KNX eTR 101-BA2

Room Temperature Controller with 2 A/D Inputs

Item numbers 71310 (white), 71312 (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. Safety and operating instructions

1.1. Installation notes

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

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

- Comply with the locally applicable directives, regulations and provisions for electrical installation.
- De-energise all cables to be mounted and take safety precautions against unintentional switch-on.
- Inspect the device for damage before installation. Only put undamaged devices into operation.
- Immediately take the device or system out of service and secure it against unintentional switch-on if risk-free operation is no longer guaranteed.

Use the device exclusively for building automation and observe the operating instructions. Improper use, modifications to the device or failure to observe the operating instructions will invalidate any warranty or guarantee claims.
Operate the device only as a fixed-site installation, i.e. only in assembled condition 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.

For information on installation, maintenance, disposal, scope of delivery and technical data, please refer to the installation instructions.

2. Description

The **Room Temperature Controller KNX eTR 101-BA2** 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 **KNX eTR 101-BA2** 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.

Either binary contacts such as push-buttons or window contacts or analogue temperature sensors T-NTC can be connected to 2 inputs.

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
- **2 inputs** for binary contacts or T-NTC temperature sensor

3. Commissioning

Configuration is made using the KNX software as of 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. There you will also find the product manual.

After the bus voltage has been applied, the device will enter an initialisation phase lasting approx. 5 seconds. During this phase no information can be received or sent via the bus.

4. Addressing the device

The equipment is delivered with the individual address 15.15.255. This can be changed via the ETS.
The programming button is located at the bottom outer side of the front panel of the device and is recessed. Use a thin object to reach the button, e. g. a 1.5 mm² wire.

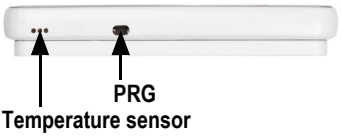


Fig. 1
View from bottom

5. Display and operation at the device

5.1. Adjust room temperature

Depending on the setting of the "Display mode" parameter in the device application, the **Room Temperature Controller KNX eTR 101-BA2** 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.

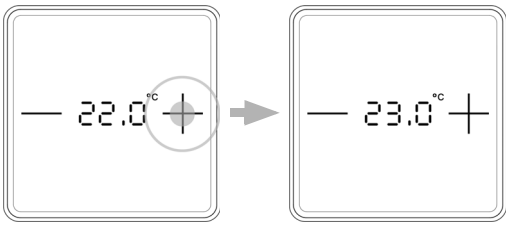
Option A: Display of actual temperature (room temperature)

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

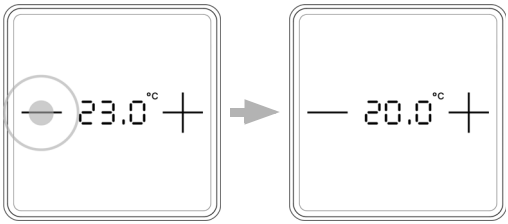
Option B: Display of target temperature or basic setpoint shift

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):

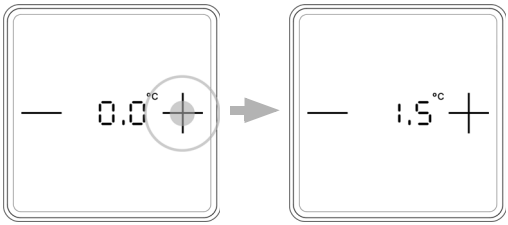


Tap +:
Increase room temperature (target temperature is increased)

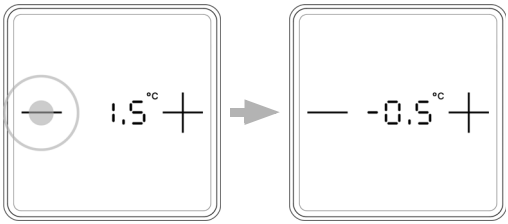


Tap -:
Lower room temperature (target temperature is lowered)

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



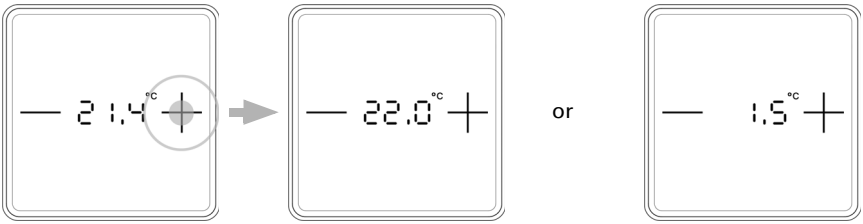
Tap +:
Increase room temperature (Basic setpoint shift direction PLUS)



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.

6. Transfer protocol

Units:

Temperatures in degrees Celsius

6.1. 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	Switch LED	Input	-WC-	[1.1] DPT_Switch	1 Bit
7	Temperature sensor: malfunction	Output	R-CT	[1.1] DPT_Switch	1 Bit
8	Temperature sensor: measured value external	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: measured value total	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: measured value minimum	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
13	Temperature sensor: measured value maximum	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
14	Temperature sensor: measured value min./max. reset	Input	-WC-	[1.17] DPT_Trigger	1 Bit
15	Temp.control: HVAC mode (priority 1)	Input	-WC-	[20.102] DPT_HVACMode	1 Byte
16	Temp.control: HVAC mode (priority 2)	Input	RWCT	[20.102] DPT_HVACMode	1 Byte
17	Temp.control: Mode frost/heat protection activt.	Input	RWCT	[1.1] DPT_Switch	1 Bit
18	Temp.control: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 Bit
19	Temp.control: Current setpoint	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes

No	Text	Function	Flags	DPT type	Size
20	Temp.control: Switch. (0: Heating | 1: Cooling)	Input	-WC-	[1.1] DPT_Switch	1 Bit
21	Temp.control: Setpoint Comfort heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
22	Temp.control: Setpoint Comfort heat.(1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
23	Temp.control: Setpoint Comfort cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
24	Temp.control: Setpoint Comfort cool.(1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
25	Temp.control: Basic 16-bit setpoint shift	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
26	Temp.control: Setpoint Standby heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
27	Temp.control: Setpoint Standby heat.(1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
28	Temp.control: Setpoint Standby cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
29	Temp.control: Setpoint Standby cool. (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
30	Temp.control: Setpoint Eco heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
31	Temp.control: Setpoint Eco heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
32	Temp.control: Setpoint Eco cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
33	Temp.control: Setpoint Eco cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
34	Temp.control: Control variable heating (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
35	Temp.control: Control variable heating (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
36	Temp.control: Control variable cooling (level 1)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
37	Temp.control: Control variable cooling (level 2)	Output	R-CT	[5.1] DPT_Scaling	1 Byte
38	Temperature control: Variable for 4/6-way valve	Output	R-CT	[5.1] DPT_Scaling	1 Byte
39	Temp.control: Status Heat. level 1 (1=ON|0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
40	Temp.control: Status Heat. level 2 (1=ON|0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
41	Temp.control: Status Cool. level 1 (1=ON|0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit

No	Text	Function	Flags	DPT type	Size
42	Temp.control: Status Cool. level 2 (1=ON|0=OFF)	Output	R-CT	[1.1] DPT_Switch	1 Bit
43	Temp.control: Comfort extension status	Input / Output	RWCT	[1.1] DPT_Switch	1 Bit
44	Temp.control: Comfort Extension time	Input	RWCT	[7.5] DPT_Time-PeriodSec	2 Bytes
45	Temp. threshold value 1: Measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
46	Temp. thresholdV 1: Absolute value	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
47	Temp. thresholdV 1: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
48	Temp. thresholdV 1: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_Time-PeriodSec	2 Bytes
49	Temp. thresholdV 1: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_Time-PeriodSec	2 Bytes
50	Temp. thresholdV 1: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
51	Temp. thresholdV 1: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 Bit
52	Temp. threshold value 2: Measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
53	Temp. thresholdV 2: Absolute value	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 Bytes
54	Temp. thresholdV 2: (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 Bit
55	Temp. thresholdV 2: Switching delay from 0 to 1	Input	-WC-	[7.5] DPT_Time-PeriodSec	2 Bytes
56	Temp. thresholdV 2: Switching delay from 1 to 0	Input	-WC-	[7.5] DPT_Time-PeriodSec	2 Bytes
57	Temp. thresholdV 2: Switching output	Output	R-CT	[1.1] DPT_Switch	1 Bit
58	Temp. thresholdV 2: Switching output block	Input	-WC-	[1.1] DPT_Switch	1 Bit
59	Push button 1 long-term	Output	R-CT	[1.8] DPT_Up-Down	1 Bit
60	Push button 1 short-term	Output	R-CT	[1.10] DPT_Start	1 Bit
61	Push button 1 switching	Output	R-CT	[1.1] DPT_Switch	1 Bit
62	Push button 1 dimming	Input / Output	RWCT	[3.7] DPT_Control_Dimming	4 Bit
63	Push button 1 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 Byte
64	Push button 1 encoder 16 bit	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes

No	Text	Function	Flags	DPT type	Size
65	Push button 1 Scene (recall and save)	Output	R-CT	[17.1] DPT_ SceneNumber [18.1] DPT_ SceneControl	1 Byte
66	Push button 1 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
67	Push button 1 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
68	Push button 1 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
69	Push button 1 NTC fault	Output	R-CT	[1.1] DPT_Switch	1 Bit
70	Push button 2 long-term	Output	R-CT	[1.8] DPT_UpDown	1 Bit
71	Push button 2 short-term	Output	R-CT	[1.10] DPT_Start	1 Bit
72	Push button 2 switching	Output	R-CT	[1.1] DPT_Switch	1 Bit
73	Push button 2 dimming	Input / Output	RWCT	[3.7] DPT_Control_Dimming	4 Bit
74	Push button 2 encoder 8 bit	Output	R-CT	[5.10] DPT_Value_1_Ucount	1 Byte
75	Push button 2 encoder 16 bit	Output	R-CT	[9.7] DPT_Value_Humidity	2 Bytes
76	Push button 2 Scene (recall and save)	Output	R-CT	[17.1] DPT_ SceneNumber [18.1] DPT_ SceneControl	1 Byte
77	Push button 2 NTC measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
78	Push button 2 NTC external measured value	Input	-WC-	[9.1] DPT_Value_Temp	2 Bytes
79	Push button 2 NTC total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 Bytes
80	Push button 2 NTC fault	Output	R-CT	[1.1] DPT_Switch	1 Bit

7. Setting the parameters

7.1. 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.

7.2. 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

7.3. 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 **KNX eTR 101-BA2** 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

7.4. 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 extension 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

7.4.1. 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

7.4.2. 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.

7.5. Temperature threshold values

Activate the required temperature threshold values. The menus for the further setting of the threshold values are then displayed.

Use threshold value 1 / 2	Yes • No

The threshold value always refers to the associated measured value that is received via the "Temp. threshold value X: measured value" object.

7.5.1. Threshold value 1, 2

Threshold value

Decide in which cases **threshold values and delay times** received are to be kept per object. 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).

Set the threshold values directly in the application program using parameters, or define them via the bus using a communication object.

Threshold value setpoint using parameter:

Set the threshold values and hysteresis directly.

Threshold value setpoint using	**Parameter** • Communication objects
Threshold in 0.1°C	-300… 800; 200

Threshold value setpoint using a communication object:

Beforehand, enter how the threshold value will be received from the bus. Basically, a new value can be received, or simply a command to increase or decrease.

During initial commissioning, a threshold value must be defined which will be valid until the first call with a new threshold value. For units which have already been taken into service, the last communicated threshold value can be used. Basically, a temperature range is given in which the threshold value can be changed (object value limit).

A set threshold value will be retained until a new value or a change is transferred. The current value is saved in so that it is retained in the event of a power supply failure and will be available again once the power supply is restored.

Threshold value setpoint using	Parameter • **Communication objects**
The last communicated value should	• never • after restoration of power • after power restoration and Programming
Start threshold value in 0.1°C valid until first Communication	-300 … 800; 200
Object value limit (min) in 0.1°C	-300…800
Object value limit (max) in 0.1°C	-300…800
Type of threshold value change	Absolute value • Increase/decrease
Interval *(upon increase/decrease change)*	0.1 °C • ... • 5°C

Set the **hysteresis** independently of the type of threshold value setting.

Hysteresis setting	in % • absolute
Hysteresis in % of the threshold value	0 … 50; 20
Hysteresis in 0.1°C	0 … 1100; 50

Switching output

Set the behaviour of the switching output when a threshold value is exceeded/undercut. The output switching delay can be set using objects or directly as a parameter.

When the following conditions apply, the output is (TV = Threshold value)	• TV above = 1 | TV - Hyst. below = 0 • LV above = 0 |LV - hysteresis below = 1 • TV below = 1 |TV + hysteresis above = 0 • TV below = 0 |TV + hysteresis above = 1
Delays can be set via objects (in seconds)	No • Yes

Switching delay from 0 to 1 *(if delay is adjustable via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching delay from 1 to 0 *(if delay is adjustable via objects: valid until 1st communication)*	None • 1 s • 2 s • 5 s • 10 s • ... • 2 h
Switching output sends	• 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 *(is sent only if "periodically" is selected)*	5 s • 10 s • 30 s... • 2 h

Block

The switching output can be blocked using an object.

Use switching output block	No • Yes

Set the cases in which threshold vlaues and delay times received per object are to be retained.

Assessment of the block object	• At value 1: block | At value 0: release • At value 0: block | At value 1: release
Blocking object value before first Communication	0 • 1
Switching output behaviour	
On blocking	• Do not send message • 0 Send • 1 Send
On release (with 2 second release delay)	[Dependent on the "Switching output sends" setting]

The behaviour of the switching output on release is dependent on the value of the parameter "Switching output sends" (see "Switching output")

Switching output sends on change	• Do not send message • Send switching output status
Switching output sends on change to 1	• Do not send message • if switching output = 1 ➔ send 1
Switching output sends on change to 0	• Do not send message • if switching output = 0 ➔ send 0
Switching output sends on change and periodically	Send switching output status
Switching output sends on change to 1 and periodically	if switching output = 1 ➔send 1
Switching output sends on change to 0 and periodically	if switching output = 0 ➔send 0

7.6. Button interfaces

Mechanical buttons or temperature sensors T-NRC (Elsner Elektronik item number 30516) can be attached to the two analogue/digital inputs of the **KNX eTR 101-BA2**.

Activate the interfaces you want to use.

Use interface 1 / 2	No • Yes

7.6.1. Interface 1-2

Choose a function:

Bus function	• Switch • Changeover switch • Shutter • Blinds • Awning • Window • Dimmer • 8-bit encoder • 16-bit encoder • Scene activation / scene saving • Temperature sensor NTC

Input as switch:

If a button with switch function is assigned to the input, select the bus function "Switch" and specify which value is sent when pressing/releasing the button and when it will be sent.

Bus function	**Switch**
Command when pressing the button	• send 0 • send 1 • do not send telegram
Command when releasing the button	• send 0 • send 1 • do not send telegram
Send value	• on change • for change to 1 • for change to 0 • for change and cyclical • for change to 1 and cyclical • for change to 0 and cyclical
Cycle *(only if sent as "cyclical")*	5 s ... 2 h; 1 min

Input as selector switch:

If a button with switch function is assigned to the input, select the bus function "Selector switch" and specify if the button should switch when pressed/released..

Bus function	**Selector switch**
Use additional function for long button hold	**No** • Yes
Command when pressing the button	• selector switch • do not send telegram
Command when releasing the button	• selector switch • do not send telegram

Use additional function for long button hold	No • **Yes**
Time between short and long (in 0.1 sec)	0...50; 10
Command when pressing the push button	do not send telegram
Command when releasing before time expires	• Switching • do not send telegram
Command when pressing the button	• Send 0 • Send 1 • Switching • do not send telegram
Command when releasing the button	• Send 0 • Send 1 • Switching • do not send telegram
Transmission behaviour	• 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

Input to shutter, blinds, awning or window control:

If the input to the drive control is used via the bus, select the bus function "shutter", "awning", "blinds" or "window" and specify the button function and control mode.

Function	**Shutter / blinds / awning / window**	
Button function	Up • Down Up • Down • Up/ Down Retract • Extend • Retract/Extend Open • Close • Open/Close	(blind) (roller shutter) (awning) (window)
Control mode*	• Standard • Standard inverted • Comfort mode • Dead man's switch	

* For further details about settings, please see 🕮 “Control modes for drive control” auf Seite 28

Input as dimmer:

If the input is used as a dimmer, select the bus function "Dimmer" and specify the button function, time interval (switching/dimming) and if requested, the repeat interval for a long button press.

Function	**Dimmer**
Button function	brighter • darker • brighter/darker
Time between switching and dimming (in 0.1 s)	1...50; 5
Repeat the dimm command	no • yes
Repeat the dimm command for a long button press *(if dimm command is repeated)*	every 0.1 s • every 2 sec; every 0,5 sec
Dim by *(if dimm command is repeated)*	1,50% • 3% • 6 % • 12,50% • 25% • 50%

Input 8 bit encoder:

If the input is to be used as an 8bit encoder, select the "8 bit encoder" bus function and specify which value will be sent.

Bus function	**8 bit encoder**
Range	• 0...255 • 0%...100% • 0°...360°
Value	0...255 (for range 0...255) 0...100 (for range 0%...100%) 0...360 (for range 0°...360°)

Input 16 bit encoder:

If the input is to be used as a 16bit encoder, select the "16 bit encoder" bus function and specify which value will be sent.

Function	**16 bit encoder**
Value in 0.1	-6707600...6707600; 0

Input for scenario control:

If the input is to be used for recalling and saving a scene, select the bus function "scene call-up" and decide whether the button should be used to save the scene as well (keep pressed for longer).

Bus function	**Scenario recall / Scenario saving**
Scenario no.	0...63

Scenario function	• Activate • Activate and save
Press key for longer than (in 0.1 s) Scenario saving *only for saving*	0...50

Temperature sensor

If a temperature sensor T-NTC is connected to the input, set the behaviour (malfunction object, transmission behaviour) and mixed-value calculation here. If the measured values of the sensor should deviate from the actual temperature values (e.g. in case the installation site is not in an ideal position), this may be offset and corrected.

Bus function	**Temperature sensor NTC**
Use malfunction object	Yes • No
Offset in 0.1°C	-50...50; 0
Use external measured value	Yes • No
Ext. Measured value portion of the total reading *only if an external value is used*	5% • ... • 50% • ... • 100%
All of the following settings then pertain to the total measured value	
Send behaviour	• periodically • on change • on change and periodically
On change of *if transmitted on change*	0.1°C • ... • 0.5°C • ... • 5.0°C
Send cycle *if transmitted periodically*	5 s...2 h

7.6.2. Control modes for drive control

Behaviour on button actuation in standard control mode:

	short:	**press and hold:**
Blind	Stop/step	Up or Down
Roller Shutter	Stop	Up or Down
Awning	Stop	Retract or Extend
Window	Stop	Close or Open

Standard:

If briefly operated, the drive will move incrementally or stops. If operated longer, the drive will move up to the end position. The time difference between "short" and "long" is set individually.

Control mode	**Standard**

Behavior during button operation: short = stop/increment long = Up or Down	
Time between short and long in 0.1 seconds	1...50; 10

Standard inverted:

When pushed shortly, the drive moves up to the end position. When pushed for longer, the drive moves incrementally or stops. The time difference between "short" and "long" and the repeat interval is set individually.

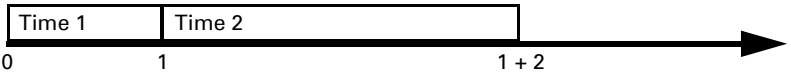
Control mode	**Standard inverted**
Behavior during button operation: short = Up or Down long = Stop/Step	
Time between short and long in 0.1 seconds	1...50; 10
Repeat the step command for a long button press	every 0.1 s • every 2 sec; every 0.5 sec

Comfort mode:

In the **comfort mode** actuating the button briefly, a bit longer and long will trigger different responses of the drive. The time intervals are set individually.

Short actuation (shorter than Time 1): The drive is positioned step-wise and stopped.
Holding it slightly longer (longer than Time 1, but shorter than Time 1+2): Drive running. Drive stops when the button is released.
Long holding (release after Time 1+2 runs out): Drive moves independently to the end position. The movement can be interrupted by a short tap.

Fig. 2
Time interval comfort mode diagram



Point in time 0:	*Actuate of button, start of time 1*
Release before time 1 expired:	*step (or stop if drive is moving)*
Point in time 1:	*End of time 1, start of time 2* *Moving command*
Release after time 1 expired *but before time 2 expires:*	*Stop*
Release after time 1 + 2 expired:	*Move into end position*

Control mode	**Comfort mode**

Behavior during button operation: Button is pushed and released before time 1 expired = stop/step held longer than time 1 = Up or Down released between time 1 and 1-2= stop released after time 1 +2 = no more stop	
Time 1	0.0s ... • 2 s; 0.4 s
Time 2	0 s • 2 s; 2 s

Dead man's switch:

The drive moves as soon as the button is actuated and stops as soon as the button is released.

Control mode	**Dead man's switch**
Behavior during button operation: Push button = Up or Down command Release button = Stop command	

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