mode“).

The electrician specified , within which limits this value can be changed (for example, within a minimum of 16 °C up to a maximum of 26 °C). You cannot set any value below or above these limit values. If the electrician made the appropriate setting , the 4-gang push-button emits a warning sound as soon as you attempt to exceed these limit values.

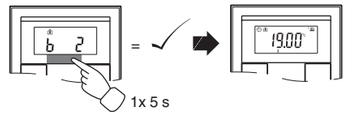


Setting the operating mode

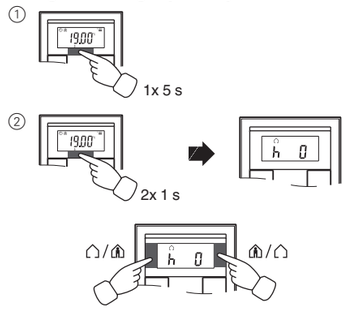


- b 0 = comfort mode
  Select this operating mode if you are staying in the room. The heating is set to the comfort setpoint temperature (e.g. 21 °C).
- b 1 = standby mode
  Select this operating mode when you are not in the room over a longer period of time. The heating is set to the standby setpoint temperature (e.g. 18 °C).
- b 2 = night operation
  The heating is set to the night setpoint temperature (e.g. 15 °C).
- b 3 = comfort extension (flashes)
  Select this operating mode if you want to suppress night operation temporarily. The heating is set to the comfort setpoint temperature (e.g. 21 °C).

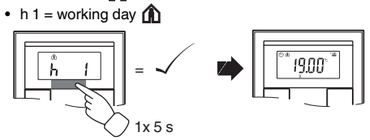
The electrician may have set , the times at which the operating mode switches automatically from night operation to comfort mode and vice versa.



Setting the working day/holiday

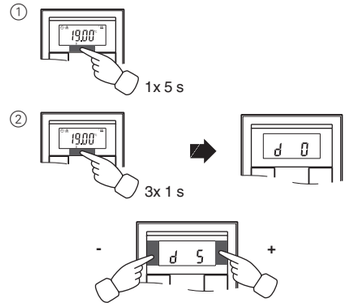


- h 0 = holiday
- h 1 = working day

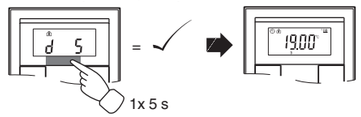


Setting the display mode

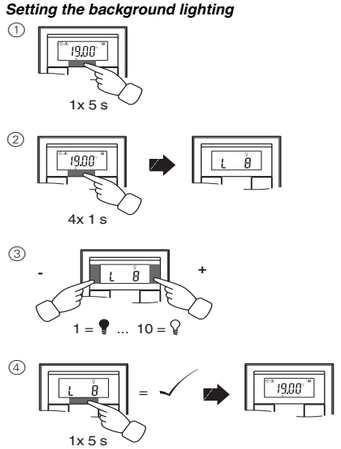
With the display mode, you can select which values you want to see in the display.



- d 0 = actual temperature (without decimal point)
- d 1 = setpoint temperature (to 0.5 degree accuracy)
- d 2 = temperature from external temperature sensor
- d 3 = date
- d 4 = time
- d 5 = fan speed
- d 6 = date and time in alternation
- d 7 = date, time and fan speed in alternation
- d 8 = actual and setpoint temperature in alternation
- d 9 = actual/setpoint temperature and time in alternation
- d 10 = actual/setpoint temperature and fan speed in alternation
- d 11 = temperature from external temperature sensor and actual temperature
- d 12 = temperature from external temperature sensor, actual temperature and time in alternation
- d 13 = actual/setpoint temperature, date and time in alternation
- d 14 = actual/setpoint temperature, fan speed and time in alternation
- d 15 = emperature from external temperature sensor, actual temperature, fan speed and time in alternation



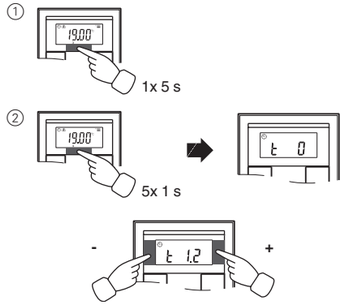
Setting the background lighting



Setting the internal clock time and switching times

If the time is updated by an external time switch, the updated time is displayed here. If you change this time manually, it will be overwritten again by the time switch during the next update.

You can only use the control menu to adjust the switching times which have been pre-programmed via the ETS. Switching times which are not defined in the ETS are shown when they are called up in the display with „**--:--**“ and cannot be set using the push-buttons on the display.



- **t 0** = time (either transmitted from the external time switch or from the internal clock)
- **t 1.1** bis **t 1.4** = time channel 1, switching time 1-4
- **t 2.1** bis **t 2.4** = time channel 2, switching time 1-4

③ Press central push-button and **hold** : he hour display for the selected time/switching time starts to flash.

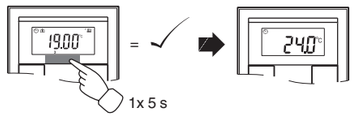
④ Press the left or right push-button on the display: Set the hours as desired

⑤ Press the central push-button **briefly** : The minute digits now flash.

⑥ Press the left or right push-button on the display: Set the minutes as desired.

⑦ Press the central push-button **briefly**: The set time (t...) appears again.

⑧ Press the central push-button **briefly** again: Save the desired new setting.



Synchronise the time via an external time switch to guarantee precision over a long period of time.

Selecting the setpoint temperature or operating mode directly

The electrician specified , whether you can access and adjust the setpoint temperature or the operating mode directly using the right/left push-button, or whether none of these functions is activated.

① **1 x** push-button **left/right/links** – **short** push-button action.

The menu command „Set setpoint temperature“ or „Set operating mode“ is displayed with the last set value. Change the value by pressing the left or right push-button on the display. The value is saved directly; you don‘t have to save it separately. After approx. 5 s, the room temperature control unit returns automatically to the standard display.

Other display views

APL.	Application not loaded or faulty
E 2	Heating setpoint temperature = cooling setpoint temperature
E 3	ETS application is not compatible
E 4	Upper control value range = lower control value range
E 5	FRAM error
E 6	Error in temperature sensor
E 7	STACK error
E 8	RAM error
E 9	Buffer error

Presettings table

Time control channel 1

Switching time	1	2	3	4
Time	___:___	___:___	___:___	___:___
Function:	_____			

Time control channel 2

Switching time	1	2	3	4
Time	___:___	___:___	___:___	___:___
Function:	_____			

Alarm functions

- ☐ Alarm sounds if actual temperature is less than the frost protection temperature **or**
- ☐ Alarm sounds if the setpoint adjustment limit is exceeded
- ☐ Other: _____

Heating setpoints in °C/°F		Adjustment limit in °C/°F	
Comfort:	_____	min: _____	max: _____
Standby:	_____	min: _____	max: _____
Night:	_____	min: _____	max: _____

Heating setpoints in °C/°F		Adjustment limit in °C/°F	
Comfort:	_____	min: _____	max: _____
Standby:	_____	min: _____	max: _____
Night:	_____	min: _____	max: _____
Frost protection:	_____	min: _____	max: _____
Heat protection:	_____	min: _____	max: _____

Setpoint adjustment valid until: Operation mode change / Permanent

Week starts (1): on Fri / Sat / Sun / Mon

Direct selection: Setpoint temperature / Operation mode / None

Technical data

Power supply:	via KNX
Connection:	Bus connecting terminal
Display elements	1x Display 1x operational LED 4x Status LED 3 push-buttons to navigate menu 4 push-buttons
Measuring range:	0 to 40 °C
Measuring accuracy:	± 1 K, depending on installation site; Offset can be configured
Controller type:	2-step Continuous PI controller Switching PI controller (PWI)
Controller mode:	Heating with 1 controller output Cooling with 1 controller output Heating with 2 controller outputs Cooling with 2 controller outputs Heating and cooling with separate controller outputs 2-step heating with 2 controller outputs 2-step cooling with 2 controller outputs 2-step heating and 2-step cooling with 4 control outputs
Type of protection:	IP 20

Schneider Electric Industries SAS

If you have technical questions, please contact the Customer Care Center in your country.

www.schneider-electric.com

This product must be installed, connected and used in compliance with prevailing standards and/or installation regulations. As standards, specifications and designs develop from time to time, always ask for confirmation of the information given in this publication.

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Settings in ETS

Selection in the product database

Manufacturer:	Schneider Electric Industries SAS	
Product family:	7.1	Heating/Single Room Thermostat
Product type:	7.1.3	Thermostat Artec/Trancent/Antique
Range name:	RTCU and FanCoil 1818/1.0	
Media type:	Twisted Pair	
Product name:	Room temperature control unit with display	
Order number:	MTN6241-40xx, MTN6241-41xx	

Selection in the product database

Manufacturer:	Schneider Electric Industries SAS	
Product family:	7.1	Heating/Single Room Thermostat
Product type:	7.1.4	Thermostat System M
Range name:	RTCU and FanCoil 1818/1.0	
Media type:	Twisted Pair	
Product name:	Room temperature control unit with display	
Order number:	MTN6241-03xx, MTN6241-04xx	

The application can only be operated with ETS3.

Application overview

Application	Vers.	Functions
RTR and FanCoil 1818/1.0	1	**Push-button functions:**
		Setpoint adjustment
		Operation mode
		Set the parameters for the disable function for push-buttons
		Signal function
		Time control
		Room temperature control unit
		Display external temperature in display
		Control and display the fan speed
		Behaviour when bus voltage recovers/ bus voltage fails

Application RTR and FanCoil 1818/1.0

Function overview

This application provides you with the following functions:

- Temperature control with various display options
- Disable function for push-buttons
- Time control
- Valve control

All buttons can be assigned the following functions independently:

- Adjust setpoints
- Access operation modes and toggle between them

The status LEDs can also be utilised independently of one another and in a wide variety of ways.

Group addresses

Group addresses are managed dynamically. Maximum number of group addresses and assignments: 254 addresses, 255 connections

Notes on this documentation

This application enables you to implement a multitude of functions. However, which functions are possible in each individual case depends on the KNX devices being controlled (e.g. dimming actuators, switch actuators etc.). The functions described here therefore show only the settings for this device.

Many parameters and their settings are dependent on the settings you have already made for other parameters. This means that some parameters will appear or disappear and the values available for selection will change according to settings you have already made. These dependencies have not been shown in the table for reasons of clarity. All settings are always shown.

Configurable times (staircase timer, ON delay, OFF delay, cyclic intervals etc.) are set via the base and factor parameters. The actual time is given by the multiplication of the two values. Example:
Base = 1 second * factor = 3 gives 3 seconds.

The **bold** values in a table are the values set during factory configuration.

Basic settings

Before you begin, make a few basic settings in the "General" tab. You can specify the following:

- Whether the operational LED switches off or displays that the device is operating.
- How the date and time are received.
- Whether and how the time is sent cyclically to the bus.
- How large the start-up delay for the device should be after bus voltage recovery.

General	
Parameter	**Settings**
Switch on operational LED	**Yes**
	No
Receive date and time	In one communication object
	In two communication objects
Send time cyclically	**No**
	Every minute
	Every hour
	Daily
Format of sent time	Date/time format (8 byte)
	Time format (3 byte)
Device's start-up delay in s (0-255)	2-255, **4**

General settings for date and time

Here you set whether the date and time are received by two communication objects (3 byte each) or by only one communication object. In the latter case, there is an 8 byte object available.

If you send the time cyclically to the bus, you either have an output object with 3 byte or one with 8 byte, depending on which format you selected.

You can find more details on time control, synchronisation and master-slave functions in the "Time control" chapter.

Start-up delay

The start-up delay is the time delay between the bus voltage recovery and the device's functional start. Set a time after which the current values can be read by other KNX devices.

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Time control	Date object input	3 byte	Low	WC	Receive
Time control	Time object input	3 byte	Low	WC	Receive
Time control	Date/time object input	8 byte	Low	WC	Receive
Time control	Date/time object output	8 byte	Low	CT	Transmit
Time control	Time object output	3 byte	Low	CT	Transmit

Setting the display

Here, you set the display options and display functions:

- You can disable the control menu so that the menu buttons cannot be used to make further changes to the settings.
- You use the display mode to specify which values you want to display on the basic display (actual temperature, setpoint temperature, time, date, external temperature and fan speed). You can display these values either individually or in alternation. You can also set the display rhythm for alternating displays. The display mode can also be set using the control menu on the push-button.
- For the weekday display, you can set day "1". This means that the first weekday can be defined as: Friday, Saturday, Sunday or Monday. Each weekday is then shown in the display with a different number accordingly.
- Time format and unit of temperature display (Celsius/Fahrenheit).
- The background lighting on the display can either be switched off or on at all times, or can be switched on during operation. You can also set the persistence period and the brightness of the background lighting.

The parameters for the background illumination and display mode can be changed using the menu buttons on the push-button (see operating instructions).

If you use room temperature control ("Control general" tab), additional possible settings appear:

- You can specify whether or not the operation mode can be changed when the frost or heat protection operation mode is activated.
- "Access menu setpoint temperature/operation mode directly" Here, you specify which operation mode you want to select with a short push of a button on the menu buttons. You can choose between the control menu "Set setpoint temperature" or "Set operation mode".
- On the display, a symbol can show either the current controller status or whether heating or cooling is activated.

Display heating and cooling symbol = shows current controller status

Display	Type of control
	Heating active, correcting variable ≠0
	Cooling active, correcting variable ≠0
1 2 (below the symbols)	1 = Heating/cooling active, correcting variable ≠0 For two-stage heating/cooling 1 = Basic level active, correcting variable ≠0 2 = Basic level and additional level active, correcting variable ≠0
--	Insensitive zone, correcting variables = 0

Display heating and cooling symbol = shows heating/cooling

Display	Type of control
	Heating
	Cooling
1 2 (below the symbols)	1 = Heating/cooling active, correcting variable ≠0 For two-stage heating/cooling: 1 = Basic level active, correcting variable ≠0 2 = Basic level and additional level active, correcting variable ≠0

Display	
Parameter	**Settings**
User menu enabled	**Yes** No
Adjust operation mode during frost / heat protection	Yes **No**
Set display mode (multiple names appear during the change)	**Actual temperature** Setpoint temperature External temperature Date Time Fan speed Date/time Date, time, fan speed Actual temperature, setpoint temperature Actual temperature, setpoint temperature, time Actual temperature, setpoint temperature, fan speed External temperature, actual temperature External temperature, actual temperature, time Actual temperature, setpoint temperature, time Actual temperature, setpoint temperature, fan speed, time External temperature, actual temperature, fan speed, time

Display	
Parameter	**Settings**
Display rhythm	3 s - 10 s, **5 s**
Time display	**00:00 ...23:59** 01:00 ...12:59 (AM/PM)
Access menu setpoint temperature/operation mode directly (menu buttons)	No **Setpoint adjustment** Operation mode changed
Display heating and cooling symbol	Shows the current controller status **Shows heating/cooling**
Unit of temperature display	°**C**, °F
Display "1" corresponds to	Friday Saturday Sunday **Monday**
Switch on background lighting	No Yes **During operation + persistence**
Persistence period in s (1-254)	1-254, **10**
Set brightness (1 = very dark / 10 = very bright)	1-10, **5**

Use signal function

The signal function enables the device to display whether the actual temperature is above or below a preset value. The signal is shown on the display by the bell symbol, and is ended when the actual temperature returns to within the set range.

When an signal is issued, a "1" is transmitted to the bus via the "Signal object output", and a "0" is transmitted after the signal is finished. The "Signal object input" can also be set to "1" by another sensor.

The signal cannot be acknowledged. It is not possible to acknowledge the signal when the alarm is triggered via the feedback object.

Signal function	
Parameter	**Settings**
Use signal function	Yes **No**
Report if actual temperature is higher than	20,0 = 68.0 °F to 40.0 °C = 104.0 °F, **No**
Report if actual temperature is lower than	0,0 = 32,0 °F to 19,0 °C = 166.2 °F, **No**

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Signal function	Feedback object input	1 bit	Low	WC	Receive
Signal function	Feedback object output	1 bit	Low	CT	Transmit

Push-button information

On the “Push-button info” tab you can see which push-button names in ETS correspond to which push-buttons on the device. The names assigned cannot be changed.

Push-button info	
Parameter	
Push-button 1 =	Upper left push-button
Push-button 2 =	Upper right push-button
Push-button 3 =	Lower left push-button
Push-button 4 =	Lower right push-button
Left menu button =	Left push-button next to display
Right menu button =	Right push-button next to display

Change setpoint

You can change the setpoint for the integrated room temperature control unit by pressing a push-button. Whether this change affects the current operation mode or all operation modes depends on the setting you make in the "Control general - On what the setpoint adjustment has an effect" tab.

Push-button X	
Parameter	**Settings**
Select push-button function	Setpoint adjustment

Status feedback

The status LED can:

- Be switched on or off continuously.
- Light up when pressed (for a long period), and go out when released.
- Flash.
- Display the status of the status feedback object.

Parameter

Parameter	Settings
Setpoint adjustment	**Increase setpoint** Reduce setpoint
Set step width	**0.5 K** 1 K
Trigger status LED	Switched on Switched off From status feedback object **Operation = ON / release = OFF** Long operation = ON / release = OFF Flashes Flashes when status feedback object equals 1 Flashes when status feedback object equals 0 Operation = flash / release = OFF Long operation = flash / release = OFF

Toggle operation modes

Use this function to toggle operation modes with a single push-button.

Push-button X	
Parameter	**Settings**
Select push-button function	Operation mode

Parameter	**Settings**
Number of operation modes between which you want to toggle.	One Two Three **Four**
Operation mode 1	**Comfort extension operation** Comfort operation Standby operation Night operation
Operation mode 2	Comfort extension operation **Comfort operation** Standby operation Night operation
Operation mode 3	Comfort extension operation Comfort operation **Standby operation** Night operation
Operation mode 4	Comfort extension operation Comfort operation Standby operation **Night operation**
Trigger status LED	Switched on Switched off **Operation = ON / release = OFF** Flashes Operation = flash / release = OFF Switched on in comfort extension operation Switched on in comfort operation Switched on in standby operation Switched on in night operation Switched on in frost/heat protection operation

Setting the parameters for the disable function for push-buttons

You can use the disable function to disable the push-buttons in two different ways:

1. For each push-button separately
2. All push-buttons function like a predefined master push-button

You can determine whether disabling should occur when disable object = 0 or when disable object = 1.

When a disable function is activated via the disable object, all current push-button functions (including cyclical actions) are suppressed.

Disable function for push-buttons	
Parameter	**Setting**
Apply disable function	**No** Yes
Set disable function	
Execute disable function	At object value 0 **At object value 1**
Type of blocking	Set separately for each push-button **All push-buttons function like master**

For each push-button separately

With this function you can disable each push-button individually. When a push-button is disabled, it does not execute a function when pressed.

Disable function for push-buttons	
Parameter	**Setting**
Type of blocking	Set separately for each push-button
Push-button 1 disable Push-button 2 disable Push-button 3 disable Push-button 4 disable	**Yes** No
Include menu buttons in the lock	**Yes** No

All push-buttons function like master

You can use this function to specify one push-button as a master push-button. When any push-button is pressed, the function that was parameterised for the master key is carried out.

Disable function for push-buttons	
Parameter	**Setting**
Type of blocking	All push-buttons function like master
Master push-button =	Push-button 1
	Push-button 2
	Push-button 3
	Push-button 4
Include menu buttons in the lock	**Yes**
	No

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Disable function	Locking object	1 bit	Low	WC	Receive

Activating the time control

Two time-switch channels are available, each with four programmable switch times, in order to trigger actions with minute-by-minute precision.

The room temperature control unit can be connected to an external clock via:

- The date and time object
- The object for requesting time
- The object for labelling a working day / holiday

This link synchronises the internal clock.

After a reset, the time is set to 0:00, and the time symbol in the display flashes. If no time synchronisation is completed within 24 hours, switching commands can continue to be carried out or suppressed, depending on the setting. In this case, the time symbol also flashes.

Time control	
Parameter	**Settings**
Use time control	Yes
	No

Request time synchronisation via the bus

After a download or when the bus voltage is applied, the room temperature control unit can transmit a telegram to the bus to request the current time and date. This synchronises the time and date in the push-button. Make the following settings:

① "General" tab. In the "Receive date and time" parameter, select whether the data should be received in one or two communication objects.

② "Time control" tab. Set the "Request time synchronisation via the bus" parameter to "Yes".

③ "Time control" tab. In the "Behaviour when synchronisation fails" tab, select whether the switching commands should be executed or suppressed.

④ Connect the objects "Time object input", "Date object input", "Date/time object input" and "Time request" to the corresponding objects of a year time switch.

The function "Request time synchronisation via the bus" only works in conjunction with an appropriate year time switch.

General	
Parameter	**Settings**
Receive date and time	In one communication object
	In two communication objects

Time control	
Parameter	**Settings**
Request time synchronisation via the bus	**Yes** No
Behaviour when synchronisation fails	**Switching commands are still carried out** Switching commands are suppressed

Using the room temperature control unit as a master clock

Use a room temperature control unit as a master clock to synchronise the time of other room temperature control units or similar devices (slave clocks).

Make the following settings:

① "General" tab of the master clock: Set the "Send time cyclically" parameter to "Every minute", "Hourly" or "Every day".

② "General" tab of the master clock: Select the format for the time that is sent.

③ "General" tab of the slave clocks: Set the "Send time cyclically" parameter to "No".

④ Connect the objects "Date/time object output" or "Time object output" to each other.

⑤ Set the time on the master clock.

The time is synchronised on all other slave clocks.

This only applies to transmitting the time. The date is not transmitted to the bus and cannot be set with the menu buttons.

General	
Parameter	**Settings**
Send time cyclically	**No** Every minute Every hour Daily
Format of sent time	**Time format (3 byte)** Date/time format (8 byte)

Parameters for the switching times

Time control is deactivated by default. Furthermore, it is initially not possible to specify the switching times via the control menu (-:- is displayed)..
If you want to use time control, you have to overwrite the switching times once with an ETS download.

The following switching times are set by default:

- Switching time 1 = 06:00:00
- Switching time 2 = 12:00:00
- Switching time 3 = 18:00:00
- Switching time 4 = 22:00

The switching times are not carried out until the time has been set once via the control menu or via the time object.

When a change is made from "Day off" to "Working day" or vice-versa:
The room temperature control unit executes the last switching times which are programmed up to the current time, taking into account the new setting.

Time control	
Parameter	**Settings**
Number of time switch channels	**1** 2
Time channel 1 / Time channel 2	
Number of switching times	1 2 3 **4**
Actuator group	**Switch object** Value object (8 bit in steps) Value object (8 bit continuous) Priority object Value object (16-bit integer without sign) Value object (16-bit integer with sign) Value object (16-bit floating point value)

Time channel X - switching time X	
Parameter	**Settings**
Overwrite switching times	**Yes** No
Switching time X	
Hour (0-23)	0-23, **6, 12, 18, 22**
Minute (0-59)	0-59, **0**
Execute switch time	**On working day** On holiday Always
Value	ON telegram OFF telegram **100 %**, 90 %, 80 %, ..., 0 %, 25 %, 75 % 0-255, **255** Switch on with priority (11) Switch off with priority (10) Remove priority (00) 0-65535, **65535** -32768 ... 32767, **32767**
Value = base * factor	
Base (possible values in brackets)	0.01, ... 327.68, **0,01**
Factor (0-2047)	0-2047, **1000**

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Time control	Time object input	3 byte	Low	WC	Receive
Time control	Date object input	3 byte	Low	WC	Receive
Time control	Date/time object input	8 byte	Low	WC	Receive
Time control	Time object output	3 byte	Low	CT	Transmit
Time control	Date/time object output	8 byte	Low	CT	Transmit
Time control	Time request	1 bit	Low	CT	Transmit
Time control	Working day/holiday	1 bit	Low	WCT	Transmit/ receive
Time control	Switch object A/B	1 bit	Low	WCT	Transmit/ receive
Time control	Value object A/B	1 byte	Low	WCT	Transmit/ receive
Time control	Value object A/B	2 byte	Low	WCT	Transmit/ receive
Time control	Priority object A/B	1 byte	Low	WCT	Transmit/ receive

Communication object "Working day / day off"

The value 1 (1 bit) switches the clock to "Working day" mode. The value 0 (1 bit) switches the clock to "Day off" mode.

If the communication object "Working day / day off" does not have a group address then the default value "0" is used. This means that the clock is in "Day off" mode.
Only the switching times parameterised for "Day off" or "Always" are then executed.

This object should be controlled by an appropriate year time switch.

Getting to know and parameterising the room temperature control unit

To activate the room temperature controller, you must set the "Use control" parameter to "Yes" in the "Control general" tab. Once you have done this, further configurable tabs are available. As for all parameters, the recommended settings are already specified here. However, you must check all parameters to make sure that they are set correctly and appropriately for your installation's local conditions.

Control general	
Parameter	**Settings**
Use control	Yes
	No

How the room temperature controller functions

There are many factors that can affect room temperature. The task of the control is to detect the actual temperature constantly, and to ensure that the heating or cooling system receives new information accordingly. The heating or cooling system converts this information and adjusts the room temperature to the preconfigured setpoints.

The actual temperature is continuously measured by the temperature sensor integrated into the push-button. However, you can also measure the temperature via an external sensor and transfer it to the controller via the bus, which then takes it fully or partially into account when assessing the actual temperature.

The controller can control the connected heating/cooling systems via corresponding switch telegrams or continuous correcting variables. In this way, both PI controls and 2-step controls can be parameterised.

Four operation modes (comfort, standby, night and frost/heat protection) for which setpoints can be set in each case are available for differentiated control with different requirements.

Additional functions of the room temperature control unit are comfort extension, shared/separate correcting variable output, selection of the operation mode after reset, offset of the setpoint temperatures, 1 bit/1 byte status objects, taking into account a temperature which has been measured separately, temperature drop detection, and valve protection.

Setpoints and operation modes

Four operation modes are available to help you control the room temperature:

- Comfort mode
  Controls the room temperature when the room is being used.
- Standby mode
  Lowers temperature slightly when the room is not being used.
- Night operation
  Lowers temperature significantly, e.g. at night or over the weekend.
- Frost/heat protection
  Automatically switches on the heating or cooling when adjustable temperature threshold values are not reached or are exceeded.

The additional "comfort extension" operation mode acts in the same way as the comfort mode, but is exited automatically after a time period that you can set.

You can switch back and forth between these operation modes in different ways:

- Via the communication objects, by using the time control on the push-button, for example
- Via the control menu

You can specify a setpoint for each operation mode. When changing the operation mode, the relevant setpoint for continued room temperature control is used. The setpoints for all operation modes, except for frost/heat protection, can be manually altered within adjustable limits using the control menu on the push-button, or can be adjusted via the "Setpoint adjustment input" object. You can also specify whether setpoint adjustment affects

- The current operation mode only or
- All operation modes

Setpoint adjustment affects current operation mode only

In this setting, the setpoint temperature of the current operation mode is changed. You can select whether or not the setpoint adjustment is retained after the operation mode is switched.

The operation mode switch via frost/heat protection does not affect the setpoint adjustment.

Setpoint adjustment maintained after change in operation mode = No

Comfort = 2 °C Standby = 0 °C Night = 0 °C	Comfort -> Standby ->Comfort	Comfort = **0 °C** Standby = 0 °C Night = 0 °C
Comfort = 2 °C Standby = 0 °C Night = 0 °C	Comfort -> Frost protection- >Comfort	Comfort = **2 °C** Standby = 0 °C Night = 0 °C

Setpoint adjustment maintained after change in operation mode = Yes

Comfort = 2 °C Standby = 0 °C Night = 0 °C	Comfort -> Standby ->Comfort	Comfort = **2 °C** Standby = 0 °C Night = 0 °C

You can specify the setpoint adjustment directly via the "Setpoint adjustment input" object and the control menu. By comparison, you use the "Current setpoint temperature input" object to specify a new setpoint temperature. Setpoint adjustment is determined here by the difference between the current setpoint temperature and the object value.

Example 1

Heating, current operation mode = standby
Limits of setpoint adjustment = +3 K/-3 K
Setpoint adjustment: "Setpoint adjustment input" object = +3 °C

Initial status	Result
Comfort = 21 °C	Comfort = 21 °C
Standby = 19 °C	Standby = **22 °C**
Night = 17 °C	Night = 17 °C
Frost protection = 7 °C	Frost protection = 7 °C

Example 2

Heating, current operation mode = comfort
Limits of setpoint adjustment = +5 K/-5 K
New set value: object "Current setpoint temperature input" = +30 °C

Initial status	Result
Comfort = 21 °C	Comfort = **26 °C**
Standby = 19 °C	Standby = 19 °C
Night = 17 °C	Night = 17 °C
Frost protection = 7 °C	Frost protection = 7 °C

Setpoint adjustment affects all operation modes

In this setting, you not only change the setpoint temperature for the current operation mode, you change all the setpoint temperatures in the same way and at the same time. The only setpoint temperatures that are not affected are those for the frost/heat protection. These operation modes also specify the limits of the setpoint adjustment. It is therefore not possible to set setpoint temperatures lower than the frost protection or higher than the heat protection.

You can specify the setpoint adjustment directly via the "Setpoint adjustment input" object and the control menu. By comparison, you use the "Current setpoint temperature input" object to specify a new setpoint temperature. Setpoint adjustment is determined here by the difference between the current setpoint temperature and the "reference setpoint for calculating the setpoint adjustment".

Example 1

Cooling/heating
Limits of setpoint adjustment = +3 K/-3 K
Setpoint adjustment: "Setpoint adjustment input" object = +5 °C

Initial status	Result
Cooling:	Cooling:
Heating protection = 35 °C	Heat protection = 35 °C
Night = 28 °C	Night = **31 °C**
Standby = 26 °C	Standby = **29 °C**
Comfort = 24 °C	Comfort = **27 °C**
Heating:	Heating
Comfort = 21 °C	Comfort = **24 °C**
Standby = 19 °C	Standby = **22 °C**
Night = 17 °C	Night = **20 °C**
Frost protection = 7 °C	Frost protection = 7 °C

Example 2

Cooling/heating
Limits of setpoint adjustment = +10 K/-10 K
Setpoint adjustment: "Setpoint adjustment input" object = +20 °C

Initial status	Result
Cooling:	Cooling:
Heating protection = 35 °C	Heat protection = 35 °C
Night = 28 °C	Night = **35 °C**
Standby = 26 °C	Standby = **33 °C**
Comfort = 24 °C	Comfort = **31 °C**
Heating:	Heating
Comfort = 21 °C	Comfort = **28 °C**
Standby = 19 °C	Standby = **26 °C**
Night = 17 °C	Night = **24 °C**
Frost protection = 7 °C	Frost protection = 7 °C

Example 3

Cooling/heating
Limits of setpoint adjustment = +3 K/-3 K
New set value: object "Current setpoint temperature input" = 24 °C
Reference setpoint for calculating the setpoint adjustment = 21 °C
Calculated setpoint adjustment = +3 °C

Initial status	Result
Cooling:	Cooling:
Heating protection = 35 °C	Heat protection = 35 °C
Night = 28 °C	Night = **31 °C**
Standby = 26 °C	Standby = **29 °C**
Comfort = 24 °C	Comfort = **27 °C**
Heating:	Heating
Comfort = 21 °C	Comfort = **24 °C**
Standby = 19 °C	Standby = **22 °C**
Night = 17 °C	Night = **20 °C**
Frost protection = 7 °C	Frost protection = 7 °C

The active operating state of the controller is determined by the states of the communication objects: "Comfort", "Night reduction", "Frost/heat protection" and "Dewpoint alarm".

The highest priority when calculating the setpoints is the dewpoint alarm. If it occurs, heating continues to be possible but cooling is deactivated ("0" to the controller output). The dewpoint alarm is terminated when its communication object is set to "0".

After a reset, the operation mode you preconfigured is active. The corresponding setpoints then also apply. If the setpoint that was set is changed via the control menu and the value is higher or lower than the set limit, an acoustic signal can inform you of this (you can set this on the "Signal function" tab).

When a setpoint adjustment is received via the bus, the controller checks whether it lies within the parameterised limits, and if necessary, adjusts it to the corresponding limits.

Comfort mode

The symbol in the display indicates that the controller is in the "Comfort" operation mode. This operation mode is used to control the room temperature when the room is being used.

Comfort mode is active

- If (for example a presence detector) reports that someone is present via the "Comfort input" object. An external push-button is also an option.
- If you select the operation mode "Comfort" in the control menu.
- If you activate a push-button for which the push-button function operation mode = comfort mode was parameterised.

Ending the comfort mode via the "Comfort input" object (value = 0) results in the standby or night mode being activated. This is useful as an office application for central resetting, for example.

You can set the controller to automatically switch to this state after a reset or a download.

Control general	
Parameter	**Settings**
Operation mode after reset	Comfort operation **Standby operation** Night operation Frost/heat protection Last operation
Operation mode after download	**Comfort operation** Standby operation Night operation Frost/heat protection

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Control	Comfort input	1 bit	Low	WC	Receive
Control	Comfort output	1 bit	Low	CRT	Transmit

Comfort extension (symbol flashes)

Comfort extension is indicated by the flashing symbol. The comfort extension operation mode is largely the same as the comfort mode. However, the comfort extension is exited automatically after a time period that you can set. It temporarily suppresses the night operation mode when the room is used for longer during the evening, for example.

You can access the comfort extension via:

- The control menu,
- A push-button (operation mode push-button function = comfort extension operation) or
- The bus (object "Comfort extension")

The parameterised time for the comfort extension runs to an end and can then be restarted by activating the comfort extension again in the control menu, for example.

If you select the comfort extension via the control menu, the symbol flashes.

The comfort extension is terminated:

- When the parameterised time has elapsed.
- When the "Night operation", "Comfort" or "Standby" operation mode is selected in the control menu.

You can parameterise the controller so that, once the comfort extension has ended, the controller:

- Switches to standby mode.
- Switches to night operation.
- Switches to the operation mode specified by the current value. A precondition for this is that the parameter "Termination of comfort extension via objects" is set to "No".

Control general	
Parameter	**Settings**
Duration of comfort extension	None Test mode (1 min) 30 min to 4.0 h, **1.0 h**
Termination of comfort extension via objects* *Objects: comfort, standby, operation mode	Yes **No**
Operation mode after comfort extension	Standby operation Night operation **Current object values**

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Control	Comfort extension input	1 bit	Low	WC	Receive
Control	Comfort extension output	1 bit	Low	CRT	Transmit

Standby operation ⌂

The ⌂ symbol in the display indicates that the controller is in the "Standby" operation mode. This operation mode enables you to reduce or increase the room temperature to a parameterised level as soon as the room is no longer in use. A brief heating period or cooling period is triggered by the low difference in temperature to the comfort mode.

Standby operation is activated

- If all the operation mode objects equal "0", i.e. the operation modes "Dewpoint alarm", "Night reduction", "Frost/heat protection" or "Comfort" are inactive.
- If you select the operation mode "Standby" in the control menu.
- If you activate a push-button for which the push-button function operation mode = standby mode was parameterised.

You can set the controller to automatically switch to this state after a reset or a download.

Control general	
Parameter	**Settings**
Operation mode after reset	Comfort operation **Standby operation** Night operation Frost/heat protection Last operation
Operation mode after download	**Comfort operation** Standby operation Night operation Frost/heat protection

Night operation ☽

The ☽ symbol in the display indicates that the controller is in the "night operation" mode. This operation mode enables you to reduce or increase the room temperature to a greater extent during the night or over the weekend. In this operation mode, you use a "1" telegram to switch via the "Night reduction" object.

The night operation mode is active when the comfort object is set to "0" and

- the "night reduction input" object is set to "1", or
- When you select "Night operation" mode in the control menu or
- If you push a push-button that was parameterised for the push-button function operation mode = night operation.

Night operation ends

- When the "Night reduction input" object is set to "0", or
- When the Comfort extension", "Comfort" or "Standby" operation mode is selected in the control menu.

You can set the controller to switch automatically to this state after a reset or after a download.

Control general	
Parameter	**Settings**
Operation mode after reset	Comfort operation **Standby operation** Night operation Frost/heat protection Last operation
Operation mode after download	**Comfort operation** Standby operation Night operation Frost/heat protection operation

Frost/heat protection

The parameterised values for frost protection (e.g. +7°C) or heat protection (e.g. +35°C) are set as new setpoints with a "1" telegram to the "Frost/heat protection input" object. This prevents the room from becoming overheated or the heating from freezing. A "0" telegram terminates the "frost/heat protection" and the new operation mode is set again. The operation mode is the result of current information from the objects "Comfort extension input", "Comfort input" and "Night reduction input". If no change occurs, the previous operation mode is set. This does not apply when the "Dewpoint alarm" operation mode is also active.

On the "Display" tab, you can specify whether the user is allowed to adjust the operation mode during frost/ heat protection. "No" is the default setting here.

Dewpoint alarm

The dewpoint operation mode is used to switch off the cooling in all circumstances. A "1" telegram to the "Dewpoint alarm" object switches off the cooling when there is condensation in the cooler. This operation mode has the highest priority. A "0" telegram terminates the "dewpoint alarm" and the new operation mode is set. The operation mode is the result of current information from the objects "Comfort input" and "Night reduction input". If no change occurs, the previous operation mode is set.

Locking object

You can use the control's locking object to activate the frost/heat protection with priority.

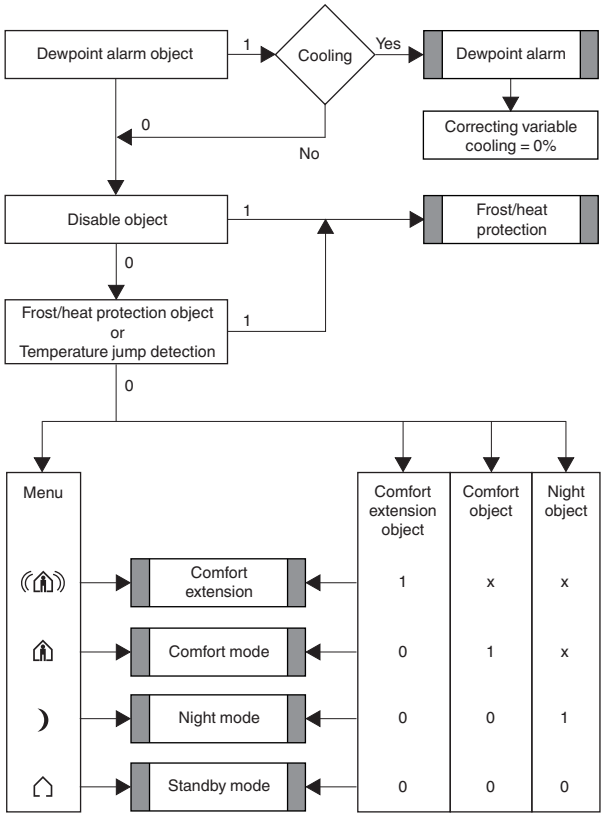
Application: A push-button at the building's exit enables you to switch the system to the away setting, for example. In this case, the heating only comes on during extreme cold. If the window contacts are monitored and the windows are only closed after the away setting is activated, the frost/heat protection remains active anyway.

Toggling between operation modes via 1 bit

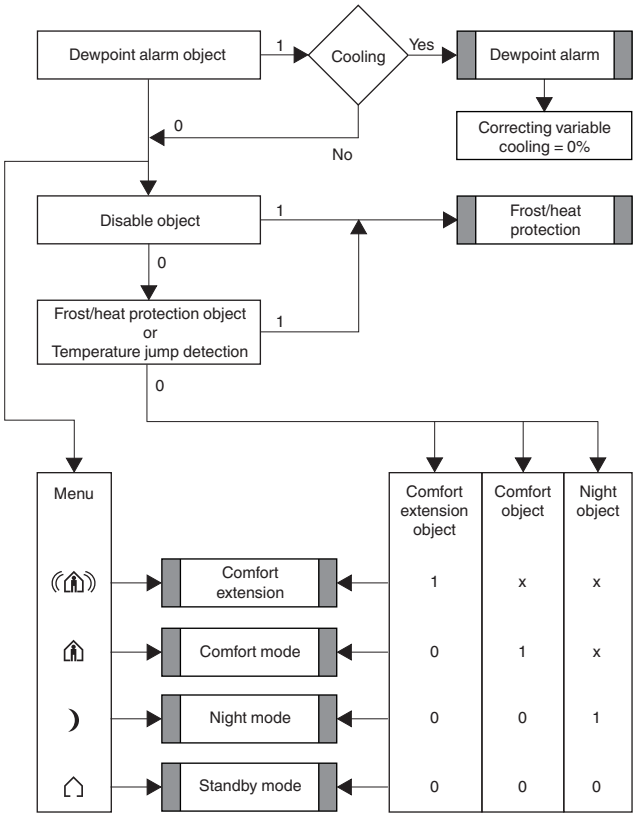
The following shows toggling between operation modes via 1 bit. Different processes occur during toggling between operation modes, depending on the parameter "Adjust frost/heat protection operation mode".

Display	
Parameter	**Settings**
Adjust operation mode during frost / heat protection	Yes **No**

Adjust operation mode during frost / heat protection = No



Adjust operation mode during frost / heat protection = Yes



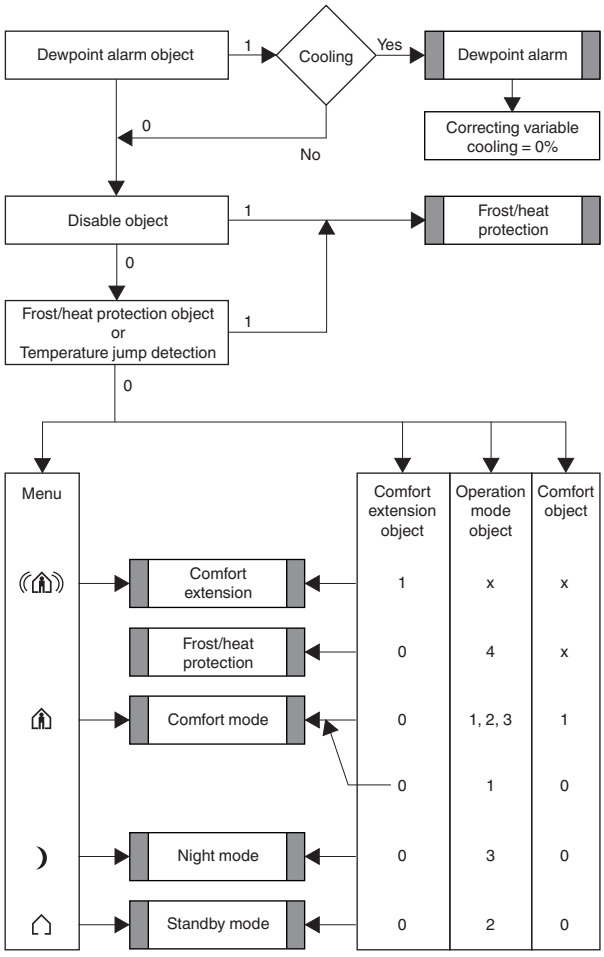
Toggling between operation modes via 1 byte

The following shows toggling between operation modes via 1 byte. Different processes occur during toggling between operation modes, depending on the parameter "Adjust frost/heat protection operation mode".

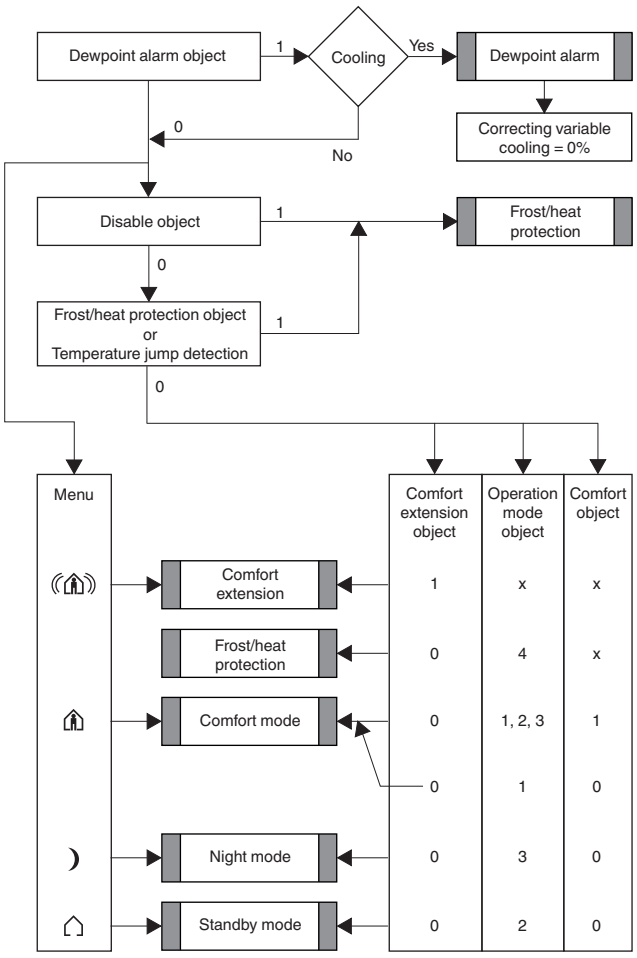
Display	
Parameter	**Settings**
Adjust operation mode during frost / heat protection	Yes **No**

- "4" = Frost/heat protection
- "3" = Night reduction
- "2" = Standby
- "1" = Comfort

Adjust operation mode during frost / heat protection = No



Adjust operation mode during frost / heat protection = Yes



Heating and cooling

Heating

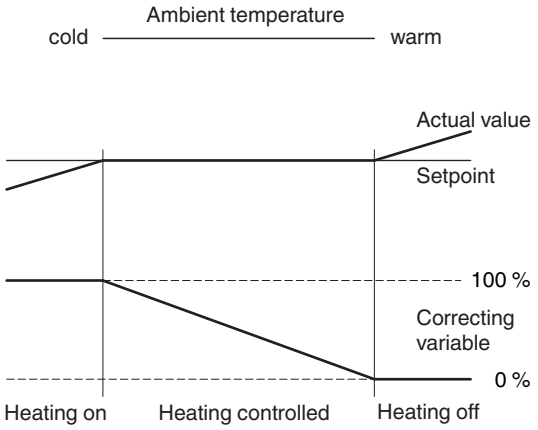
In the heating control mode, the current actual temperature is compared with the current setpoint temperature. If the actual temperature lies below the setpoint temperature, this difference is counteracted by issuing a correcting variable that does not equal "0".

Heating with constant correcting variables (e.g. EMO valve drive):

- Radiator/convector warm water heating
- Underfloor warm water heating
- 2-circuit underfloor warm water heating
- Air convectors

Heating with switching correcting variables (e.g. switch actuator):

- Electric convector
- Night storage heating
- Ceiling heating



Cooling

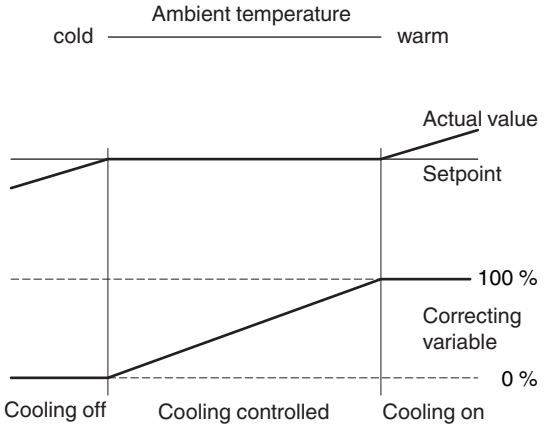
In the cooling control mode, the current actual temperature is compared with the current setpoint temperature. If the actual temperature is more then the setpoint temperature, this difference is counteracted by issuing a correcting variable that does not equal "0".

Cooling with constant correcting variables (e.g. EMO valve drive):

- Cooling ceiling
- Air convectors

Cooling with switching correcting variables (e.g. switch actuator):

- Cooling ceiling
- Air convectors



Heating and cooling

You can use the parameter "Switch between heating and cooling" to set whether heating and cooling are

- Set automatically by the controller or
- Set externally via the "Heating/cooling" object

If you select the "Heating/cooling" object, you can only force the controller into the heating or cooling mode via the object value.

If you have set the parameter "Switch between heating and cooling" to "Externally (via Heating/cooling object)" then after a download or restoration of bus voltage, a read request is transmitted to the bus by the "Heating/cooling" object.

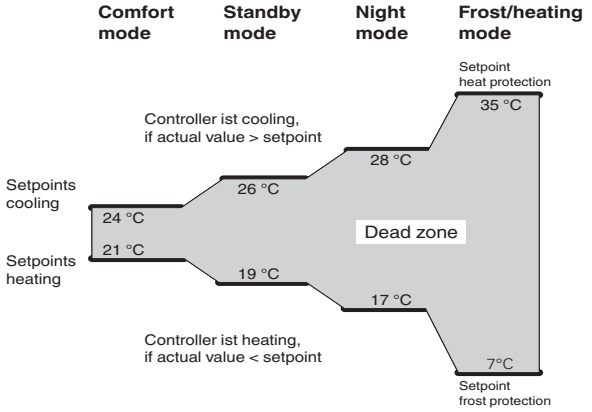
- If the object does not receive any status feedback after a download, the controller switches to "Heating" and the object sends a "1" to the bus.
- If the object does not receive any status feedback after bus voltage recovery, the controller switches to the last mode.
- If the object receives a status feedback, the object's operation mode is set.

If automatic mode was selected, the controller decides which control mode is suitable based on the parameterised setpoints, the insensitive zone and the current actual temperature.

The insensitive zone

The insensitive zone prevents the controller from switching constantly between heating and cooling. For example, if a heater is used for heating, it has sufficient thermal energy after the valve has been closed to continue to heat the room above the setpoint temperature. If you have configured the heating and cooling setpoint temperatures to be the same, the insensitive zone is set to "0 K". The air conditioning unit cools immediately because the setpoint for cooling has been exceeded. The procedure repeats itself again and again. This error is displayed as "Er 2" in the display.

Another error occurs if the heating setpoint was set higher than the cooling setpoint. This is displayed as error message "Er 2" after a reset. The control remains inactive until you rectify the error in the ETS and re-load the parameters.

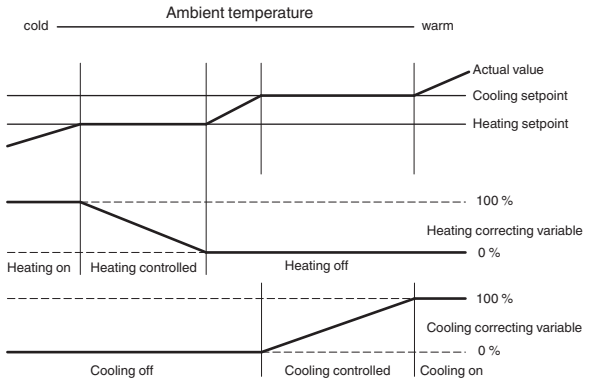


Heating and cooling with constant correcting variables (e.g. EMO valve drive):

- 2-pipe fan coil
- 4-pipe fan coil (with external switching between heating and cooling)
- 4-pipe fan coil (with automatic switching between heating and cooling)
- 1-circuit air conditioned ceiling
- Cooling ceiling with combined warm water heating
- Cooling ceiling with combined underfloor heating
- Variable air volume

Heating and cooling with switching correcting variables (e.g. switch actuator):

- Cooling ceiling
- Air convectors



Adjust the setpoint ranges for heating and cooling together

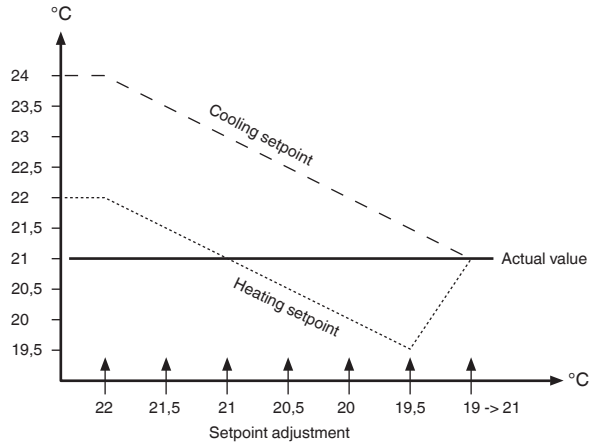
The difference between the two setpoints (heating and cooling) is interpreted as the insensitive zone.

Example:

The upper and lower setpoint adjustment is 3 K respectively.

Actual value = 21 °C; Heating setpoint = 22 °C; Cooling setpoint = 24 °C, this results in an insensitive zone of 2 K.

If you now adjust the setpoint temperature downwards using the display, then the following values are displayed: 22,0; 21,5; 21,0; 20,5; 20,0; 19,5; 21,0.

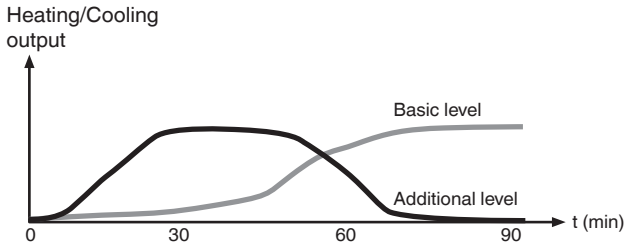


The jump from 19.5 to 21.0 can be explained by the fact that the cooling setpoint is relevant now because the actual temperature is more than or the same as the cooling setpoint temperature. Depending on the setting, this setpoint adjustment affects all the operation modes or just the current operation mode.

Setting "Setpoint adjustment affects current operation mode only": If comfort mode is currently activated, you can adjust the comfort setpoints for heating and cooling together, but you can not adjust the values for standby or night operation.

Two-stage heating or cooling

In order to shorten the heat-up phase with slow heating systems (e.g. underfloor heating), a second, more responsive heating system that heats up faster during the long start-up period of the main system (basic level) is frequently used.



The same behaviour applies with cooling systems.

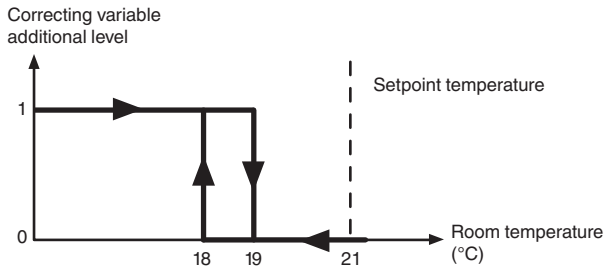
The additional level, which is controlled via 2-step control, remains switched on until a parameterised interval below the basic level is reached (e.g. 2 K), and then switches off. Only the basic level then remains switched on.

Example:

- Setpoint temperature: 21 °C
- Interval between basic level - additional level: 2 K
- Hysteresis of additional level: 1 K

The additional level remains switched on until "Setpoint temperature minus interval" (21 °C - 2 K = 19 °C) is reached. The additional level is then switched off.

It is only switched on again when the actual temperature is lower than the "setpoint temperature minus interval minus hysteresis" (21 °C - 2 K - 1 K = 18 °C).



The push-button displays the active basic level with a "1" and the active additional level with a "2".

Display

On the display, a symbol can show either the current controller status or whether heating or cooling is activated.

Display heating and cooling symbol = shows current controller status

Display	Mode
	Heating active, correcting variable ≠0
	Cooling active, correcting variable ≠0
1 2 (below the symbols)	1 = Heating/cooling active, correcting variable ≠0 For two-stage heating/cooling 1 = Basic level active, correcting variable ≠0 2 = Basic level and additional level active, correcting variable ≠0
--	Insensitive zone, correcting variables = 0

Display heating and cooling symbol = shows heating/cooling

Display	Mode
	Heating
	Cooling
1 2 (below the symbols)	1 = Heating/cooling active, correcting variable ≠0 For two-stage heating/cooling: 1 = Basic level active, correcting variable ≠0 2 = Basic level and additional level active, correcting variable ≠0

Controller types

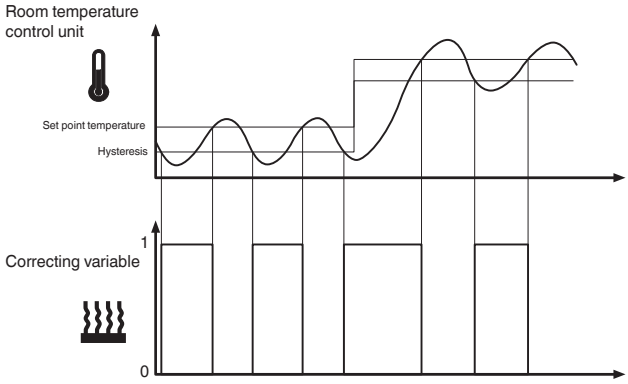
The room temperature control unit transmits correcting variables to the bus via various communication objects, which you can use to control different controller types with switching commands or by specifying percentage values:

- Continuous 2-step control
- Switching 2-step control
- Continuous PI control
- Switching PI control

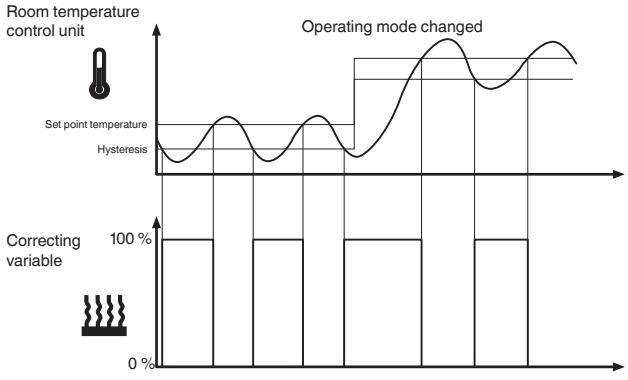
Continuous and switching 2-step control

The 2-step control is the simplest type of control. The heating switches on as soon as the actual temperature falls below a specific value, and switches off as soon as the setpoint temperature has been exceeded.

Switching 2-step control:



Continuous 2-step control:



The disadvantage of simple control, in contrast to its advantage, is that the room temperature is not constant but changes continuously, reducing comfort particularly when heating and cooling systems are slow to react. To counteract this effect, you can set a sufficiently small hysteresis. However, this leads to an increase in switching frequency, and therefore to increased wear of the drives.

The temperature overshoot above or below the hysteresis apparent in the diagram is caused when the heating/cooling system continues to emit heat or cold into the room after it has been switched off.

Setting rules for the 2-step control

"Hysteresis of the 2-step control" parameter:

- Small hysteresis:
  Leads to small fluctuations, but frequent switching.
- Large hysteresis:
  Leads to large fluctuations, but infrequent switching.

In general, due to the influences of the heating system and the room, the temperature fluctuations in the room are significantly higher than the hysteresis.

Continuous and switching PI control

For the PI control, the correcting variable is calculated from a proportional and an integral share. The calculation is governed by parameters such as:

- Temperature difference between actual value and setpoint
- Proportional range
- Reset time

In this way, the controller can correct the room temperature quickly and accurately. The corresponding correcting variable is transferred via a 1 bit/1 byte value to the bus.

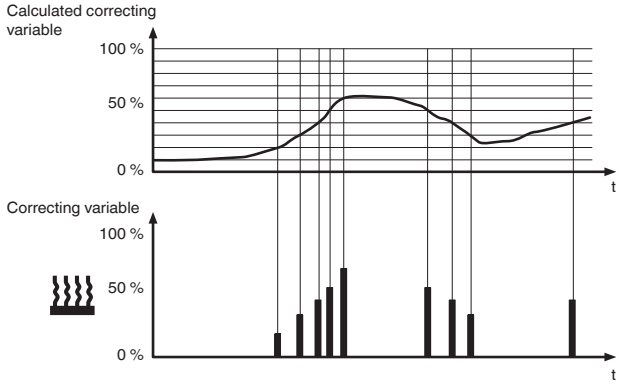
The standard control parameters for the most common system types are already installed in the controller:

- Warm water heating
- Underfloor heating
- Electric heating
- Fan convector
- Split unit
- Cooling ceiling

You can also set the control parameters for the proportional range and the reset time manually, but you should know exactly which actuators are connected and the control conditions in the room.

Continuous PI control

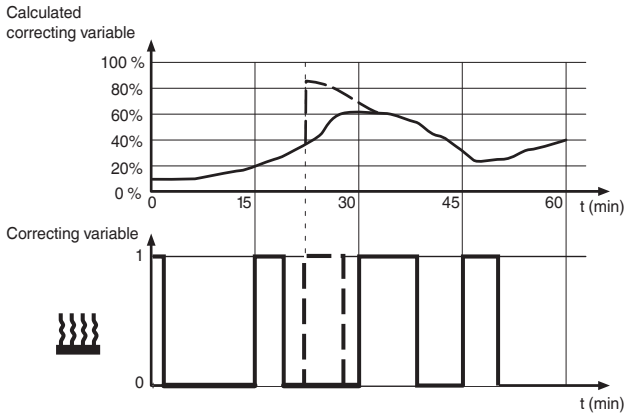
For the continuous PI control, the corresponding 1 byte correcting variable is transmitted 0-100% directly via the bus to the heating actuator or an EMO valve drive, which convert the correcting variable directly to a degree of opening. However, this is only transmitted when the newly calculated correcting variable has changed by a specified percentage.



Switching PI control (PWM)

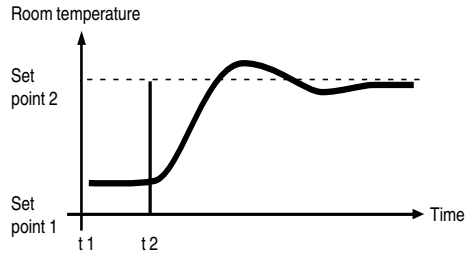
With the switching PI control, also known as the PWM control, the correcting variables calculated by the controller (0-100%) are converted into a pulse-width modulation (PWM). Within a constant, defined cycle time, the control actuator is opened ("1") and then closed again ("0") for the calculated percentage period. For example, when a correcting variable of 25% is calculated for a cycle time of 12 minutes, a "1" is transmitted at the beginning of the cycle time, and a "0" is transmitted after three minutes (= 25% of 12 minutes)

.



When the setpoint temperature changes, the controller recalculates the required correcting variable and transmits it still within the current cycle (broken line).

Setting rules for the PI control



In general:

- Large system increases (e.g. high heating output, steep characteristic curves for valves) are controlled with large proportional ranges.
- Slow heating systems (e.g. underfloor heating) are controlled with high-level reset times.

If no satisfactory control result is achieved by selecting an appropriate heating or cooling system, you can improve the adaptation "via control parameters":

- Small proportional range:
  Large overshoot for setpoint changes (also continuous oscillation under certain circumstances), rapid adjustment to the setpoint.
- Large proportional range:
  No (or little) overshooting, but slow adjustment.
- Short reset time:
  Rapid correction of control deviations (ambient conditions), risk of continuous oscillation.
- Long reset time:
  Slow correction of control deviations.

The framework conditions for setting the cycle time are as follows:

- For small values, the switching frequency and the bus load are increased.
- For large values, temperature fluctuations are created in the room.
- A short cycle time for rapid heating systems (e.g. electric heating).
- A long cycle time for slow heating systems (e.g. underfloor warm water heating).

Examples

Warm water radiator heating with motorised valve drives:

Characteristics	Parameter	Setting
Heating only	Controller type	Heating
	Correcting variable output	Continuous PI control
	Adjust the controller to the heating system	Warm water heating (5 K/150 min)

Cooling ceiling with motorised valve drives:

Characteristics	Parameter	Setting
Cooling only	Controller type	Cooling
	Correcting variable output	Continuous PI control
	Adjust the controller to the cooling system	Adjustment via control parameter
	Cooling proportional range	Approx. 5 K (depending on the application)
	Reset time for cooling	Approx. 240 min. (depending on the application)

Switching electric radiator heating:

Characteristics	Parameter	Setting
Heating only	Controller type	Heating
	Correcting variable output	Switching PI control
	Adjust the controller to the heating system	Electric heating (4 K/100 min)

Air conditioning with 4-duct (2-circuit) air convector system (e.g. switching valve drives):

Characteristics	Parameter	Setting
Heating or cooling as required, with automatic switching	Controller type	Heating and cooling
	Correcting variable output - heating	e.g. switching PI control
	Adjust the controller to the heating system	Air convector (4 K/90 min)
	Correcting variable output - cooling	e.g. switching PI control
	Adjust the controller to the cooling system	Air convector (4 K/90 min)
e.g. automatically switch between heating and cooling	Switch between heating and cooling	automatically via the controller

Temperature limitation using shading facility:

Characteristics	Parameter	Setting
Cooling only	Controller type	Cooling
	Correcting variable output - heating	Switching 2-step control
	Hysteresis	Large (e.g. 2 K)

Setting the room temperature control unit

Setting the general control parameters

Set the control first. Then specify which control type you want to plan.

Specify

- Whether and how the comfort extension should function, and which operation mode the device should go to after a reset.
- Whether setpoint adjustments via the control menu should be saved, or whether each setpoint you set should apply again when the operation mode is changed.
- How large a setpoint adjustment is allowed.
- Whether the setpoint adjustment affects the current operation mode only or all operation modes.

Control general	
Parameter	**Setting**
Use controller control	Yes
	No
Controller type	**Heating**
	Cooling
	Heating and cooling
Duration of comfort extension	None
	Test mode (1 min)
	30 min to 4.0 h, **1.0 h**
Termination of comfort extension via objects*	Yes
*Objects: comfort, standby, operation mode	**No**
Operation mode after comfort extension	Standby operation
	Night operation
	Current object values
Operation mode after reset	Comfort operation
	Standby operation
	Night operation
	Frost/heat protection operation
	Last operation
Operation mode after download	Comfort operation
	Standby operation
	Night operation
	Frost/heat protection operation
On what the setpoint adjustment has an effect	**Current operation mode**
	All operation modes
Setpoint adjustment maintained after change in operation mode	Yes
	No
Max. upper setpoint adjustment	0 - 10 K, **3 K**
Max. lower setpoint adjustment	0 - 10 K, **3 K**
Switch between heating and cooling	Automatically (via the controller)
	Externally (via heating/cooling object)
Heating/cooling read request after bus voltage recovery	Yes
	No
Waiting time after switching-over (heating/cooling)	Yes
	No
Waiting time (1-60 min)	1 ... 60, **10**

If you have parameterised the **"Heating and cooling"** controller type, either the controller automatically switches between heating and cooling or it is done by the "Heating/cooling" object accordingly.
If the controller switches automatically between heating and cooling, the controller is either in heating or cooling mode. The correcting variable of the non-active mode is switched to 0% (off).

When switching externally, switch to the heating mode with a "1" telegram, and to cooling mode with a "0" telegram.

If the same transmitting group address is used for the correcting variables for heating and cooling, the "0" telegrams of the non-active controller type are automatically suppressed.

Setting the operation mode and status

Here you can set whether to toggle between operation modes via 1 bit or 1 byte. Additionally, you define the 1 bit status object here.

If you want to display the system's status using visualisation software, there is one 1 byte status object and one 2 byte status object available for this purpose.

Operation mode/status	
Parameter	**Setting**
Toggle operation mode via 1 bit/ 1 byte	**1 bit**
	1 byte
Define 1 bit status object	Bit 0: Comfort
	Bit 1: Standby
	Bit 2: Night operation
	Bit 3: Frost/heat protection
	Bit 4: Dewpoint alarm
	Bit 5: Heating (1)/cooling (0)
	Bit 6: Controller inactive
	Bit 7: Frost alarm (1)

Structure of the 1 byte status object:

Bit 0 Comfort (1/0)
Bit 1 Standby (1/0)
Bit 2 Night operation (1/0)
Bit 3 Frost/heat protection (1/0)
Bit 4 Dewpoint alarm 1/0
Bit 5 Heating (1)/cooling (0)
Bit 6 Controller inactive (1/0)
Bit 7 Frost alarm (1/0)

Structure of the 2 byte status object:

Bit 00 Error (1/0)
Bit 01 * (0)
Bit 02 * (0)
Bit 03 * (0)
Bit 04 Additional heating level (1/0)
Bit 05 * (0)
Bit 06 * (0)
Bit 07 Heating inactive (1/0)
Bit 08 Heating (1)/cooling (0)
Bit 09 * (0)
Bit 10 Additional cooling level (1/0)
Bit 11 Cooling inactive (1/0)
Bit 12 Dewpoint alarm (1/0)
Bit 13 Frost alarm (1/0)
Bit 14 Temperature alarm (1/0)
Bit 15 * (0)

*not supported

Setting the setpoints

For each operation mode, there is a setpoint available for temperature control when changing operation mode automatically or manually. You have to specify this setpoint. You can change the setpoint manually via the control menu on the push-button within setpoint adjustment (see "Control general" tab). There is no setpoint adjustment for frost or heat protection.

Reference value for calculating the setpoint adjustment:

This parameter is only activated if the setpoint adjustment is to affect all operation modes equally ("Control general" tab). If you specify a new setpoint temperature via the object "Current setpoint temperature input", the setpoint adjustment is calculated as the difference between the reference value and the object value.

Example

Cooling/heating
Limits of setpoint adjustment = +3 K/-3 K
New set value: object "Current setpoint temperature input" = 24 °C
Reference setpoint for calculating the setpoint adjustment = 21 °C
Calculated setpoint adjustment = +3 °C

Initial status	Result
Cooling:	Cooling:
Heating protection = 35 °C	Heat protection = 35 °C
Night = 28 °C	Night = **31 °C**
Standby = 26 °C	Standby = **29 °C**
Comfort = 24 °C	Comfort = **27 °C**
Heating:	Heating
Comfort = 21 °C	Comfort = **24 °C**
Standby = 19 °C	Standby = **22 °C**
Night = 17 °C	Night = **20 °C**
Frost protection = 7 °C	Frost protection = 7 °C

Setpoints	
Parameter	**Setting**
Reference value for calculating the setpoint adjustment* *based on object "Current setpoint temperature input"	5.0 - 40 °C in 0.5 degree steps, **21.0 °C = 69.8 °F**
Heating	
Comfort setpoint	5.0 - 40 °C in 0.5 degree steps, **21.0 °C = 69.8 °F**
Standby setpoint	5.0 - 40 °C in 0.5 degree steps, **19.0 °C = 66.2 °F**
Night setpoint	5.0 - 40 °C in 0.5 degree steps, **17.0 °C = 62.6 °F**
Frost protection setpoint	0 - 15 °C in 1.0 degree steps, **7.0 °C = 44.6 °F**
Cooling	
Comfort setpoint	5.0 - 40 °C in 0.5 degree steps, **24.0 °C = 75.2 °F**
Standby setpoint	5.0 - 40 °C in 0.5 degree steps, **26.0 °C = 78.8 °F**
Night setpoint	5.0 - 40 °C in 0.5 degree steps, **28.0 °C = 82.4 °F**
Heat protection setpoint	18 - 40 °C in 1.0 degree steps, **35.0 °C = 95.0 °F**

Correct and send actual temperature

The actual temperature is affected by the following:

- Actual temperature inside (measured by internal sensors)
- Actual temperature outside (measured by external temperature sensors)
- Combination of internal and external actual temperature

You can set the temperature difference (the last difference transmitted compared to the current actual temperature) at which the actual temperature is transmitted, and the interval at which it should automatically be transmitted (e.g. to visualisation software).

Here, you can also set a correction value for the temperature sensor installed in the room temperature control unit. This is useful if it is installed in an unsuitable place in the room where the temperature is different from other places in the room (e.g. due to a draught or heat sources nearby), for example. The following formula applies:

Actual temperature = measured temperature + correction value

If you also use an external temperature sensor, you can set the percentage proportion at which the external actual temperature should be included in the current actual temperature. The external value is received via the "Current actual temperature input" object, read by the room temperature control unit and calculated according to the set weighting. The "Current actual temperature input" object is then overwritten by the calculated actual value.

You can set the system to monitor the actual external temperature cyclically. If the controller does not receive any new values during this time, a read request is sent. If no new value is received in response to this, the actual external temperature is equalised with the actual internal temperature.

If you do not want the system to monitor the actual external temperature, set the value here to "0".

Actual temperature (resulting)	
Parameter	**Setting**
Correct internal actual temperature Factor (-128 ... 127) * 0.1 K	-128 ... 127, **0**
Take actual external temperature partially into account	5 % to 100 %, **No**
Monitor actual external temperature every ... min (0-255)	0 ... 255, **60**
Send actual temperature if difference is ... K	No 0.1 to 2.0 K, **0.2 K**
Send actual temperature every ... min	No 3 to 60 min, **10 min**

Set temperature drop detection

When temperature drop detection is switched on, the room temperature control unit checks whether the temperature has changed by the set temperature difference within three minutes. If this is the case, the system switches to frost/heat protection mode for a period that you can set. After this time has elapsed, the controller switches back to the operation mode that was set previously.

You can set which temperature value or sensor the temperature for the measurement is taken from.

If using an external sensor, the actual temperature can consist of the temperature measured by the room temperature control unit and the external temperature, depending on the parameterised weighting (see "Correcting and setting the actual temperature").

Temperature jump	
Parameter	**Setting**
Temperature jump detection	**No** +/- 0.2 K / 3 min ... +/- 4.0 K / 3 min
Duration of the frost/heat protection in event of temperature jump (10-60 min) Frost protection during heating operation Heat protection during cooling operation	10 - 60 min, **20 min**
Temperature measurement	Of actual internal temperature Of actual external temperature Of actual internal or external temperature **Of (resulting) internal temperature**

Set closed-loop control for heating and additional level

This tab only appears if you set the "heating" or "heating and cooling" control type in the "Control general" tab. Here, you can set which heating control type should be activated. For PI controls, you can select between five standard system types, for which the recommended parameters have already been preconfigured. However, if you have sufficient specialised knowledge, you can also set the control parameters as required.

For 2-step control, set the hysteresis here.

Control heating	
Parameter	**Setting**
Basic level	
Direction of the controller	**Normal** Inverted
Correcting variable output	PI control (switching) **PI control (continuous)** 2-step control (switching) 2-step control (continuous)
Select heating system	Adjustment via control parameter **Warm water heating (5 K/ 150 min)** Underfloor heating (5 K/ 240 min) Electric heating (4 K/100 min) Air convector (4 K/90 min) Split unit (4 K/90 min)
Hysteresis	0.3 K - 2.0 K, **0.5 K**
Proportional range for heating in 0.1 K (10-255)	10 - 255, **40**
Reset time for heating (1-255 min)	**No**, 1 - 255

Here, specify the settings for the second heating level.

Control heating	
Parameter	**Setting**
Use additional level	Yes **No**
Direction of the controller	**Normal** Inverted
Correcting variable output	**2-step control (switching)** 2-step control (continuous)
Interval Factor (10 ... 100) * 0.1 K	10 ... 100, **20**
Hysteresis	0.3 K - 2.0 K, **0.5 K**

Set control cooling and additional level

This tab only appears if you set the "cooling" or "heating and cooling" control type in the "Control general" tab. Here, you can set which cooling control type should be activated. For PI controls, you can select between three standard system types, for which the recommended parameters have already been preconfigured. However, if you have sufficient specialised knowledge, you can also set the control parameters as required.

For 2-step control, set the hysteresis here.

Control cooling	
Parameter	**Setting**
Basic level	
Direction of the controller	**Normal**
	Inverted
Correcting variable output	PI control (switching)
	PI control (continuous)
	2-step control (switching)
	2-step control (continuous)
Select cooling system	Adjustment via control parameter
	Air convector (4 K/90 min)
	Split unit (4 K/90 min)
	Cooling ceiling (5 K/240 min)
Hysteresis	0.3 K - 2.0 K, **0.5 K**
Proportional range for cooling in 0.1 K (10-255)	10 - 255, **40**
Reset time for cooling (1-255 min)	**No**, 1 - 255

Here, specify the settings for the second cooling level.

Control heating	
Parameter	**Setting**
Use additional level	Yes
	No
Direction of the controller	**Normal**
	Inverted
Correcting variable output	**2-step control (switching)**
	2-step control (continuous)
Interval Factor (10 ... 100) * 0.1 K	10 ... 100, **20**
Hysteresis	0.3 K - 2.0 K, **0.5 K**

Set correcting variables and valve protection

Note that you need to set different parameters for 2-step control than you do for a PI control.

For "Cycle time of switching correcting variable", set the duration for the PI control. The calculated correcting variable is always transmitted at the start of a cycle time. If the valve drive has not received a value (e.g. during commissioning), the room could continuously heat up or cool down. To prevent this, set the "Cycle time for automatic sending of correcting variable". The correcting variable is transmitted again within the set time (as a precaution).

The minimum correcting variable must always be smaller than the maximum correcting variable! If not, the message "Er 4" appears on the display.

Valve protection

Valve protection prevents the valves on the heaters becoming stuck due to deposits in the heating water when the heating is switched off for a longer period of time (e.g. over the summer). When the valve protection is switched on, the valves are opened for a preset duration (100% on the controller output) after a preset number of days, and are then closed again (0% on the controller output).

The following settings apply for the "Heating" and "Cooling" controller types:

Correcting variables	
Parameter	**Setting**
Basic level	
Select a minimum correcting variable that is smaller than the maximum correcting variable.	
Cycle time of switching correcting variable (2-60 min)	2-60, **15**
Range of minimum correcting variable from 0 % to ... %	0 % - 100 %, **30 %**
Minimum correcting variable (0 % - 100 %)	0 % - 100 %, **30 %**
Range of maximum correcting variable from 100 % to ... %	0 % - 100 %, **70 %**
Maximum correcting variable (100 % - 0%)	0 % - 100 %, **70 %**
Change for which correcting variable is sent	2 % - 10 %, **3 %**
Send correcting variable cyclically	**Yes**
	No
Cycle time for automatic sending of correcting variable in min (1-60)	1-60, **30**
Send inactive correcting variable cyclically	**Yes**
	No
Use valve protection	Yes
	No
Activate valve protection every ... days (1 - 30)	1-30, **15**
Approach end position for ... min (1-30)	1-30, **4**

Correcting variables	
Parameter	**Setting**
Additional level	
Send correcting variable cyclically	**Yes** No
Cycle time for automatic sending of correcting variable in min (1-60)	1-60, **30**
Send inactive correcting variable cyclically	**Yes** No
Use valve protection	Yes **No**
Activate valve protection every ... days (1 - 30)	1-30, **15**
Approach end position for ... min (1-30)	1-30, **4**

Control problems - what to do if

Problem	**Possible solution**
The controller switches constantly between heating and cooling.	Increase insensitive zone between heating and cooling or increase "Waiting time after switching-over".
The setpoint is only reached very slowly.	Decrease the proportional range, either by selecting a system type with a smaller proportional range in the system-specific selection "Adjustment of the controller to the heating/ cooling system", or by directly reducing the proportional range via control parameters in the adjustment, or by decreasing the integral time.
The room temperature exceeds the limits when changes are made to the setpoint.	Increase the proportional range, either by selecting a system type with a larger proportional range in the system-specific selection "Adjustment of the controller to the heating/ cooling system", or by directly increasing the proportional range via control parameters in the adjustment, or by increasing the integral time.
It is always too hot or too cold in the room.	Compensate for the room temperature measurement by changing the "Compensation of the internal actual temperature" parameters accordingly.

Communication objects

You can select the following communication objects:

Function	**Object name**	**Type**	**Prio**	**Flags**	**Behaviour**
Control	Current actual temperature output	2 byte	Low	CRT	Transmit/ read out
Control	Current actual temperature input	2 byte	Low	WCT+	Transmit/ receive
Control	Current setpoint temperature output	2 byte	Low	CRT	Transmit/ read out
Control	Current setpoint temperature input	2 byte	Low	WC	Receive
Control	Operation mode output	1 byte	Low	CRT	Transmit/ read out
Control	Operation mode input	1 byte	Low	WC	Receive
Control	Frost/heat protection output	1 bit	Low	CRT	Transmit/ read out
Control	Frost/heat protection input	1 bit	Low	WC	Receive
Control	Heating/cooling input	1 bit	Low	WCT+	Transmit/ receive
Control	Heating/cooling output	1 bit	Low	CRT	Transmit/ read out
Control	Comfort output	1 bit	Low	CRT	Transmit/ read out
Control	Comfort input	1 bit	Low	WC	Receive
Control	Comfort extension output	1 bit	Low	CRT	Transmit/ read out
Control	Comfort extension input	1 bit	Low	WC	Receive
Control	Night reduction output	1 bit	Low	CRT	Transmit/ read out
Control	Night reduction input	1 bit	Low	WC	Receive
Control	Setpoint adjustment output	2 byte	Low	CRT	Transmit/ read out
Control	Setpoint adjustment input	2 byte	Low	WC	Receive
Control	Disable object for output	1 bit	Low	CRT	Transmit/ read out
Control	Disable object for input	1 bit	Low	WC	Receive
Control	Status	1 byte	Low	CRT	Transmit/ read out
Control	Status	2 byte	Low	CRT	Transmit/ read out
Control	Status (comfort)	1 bit	Low	CRT	Transmit/ read out
Control	Status (standby)	1 bit	Low	CRT	Transmit/ read out
Control	Status (night operation)	1 bit	Low	CRT	Transmit/ read out
Control	Status (frost/heat protection)	1 bit	Low	CRT	Transmit/ read out
Control	Status (dewpoint alarm)	1 bit	Low	CRT	Transmit/ read out
Control	Status (heating/cooling)	1 bit	Low	CRT	Transmit/ read out
Control	Status (controller inactive)	1 bit	Low	CRT	Transmit/ read out
Control	Status (frost alarm)	1 bit	Low	CRT	Transmit/ read out
Control	Heating status (basic level)	1 byte	Low	CRT	Transmit/ read out

Function	Object name	Type	Prio	Flags	Behaviour
Control	Cooling status (basic level)	1 byte	Low	CRT	Transmit/ read out
Control	Correcting variable heating (basic level)	1 bit	Low	CRT	Transmit/ read out
Control	Correcting variable heating (basic level)	1 byte	Low	CRT	Transmit/ read out
Control	Correcting variable heating (additional level)	1 bit	Low	CRT	Transmit/ read out
Control	Correcting variable heating (additional level)	1 byte	Low	CRT	Transmit/ read out
Control	Correcting variable cooling (basic level)	1 bit	Low	CRT	Transmit/ read out
Control	Correcting variable cooling (basic level)	1 byte	Low	CRT	Transmit/ read out
Control	Correcting variable cooling (additional level)	1 bit	Low	CRT	Transmit/ read out
Control	Correcting variable cooling (additional level)	1 byte	Low	CRT	Transmit/ read out
Control	Dewpoint alarm	1 bit	Low	WC	Receive

Display external temperature in display

You can cyclically read an external temperature value (2-byte value) via the bus and display it. The external temperature can be the outdoor temperature transmitted from a weather station, for example.

Display external temperature	
Parameter	**Settings**
Read external temperature cyclically	Yes No
Cycle time = base * factor	
Base	1 s 1 min 1 h 1 day
Factor (3-255)	3-255, **3**

The external temperature is only shown in the display, this temperature has no effect on the control behaviour of the push-button.

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Display external temperature	External temperature	2 byte	Low	WCT	Transmit/ receive

Controlling and displaying the fan speed

You can use this setting in combination with the Fan Coil actuator, for example. If you combine it with the "Linear regulator" push-button function, you can easily control fan speeds with one push-button.

The display can be used to show whether the fan of the fan coil actuator is working in automatic or manual mode and which fan speed is currently activated. The status feedback object can be used to send the status to the LED.

In the parameters, you can set the percentage values at which the individual levels are displayed.

Fan speed	
Parameter	**Setting**
Number of fan speeds	1 - 7, **3**
Value range for speed display: 1-100 %	
Display fan speed 1 up to ... %	1 - 100%, **34%**
Display fan speed 2 up to ... %	1 - 100%, **67%**
Display fan speed 3 up to ... %	1 - 100%, **100%**
Display "Auto" in display	**If fan status automatic is "0"** If fan status automatic is "1"

Communication objects

You can select the following communication objects:

Function	Object name	Type	Prio	Flags	Behaviour
Display of fan speed	Fan 0 -100 %	1 byte	Low	WC	Receive
Display automatic	Fan status automatic	1 bit	Low	WC	Receive

Behaviour on bus voltage recovery / bus voltage failure

Behaviour on application/recovery of the bus voltage

Depending on the application settings:

- The status LEDs are switched on or off or they flash.
- The operational LED can be switched on.
- One of the following operation modes is activated: comfort, standby, night, frost/heat protection or the last operation mode.
- The clock symbol may flash in the display when the time has not yet been automatically synchronised or manually set.
- The background lighting of the display may be switched on.

Telegrams

- A telegram can be sent to request time synchronisation.
- Telegrams for the control function (actual temperature, correcting variables etc.) may be transmitted.

Behaviour when bus voltage fails

The operation LEDs, status LEDs are switched off together with the display, including the background lighting.

Displays and error messages

Er 2	A contradiction has been detected in the heating parameters (setpoints or insensitive zone are inconsistent), e.g. heating setpoint temperature ≥ cooling setpoint temperature
Er 3	The software in the push-button is not compatible with the ETS application
Er 4	Upper control value range ≤ lower control value range
Er 5	Memory error
Er 6	Error in temperature sensor
Er 7	STACK error
Er 8	RAM error
APL	Application not loaded or faulty

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