Cala KNX T 101

Room Temperature Controller

Item numbers 70980 (white), 70982 (black)

elsner elektronik

Installation and Adjustment

Installation, inspection, commissioning and troubleshooting of the device must only be carried out by a competent electrician.

This manual is amended periodically and will be brought into line with new software releases. The change status (software version and date) can be found in the contents footer. If you have a device with a later software version, please check **www.elsner-elektronik.de** in the menu area "Service" to find out whether a more up-to-date version of the manual is available.

Clarification of signs used in this manual

Safety advice.

Safety advice for working on electrical connections, components, etc.

DANGER! ... indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.

WARNING! ... indicates a potentially hazardous situation which may lead to death or severe injuries if it is not avoided.

CAUTION! ... indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.

ATTENTION! ... indicates a situation which may lead to damage to property if it is not avoided.

ETS In the ETS tables, the parameter default settings are marked by underlining.

1. Description

The **Room Temperature Controller Cala KNX T 101** measures the room temperature and displays the current value in white illuminated figures. Via the bus the device can receive an external measured value and process it with own data to overall temperature value (mixed value).

The **Cala KNX T 101** has got an integrated PI controller for a heating and a cooling system (one or two step). The room temperature is adjusted by means of the „+“ and „-“ touch buttons.

The device is supplemented with a frame of the switch series used in the building, and thus fits seamlessly into the interior fittings.

Functions:

- Measurement of **temperature**. **Mixed value** from own measured value and external values (proportions can be set in percentage), output of minimum and maximum values
- **Display** of the actual value or the target value/basic setpoint shift
- **2 touch buttons** (+/-) for adjustment of the room temperature
- **PI controller for heating** (one or two step) and **cooling** (one or two step) depending on temperature. Control according to separate target values or basic target temperature

Configuration is made using the KNX software ETS 5. The **product file** can be downloaded from the ETS online catalogue and the Elsner Elektronik website on **www.elsner-elektronik.de** in the “Service” menu.

1.0.1. Scope of delivery

- Room temperature controller in casing
- Base plate

Additionally required (not included in the deliverables):

- Junction box Ø 60 mm, 42 mm deep
- Frame (for insert 55 x 55 mm), compatible to the switch scheme used in the building

1.1. Technical data

Casing	Genuine glass, plastic
Colours	• similar to RAL 9010 pure white • similar to RAL 9005 deep black
Installation	Flush-mounted (wall installation in junction box Ø 60 mm, 42 mm deep or cavity wall socket for burr hole Ø 68 mm)
Degree of protection	IP 20
Dimensions	Housing approx. 55 x 55 (W x H, mm), Installation depth approx. 10 mm, Base plate approx. 71 x 71 (W x H, mm)

Total weight	approx. 50 g
Ambient temperature	Operating 0…+55°C, storage -30…+85°C
Ambient humidity	5...95% RH, avoid condensation
Operating voltage	KNX bus voltage
Bus current	max. 15 mA
Data output	KNX +/- Bus plug-in terminal
Group addresses	max. 183
Allocations	max. 183
Communication objects	41
Temperature measurement range	0…+55°C
Temperature resolution	0.1°C

The product is compliant with the provisions of EU Directives.

1.1.1. Accuracy of the measurement

Measurement variations from permanent sources of interference (see chapter *Installation position*) can be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

When **measuring temperature**, the self-heating of the device is compensated.

2. Installation and commissioning

2.1. Installation notes

Installation, testing, operational start-up and troubleshooting should only be performed by an electrician.

CAUTION!
Live voltage!
There are unprotected live components inside the device.

- National legal regulations are to be followed.
- Ensure that all lines to be assembled are free of voltage and take precautions against accidental switching on.
- Do not use the device if it is damaged.
- Take the device or system out of service and secure it against unintentional use, if it can be assumed, that risk-free operation is no longer guaranteed.

The device is only to be used for the intended purpose described in this manual. Any improper modification or failure to follow the operating instructions voids any and all warranty and guarantee claims.

After unpacking the device, check it immediately for possible mechanical damage. If it has been damaged in transport, inform the supplier immediately.

The device may only be used as a fixed-site installation; that means only when assembled and after conclusion of all installation and operational start-up tasks and only in the surroundings designated for it.

Elsner Elektronik is not liable for any changes in norms and standards which may occur after publication of these operating instructions.

2.2. Installation position

The **Room Temperature Controller Cala KNX T 101** is designed for wall installation in a connector socket (Ø 60 mm, 42 mm deep).

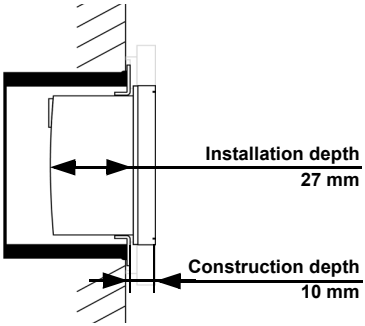


Fig. 1: Sectional drawing.
*The **Room Temperature Controller Cala KNX T 101** fits in a standard connector socket (Ø 60 mm, depth 42 mm).*
The frame is not included in the delivery!

May be installed and operated in dry interior rooms only.
Avoid condensation.

When selecting an installation location, please ensure that the measurement results are affected as little as possible by external influences. Possible sources of interference include:

- Direct sunlight
- Drafts from windows and doors
- Draft from ducts which lead from other rooms or from the outside to the junction box in which the sensor is mounted
- Warming or cooling of the building structure on which the sensor is mounted, e.g. due to sunlight, heating or cold water pipes
- Connection lines and ducts which lead from warmer or colder areas to the sensor

Measurement variations from permanent sources of interference can be corrected in the ETS in order to ensure the specified accuracy of the sensor (offset).

2.3. Device structure

2.3.1. Casing

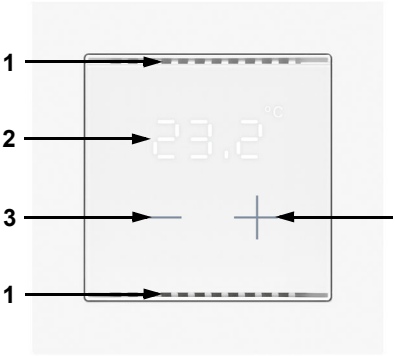


Fig. 2: Front
1 Ventilation slit (top and bottom)
2 Temperatur display
3 Touch area -
4 Touch area +

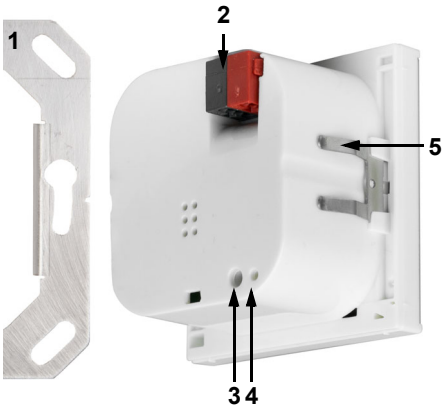


Fig. 3: Back
1 Base frame
2 KNX terminal BUS +/-
3 Programming button (recessed) for teaching the device
4 Programming LED (recessed)
5 Catches

2.4. Installation of the sensor

First install the windproof socket with feed line. Seal the inlet tubes as well, in order to prevent draughts.
Then screw the base plate to the socket and place the switch program frame. Connect the bus cable +/- to the plug (black-red).
Insert the device firmly onto the metal frame using the catches so that the device and the housing are fixed together.

2.5. Notes on mounting and commissioning

Never expose the device to water (e.g. rain) or dust. This can damage the electronics. You must not exceed a relative humidity of 95%. Avoid condensation.

After the bus voltage has been applied, the device will enter an initialisation phase lasting a few seconds. During this phase no information can be received or sent via the bus.

3. Addressing of the device at the bus

The device is supplied with the bus address 15.15.255. You can program another address into the ETS by overwriting the 15.15.255 address or by teaching via the programming button.

4. Display and operation at the device

4.1. Adjust room temperature

Depending on the setting of the "Display mode" parameter in the device application, the **Room Temperature Controller Cala KNX T 101** displays the current room temperature value (or mixed value), the target value or the shift in relation to the basic setpoint. The display can be dimmed and switched off via the bus so that *no* value is displayed.

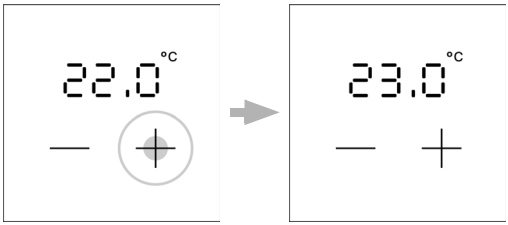
Option A: Display of actual temperature (room temperature)

The current room temperature is displayed. It is *not* possible to change the room temperature manually using the +/- buttons.

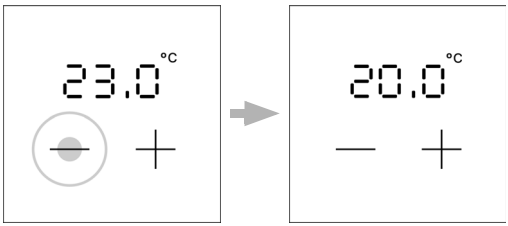
Option B: Display of target temperature or basic setpoint shift

Depending on the setting, the current target value or the shift relative to the base setpoint is displayed. The temperature can be changed by touching the +/- buttons.

Target value display (absolute value):

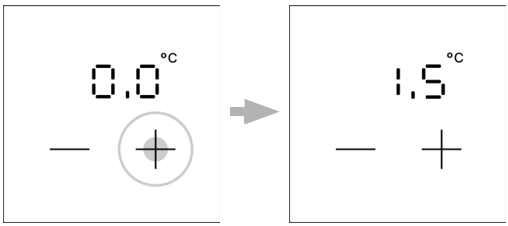


Tap +:
Increase room temperature (target temperature is increased)

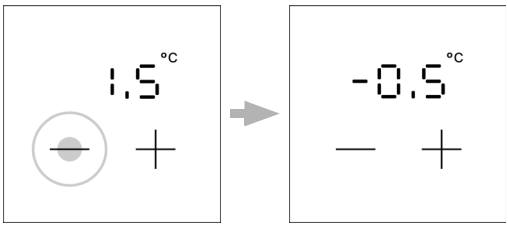


Tap -:
Lower room temperature (target temperature is lowered)

Display of the **basic setpoint shift** (change compared to the basic setpoint of the control):



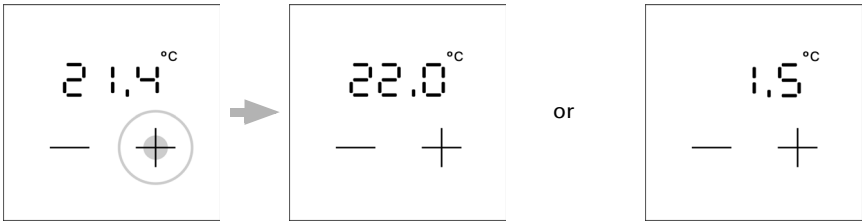
Tap +:
Increase room temperature
(Basic setpoint shift direction PLUS)



Tap -:
Lower room temperature
(Basic setpoint shift direction MINUS)

Option C: Display of actual temperature and target temperature/basic setpoint shift

During normal operation, the current room temperature is displayed. By touching the buttons, the display jumps to the target temperature or to the basic setpoint shift, depending on the presetting. Changes with + or - are visible. The display returns to the room temperature if no button is touched for 7 seconds.



Touch the **+ or -** button briefly: The current **target temperature** (or the basic setpoint shift) is displayed.

Tap +: Increase room temperature
(target temperature/basic setpoint shift is increased).

Tap -: Lower room temperature
(target temperature/basic setpoint shift is lowered).

General:

The step size for the change and the possible setting range are defined in the device application (ETS). There you can also define whether the manually changed values are retained after a mode change (e.g. Eco mode overnight) or reset to the stored values.

The button functions can be locked due to operating mode with priority 1.

5. Maintenance

Ventilation slits must not be dirty of covered. As a rule, it is sufficient to wipe the device with a soft, dry cloth as required.

6. Disposal

After use, the device must be disposed of or recycled in accordance with the legal regulations. Do not dispose of it with the household waste!

7. Transfer protocol

Units:

Temperatures in degrees Celsius

7.1. List of all communication objects

Abbreviation flags:

C Communication
R Read
W Write
T Transfer
U Update

No	Text	Function	Flags	DPT type	Size
0	Software version	Output	R-CT	[217.1] DPT_Version	2 bytes
5	LED brightness in %	Input	-WC-	[5.1] DPT_Scaling	1 byte
6	LED switching	Input	-WC-	[1.1] DPT_Switch	1 bit
7	Temperature sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
8	Temperature sensor: External reading	Input	-WCT	[9.1] DPT_Value_Temp	2 bytes
9	Temperature sensor: Measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
10	Temperature sensor: Total reading	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
11	Temperature sensor: Measured value min/max. query	Input	-WC-	[1.17] DPT_Trigger	1 bit
12	Temperature sensor: Minimum reading	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
13	Temperature sensor: Maximum reading	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
14	Temperature sensor: Measured value min/max. reset	Input	-WC-	[1.17] DPT_Trig-ger	1 bit
15	Temp. controller: HVAC mode (Priority 1)	Input / Output	RWCT	[20.102] DPT_HVACMode	1 byte
16	Temp. controller: HVAC mode (Priority 2)	Input / Output	RWCT	[20.102] DPT_HVACMode	1 byte
17	Temp. controller: Frost/heat protection mode activation	Input	RWCT	[1.1] DPT_Switch	1 bit
18	Temp. controller: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
19	Temp. controller: Current set point	Output	R-CT	[9.1] DPT_Value_Temp	2 bytes
20	Temp. controller: Switching (0: Heating | 1: Cooling)	Input	-WC-	[1.1] DPT_Switch	1 bit

No	Text	Function	Flags	DPT type	Size
21	Temp. controller: Set point for comfort Heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
22	Temp. controller: Set point for comfort Heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
23	Temp. controller: Set point for comfort Cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
24	Temp. controller: Set point for comfort Cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
25	Temp. controller: Basic 16-bit set point shift	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
26	Temp. controller: Set point for standby Heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
27	Temp. controller: Set point for standby Heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
28	Temp. controller: Set point for standby Cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
29	Temp. controller: Set point for standby Cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
30	Temp. controller: Eco heating set point	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
31	Temp. controller: Set point, eco heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
32	Temp. controller: Eco cooling set point	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 bytes
33	Temp. controller: Set point, eco cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
34	Temp. controller: Actuating variable, heating (1st stage)	Output	R-CT	[5.1] DPT_Scaling	1 byte
35	Temp. controller: Actuating variable, heating (2nd stage)	Output	R-CT	[5.1] DPT_Scaling	1 byte
36	Temp. controller: Actuating variable, cooling (1st stage)	Output	R-CT	[5.1] DPT_Scaling	1 byte
37	Temp. controller: Actuating variable, cooling (2nd stage)	Output	R-CT	[5.1] DPT_Scaling	1 byte
38	Temp. controller: Act. variable for 4/6-way valve	Output	R-CT	[5.1] DPT_Scaling	1 byte
39	Temp. controller: Status heater stage 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
40	Temp. controller: Status heater stage 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit

No	Text	Function	Flags	DPT type	Size
41	Temp. controller: Status cooler stage 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
42	Temp. controller: Status cooler stage 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
43	Temp. controller: Comfort extension status	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
44	Temp. controller: Comfort extension time	Input	RWCT	[7.5] DPT_ TimePeriodSec	2 bytes

8. Setting the parameters

8.1. Behaviour on power failure/ restoration of power

Behaviour following a failure of the bus power supply:

The device sends nothing.

Behaviour on bus restoration of power and following programming or reset:

The device sends all outputs according to their send behaviour set in the parameters with the delays established in the "General settings" parameter block.

8.2. General settings

Set basic characteristics for the **data transfer.**

Send delay in seconds after reset and bus voltage recovery	5...7200
Maximum message rate	• 1 message per second • ... • 10 messages per second • ... • 50 messages per second

Set the initial value for LED brightness. Determine if the **LED display should be controlled via objects.** This activates input objects 5 and 6 for LED brightness. And set whether the LEDs switch off automatically after pressing a push button.

Initial LED brightness in % until first communication	0...100; 10
Control LEDs with objects	No • Yes
Use automatic switching off of the LEDs after using the push button	No • Yes
Switching off after *(if automatic switch off is used)*	1 ... 255; 2 Sec. after operation

8.3. Temperature measured value

Determine is a **malfunction object** should be used. This activates output object 7 for error messages.

Use malfunction object	No • Yes

Use **Offsets** to adjust the readings to be sent.

Offset in 0.1°C	-50…50; 0

The unit can calculate a **mixed value** from its own reading and an external value. Set the mixed value calculation if desired.
If an external portion is used, all of the following settings are related to the overall reading. The display of **Cala KNX T 101** also shows the total measured value.

Use external reading	No • **Yes**
Ext. Measured value portion of the total reading	5% • 10% • ... • 50% • ... • 95% • 100%
All following settings refer to the total measured value	
Transmission pattern for and total measurements	• never • periodically • on change • on change and periodically
on change of *(if sent on change)*	0.1°C • 0.2°C • 0.5°C • 1.0°C • 2.0°C • 5.0°C
Send cycle *(if sent periodically)*	5 s • 10 s • ... • 1.5 h • 2 h

The **minimum and maximum readings** can be saved and sent to the bus. Use the 'Reset temperature min/max. value' object to reset the values to the current readings. The values are not retained after a reset.

Use minimum and maximum value	No • Yes

8.4. Temperature PI controller

Activate the control if you would like to use it.

Use controller	No • **Yes**

General rules

Decide in which cases **nominal values and delay times** received per object are to be kept. The parameter is only taken into consideration if the setting by object is activated further down. Please note that the setting "After power restoration and programming"

should not be used for the initial start-up, as the factory settings are always used until the first call (setting via objects is ignored).

The set points and delay times received via the communication object should remain:	• never • after power restoration • after restoration of power and programming

Comfort, standby, eco and building protection modes may be used as necessary to control room temperature.
Comfort when present,
Standby when absent,
Eco as a night-time mode and
Frost / heat protection (building protection) e.g. when the window is open.

The settings for the temperature control include the set point temperatures for the individual modes. Objects are used to determine which mode is to be selected. A change of modes may be triggered manually or automatically (e.g. through a timer, window contact).

The **mode** may be switched with two 8 bit objects of different priority. Objects
'... HVAC mode (Prio 2)' for switching in everyday operation and
'... HVAC mode (Prio 1)' for central switching with higher priority.
The objects are coded as follows:
0 = Auto (only on Prio 1)
1 = Comfort
2 = Standby
3 = Eco
4 = Building protection

Alternatively, you can use three objects, with one object switching between eco and standby mode and the two others are used to activate comfort mode or frost/heat protection mode. The comfort object then blocks the eco/standby object, and frost/heat protection objects have the highest priority. Objects
'... Mode (1: Eco, 0: Standby)',
'... comfort mode activation: and
'... frost/heat protection mode activation'

Switch mode via	• two 8-bit objects (HVAC modes) • three 1-bit objects

Select the **mode to be activated after reset** (e.g. power failure, reset of the line via the bus). (Default).
Then configure a temperature control **block** using the blocking object.

Mode after reset	• Comfort • Standby • Eco • Building protection

Behaviour of the blocking object with value	• 1 = Block | 0 = Release • 0 = Block | 1 = Release
Value of the blocking object after reset	0 • 1

Specify when the current **control variables** are to be **sent** to the bus. Periodic transmission is safer if a message does not reach the recipient. You may also set up periodical monitoring by the actuator with this setting.

Send control variable	• on change • on change and periodically
from change of (in absolute %)	1...10; 2
Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

The **status object** reports the current status of the output (0% = OFF, >0% = ON) and may for example be used for visualisation, or to switch off the heating pump as soon as the heating is switched off.

Send status objects	• on change • on change to 1 • on change to 0 • on change and periodically • on change to 1 and periodically • on change to 0 and periodically
Cycle *(if sent periodically)*	5 s • ... • 5 min • ... • 2 h

Then define the **type of control**. Heating and/or cooling may be controlled in two stages.

Type of control	• Single-stage heating • Dual-stage heating • Single-stage cooling • Single-stage heating + single-stage cooling • Dual-stage heating + single-stage cooling • Dual-stage heating + dual-stage cooling

General set point values

You may enter separate set point values for each mode or use the comfort set point as a basic value.

If you are using the controls for both heating *and* cooling, you may also select the setting "separately with switching object". Systems used for cooling in the summer and for heating in the winter can thus be switched from one to the other.
If you are using the basic value, only the deviation from the comfort set point value is listed for the other modes (e. g., 2°C less for standby mode).

Keep modified set points after mode change	No • Yes
Setting the set points	• with separate set points with switching object • with separate set points without switching object • with comfort set point as a basis with switching object • with comfort set point as a basis without switching object

Determine, which **value must be shown on the display.**
Actual value only means that the currently measured temperature value (or the mixed value defined) is displayed. A set point change using buttons is then *not* possible.
Set point/base shift only means that the currently valid set point (e.g. 21.5 °C) or the base set point shift (e.g. +2 °C) is displayed, depending on the set point settings. Use the buttons to change the set point or the base set point shift.
Actual value and set point/base shift displays the actual value in normal functioning conditions. If the + or - buttons are touched, the set point or the base set point shift are displayed. The set point/base shift view closes after 7 seconds of inactivity, after which the display switches back to the actual value.

Display mode	• Actual value only • Set point/base shift only • Actual and set point/Base shift

If a switching object is used, define the behaviour and the value after reset.

Behaviour of the switching object at *(with switching object)*	• 0 = Heating | 1 = Cooling • 1 = Heating | 0 = Cooling
Value of the switching object after reset *(with switching object)*	0 • 1

The **grades** for the set point changes are predefined.

Grading for set point changes (in 0.1 °C)	1... 50; 10

The control can be switched to comfort mode from eco mode, also night-time operation, via the comfort extension. This allows the user to maintain the nominal comfort set point for a longer time, e.g. when having guests. The duration of this comfort ex-

tension period is set here. After the comfort extension period is terminated, the system returns to eco mode.

Comfort extension time in seconds (can only be activated in eco mode)	1…36000; 3600

Set point for comfort

Comfort mode is usually used for day-time operation when people are present. A starting value is defined for the comfort set point as well as a temperature range in which the nominal value may be modified.

Initial heating/cooling set point (in 0.1 °C) valid until first communication	-300…800; 210

If set point values are entered separately:

Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort set point value is used as a basis:

If the comfort set point value is used as a basis, an increase/decrease relative to this value is set.

Heating initial set point (in 0.1 °C) valid until first communication	-300…800; 210
Minimum base set point (in 0.1°C)	-300…800; 160
Maximum base set point (in 0.1°C)	-300…800; 280
Reduction by up to (in 0.1°C)	1…100; 50
Increase by up to (in 0.1°C)	1…100; 50

If the comfort set point is used as the basis, but no switching object is used, a dead zone is determined for the control mode 'heating *and* cooling' to avoid direct switching from heating to cooling.

Dead zone between heating and cooling (in 0.1°C) *(only if both heating and cooling are used, without switching object)*	1…100; 50

Set point for standby

Standby mode is usually used for daytime mode when people are absent.

If set point values are entered separately:

A starting set point value is defined as well as a temperature range in which the set point value may be changed.

Heating initial set point (in 0.1 °C) valid until first communication	-300…800; 180

Cooling initial set point (in 0.1 °C) valid until first communication	-300…800; 240
Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort set point value is used as a basis:

If the comfort set point value is used as a basis, an increase/decrease relative to this value is set.

Reduce heating set point (in 0.1°C) *(for heating)*	0…200; 30
Increase cooling set point (in 0.1°C) *(for cooling)*	0…200; 30

Eco set point

Eco mode is usually used for night-time operation.

If set point values are entered separately:

A starting set point value is defined as well as a temperature range in which the set point value may be changed.

Heating initial set point (in 0.1 °C) valid until first communication	-300…800; 160
Cooling initial set point (in 0.1 °C) valid until first communication	-300…800; 280
Min. object value heating/cooling (in 0.1 °C)	-300…800; 160
Max. object value heating/cooling (in 0.1 °C)	-300…800; 280

If the comfort set point value is used as a basis:

If the comfort set point value is used as a basis, an increase/decrease relative to this value is set.

Reduce heating set point (in 0.1°C) *(for heating)*	0…200; 50
Increase cooling set point (in 0.1°C) *(for cooling)*	0…200; 60

Set point values for frost/heat protection (building protection)

The building protection mode is used, for example, when windows are opened for ventilation. Set points for frost protection (heating) and heat protection (cooling) are determined which may not be modified from outside (no access via operating devices etc.). The building protection mode may be activated with delay, which allows you to leave the building before the controls switch to frost/heat protection mode.

Nominal value frost protection\r\n(in 0,1°C)	-300…800; 70
Activation delay	none • 5 s • ... • 5 min • ... • 2 h
Nominal value heat protection (in 0,1°C)	-300…800; 350
Activation delay	none • 5 s • ... • 5 min • ... • 2 h

General actuating variables

This setting only appears for the 'heating *and* cooling' control types. This is where you can decide whether to use a shared variable for heating and cooling. If the 2nd stage has a common variable, this is also where you determine the control mode of the 2nd stage.

For heating and cooling	• separate actuating variables are used • common variables are used for Stage 1 • common variables are used for Stage 2 • common variables are used for Stage 1+2
Use actuating variable for 4/6-way valve *(only for shared actuating variable on stage 1)*	No • Yes
Control type *(for stage 2 only)*	• 2-point control • PI control
Regulating variable of the 2nd stage is on *(for stage 2 with 2-point control only)*	• 1-bit object • 8-bit object

When using the actuating variable for a 4/6-way valve the following applies:
0%...100% heating = 66%...100% actuating variable
OFF = 50% actuating variable
0%...100% cooling = 33%...0% actuating variable

8.4.1. Heating control stage 1/2

If a heating control mode is configured, one or two setting sections for the heating stages are displayed.

In the **first stage**, heating is controlled by a PI controller which allows to either enter control parameters or select predetermined applications. For explanations of the parameters, see sections *PI control with controller parameters* and *the application specified.*

Setting of the controller by	• Controller parameter • Specified applications

In the **second stage** (thus only in the case of 2-stage heating), heating is controlled via a PI or a 2-point-control. For explanations of the parameters, see the corresponding sections.
On stage 2, the set point deviation between the two stages must also be specified, i.e. beyond which set point undershoot the second stage is added.

Set point difference between 1st and 2nd stages (in 0.1°C) *(for stage 2)*	0...100; 40
Control type *(for stage 2, no shared actuating variables)*	• 2-point control • PI control

Control variable is on *(for stage 2 with 2-point control, no shared actuating variables)*	• 1-bit object • 8-bit object

PI control with controller parameters

This setting allows individual input of the parameters for PI control.

Control type	• **PI control**
Setting of the controller by	• **Controller parameter** • Specified applications

Specify the deviation from the set point value at which the maximum control variable value is reached, i.e. the point at which maximum heating power is activated.
Reset time shows how quickly the controller responds to deviations from the set point. In the case of a short reset time, the control responds with a fast increase of the control variable. In the case of a long reset time, the control responds slower and needs longer until the necessary control variable for the set point deviation is reached.
You should set the time appropriate for the heating system at this point (observe the manufacturer's instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	1...5
Reset time (in min)	1...255; 30

Now specify what should be sent when the control is blocked. Set a value greater than 0 (=OFF) to get a basic heating stage, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *(only if a value is sent)*	0...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

PI control with predetermined application

This setting provides fixed parameters for frequent applications.

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **Specified applications**
Application	• Warm water heating • Floor heating • Convection unit • Electric heating
Maximum control variable is reached at set point/actual difference of (in °C)	Warm water heating: 5 Floor heating: 5 Convection unit: 4 Electric heating: 4

Reset time (in min)	Warm water heating: 150 Floor heating: 240 Convection unit: 90 Electric heating: 100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *(only if a value is sent)*	0...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

2-point-control (only stage 2):

The 2-point control is used for systems which are only set to ON or OFF.

Control type *(is determined for shared variables above)*	• **2-point control**

Enter the hysteresis that prevents frequent on/off switching of temperatures within the threshold range.

Hysteresis (in 0.1°C)	0...100; 20

If separate actuating variables are used, the choose if the actuating variable of the 2nd stage is a 1-bit object (on/off) or an 8-bit object (on with percentage/off).

Control variable is on	• 1-bit object • 8-bit object
Value (in %) *(with 8-bit object)*	0...100

Now specify what should be sent when the control is blocked. Set a value greater than 0 (=OFF) to get a basic heating stage, e.g. for floor heating. On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *only if a value is sent*	0...100

8.4.2. Cooling control stage 1/2

If a cooling control mode is configured, one or two setting sections for the cooling stages are displayed.

In the **first stage**, cooling is controlled by a PI controller in which either control parameters or predetermined applications can be selected. For explanations of the parameters, see sections *PI control with controller parameters* and *the application specified.*

Setting of the controller by	• Controller parameter • Specified applications

In the **second stage** (thus only in the case of 2-stage cooling), cooling is controlled via a PI or a 2-point-control. For explanations of the parameters, see the corresponding sections.
On stage 2, the set point deviation between the two stages must also be specified, i.e. beyond which set point value undershoot the second stage is added.

Set point difference between 1st and 2nd stages (in 0.1°C) *(for stage 2)*	0...100; 40
Control type *(for stage 2, no shared actuating variables)*	• 2-point control • PI control
Control variable is on *(for stage 2 with 2-point control, no shared actuating variables)*	• 1-bit object • 8-bit object

PI control with controller parameters

This setting allows individual input of the parameters for PI control.

Control type	• **PI control**
Setting of the controller by	• **Controller parameter** • Specified applications

Specify the deviation from the set point value which reaches maximum variable value, i.e. the point at which maximum cooling power is activated.
Reset time shows how quickly the controller responds to deviations from the set point. In the case of a short reset time, the control responds with a fast increase of the control variable. In the case of a long reset time, the control responds slower and needs longer until the necessary control variable for the set point deviation is reached. You should set the time appropriate for the cooling system at this point (observe the manufacturer's instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	1...5
Reset time (in min)	1...255; 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *(only if a value is sent)*	0...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

PI control with predetermined application

This setting provides fixed parameters for a cooling ceiling

Control type	• **PI control**
Setting of the controller by	• Controller parameter • **Specified applications**
Application	• Cooling ceiling
Maximum control variable is reached at set point/actual difference of (in °C)	Cooling ceiling: 5
Reset time (in min)	Cooling ceiling: 30

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *(only if a value is sent)*	0...100

2-point-control (only stage 2):

2-point-control is used for systems which are only set to ON or OFF.

Control type *is determined at a higher stage for common variables*	• **2-point control**

Enter the hysteresis that prevents frequent on/off switching of temperatures within the threshold range.

Hysteresis (in 0.1°C)	0...100; 20

If separate actuating variables are used, the choose if the actuating variable of the 2nd stage is a 1-bit object (on/off) or an 8-bit object (on with percentage/off).

Control variable is on	• 1-bit object • 8-bit object
Value (in %) *(with 8-bit object)*	0...100

Now specify what should be sent when the control is blocked.
On release, the control variable follows the rule again.

When blocked, the control variable should	• not be sent • send a specific value
Value (in %) *(only if a value is sent)*	0...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

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