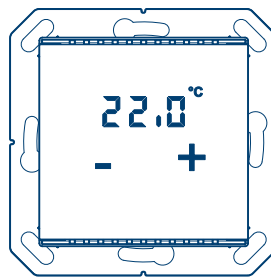


Application description EASY

KNX building management system

KNX temperature control



KNX Secure thermostat
81582005



Product overview

	Order number	Product designation	Application programme	TP product  Radio product 
	8158 2005	Thermostat with integrated bus coupling unit, KNX Secure		

Table 1: Product overview

We reserve the right to make changes of a technical nature.

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1 General

1.1 General information about this application description

This document describes the programming and parameterisation of easy compliant KNX products with the aid of the Configuration tool.

1.2 Programming software configuration tool

The application programs for the KNX products are already preinstalled in the configuration tool.



If the current application software is not available in the configuration tool, then the configuration tool must be updated (see 'Configuration tool' installation handbook).

1.3 Commissioning

Commissioning of the device essentially refers to the setting of the heating/cooling type and the connection of inputs.



The commissioning process for the configuration tool can be found in the corresponding instructions.

Programming with the configuration tool is restricted to one bus line and does not require a line coupler. As a result, it is possible to combine wired and wireless-network KNX devices.

2 Function and device description

2.1 Device overview

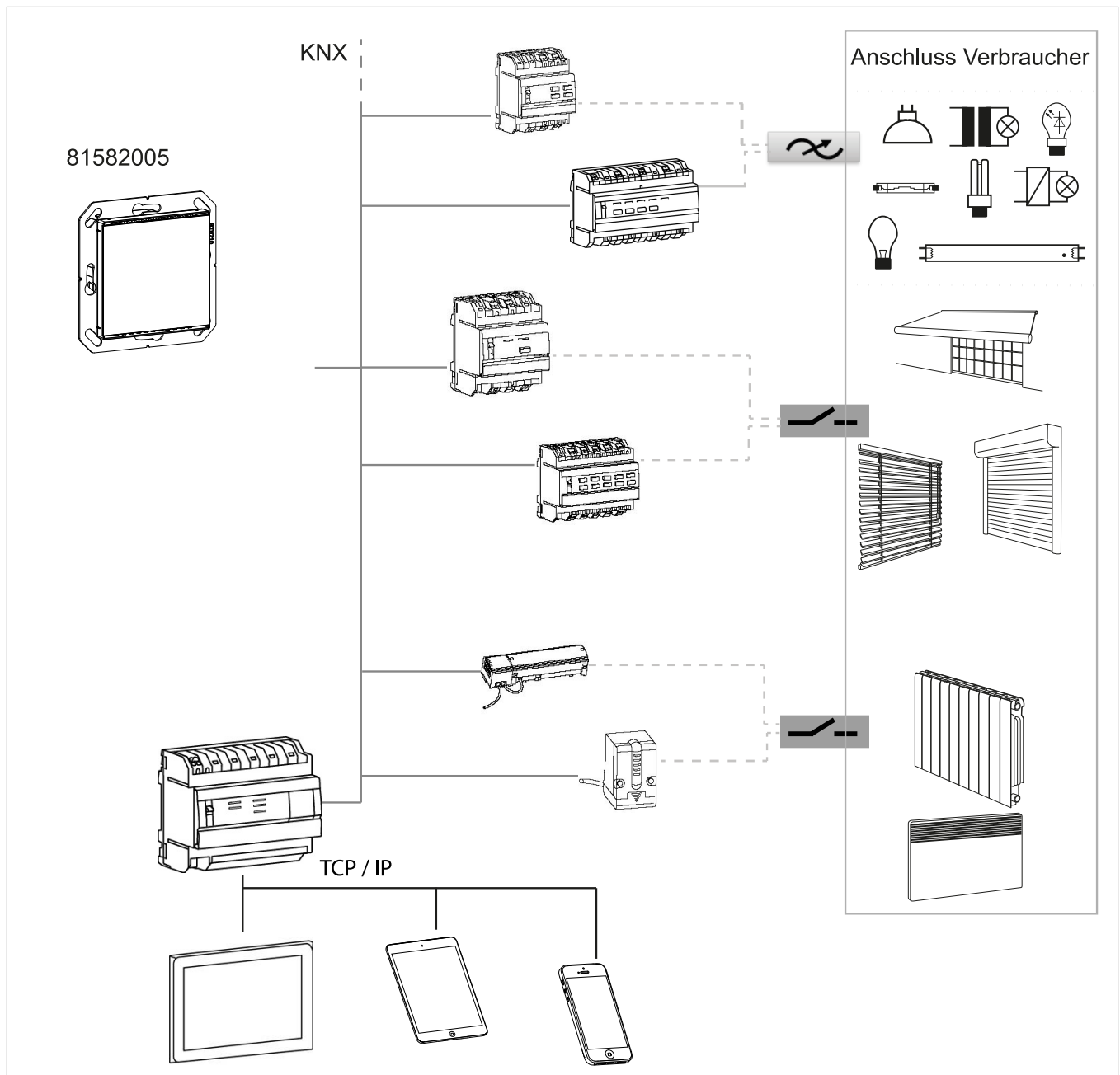


Fig. 1: Device overview

2.2 Functional description

The **KNX thermostat** can be used to control the temperature of individual rooms. In the course of this, the command value for heating or cooling is sent to the bus depending on the operating mode and room temperature.

The **KNX thermostat** compares the current room temperature with the set temperature and controls heating and cooling devices according to the current requirements.

2.3 Functional overview of the room thermostat functions

The functions described in the following section enable the individual configuration of the room thermostat functions (RTR).

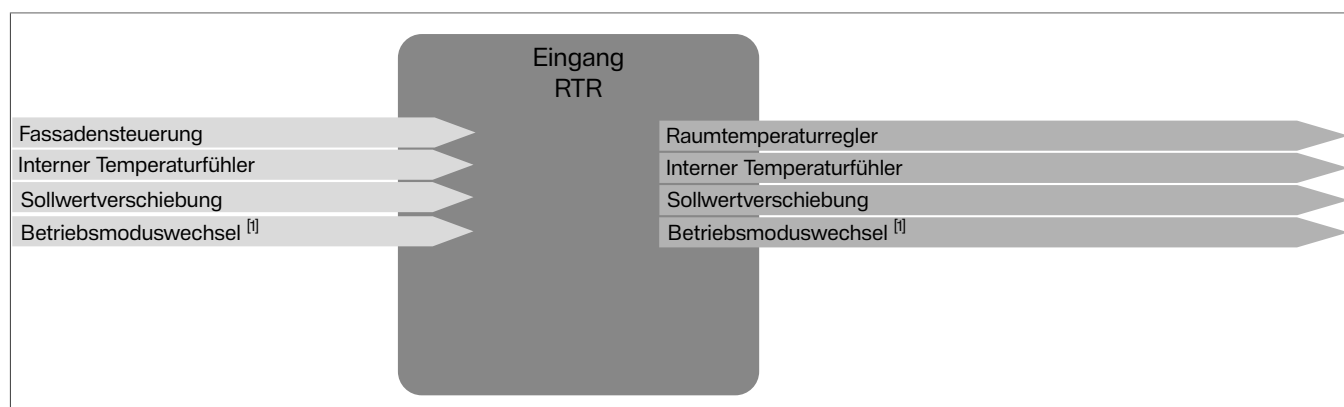


Fig. 2: Functional overview of room temperature controllers

[1] Operating modes:

-  Comfort
-  Standby
-  Eco
-  Frost/heat protection

2.3.1 Parameters of the room temperature controller

The following chapter describes the parameters for the heating and cooling functions of the device.

2.3.1.1 Function selection

In the parameter section **Function selection**, the type of system (heating or cooling) to be controlled can be selected.

2.3.1.2 Type of basic heating

The type **of heating** must be selected under **Type** of **basic** heating.

- Warm water heating
- Underfloor heating
- Fan convector heating
- Electric heating

2.3.1.3 Type of basic cooling

The type of cooling must be selected under **Type of basic cooling**.

- Ceiling cooling

3 Project preparation

The configuration of the general parameters for the room temperature controller is described in the following sections.



The parameters which are set on the display can be found in the operating instructions of the device. These parameters are not described further in this document.

Setting and commissioning are carried out using the domovea application (plus/basic).

If all devices are integrated into the project, then you can start configuring the device.



The set parameters are updated continuously during the configuration.

Setting and commissioning are carried out using the domovea application (plus/basic).

3.1 Project editing

To ensure that the commissioning process is successful, the following requirements must be complied with:

- ☑ Network connection is established.
- ☑ All of the devices used (wired or wireless) are connected to the domovea application.
- ☑ domovea (browser version or tablet app) is started.
- ☑ The project and project-specific data (project name, address, customer data) are created.
- Click search to scan devices.
 - The domovea tool has scanned the device and started with the setting.

3.2 Selecting the device

In the list of all devices, select the corresponding device in order to start the configuration.

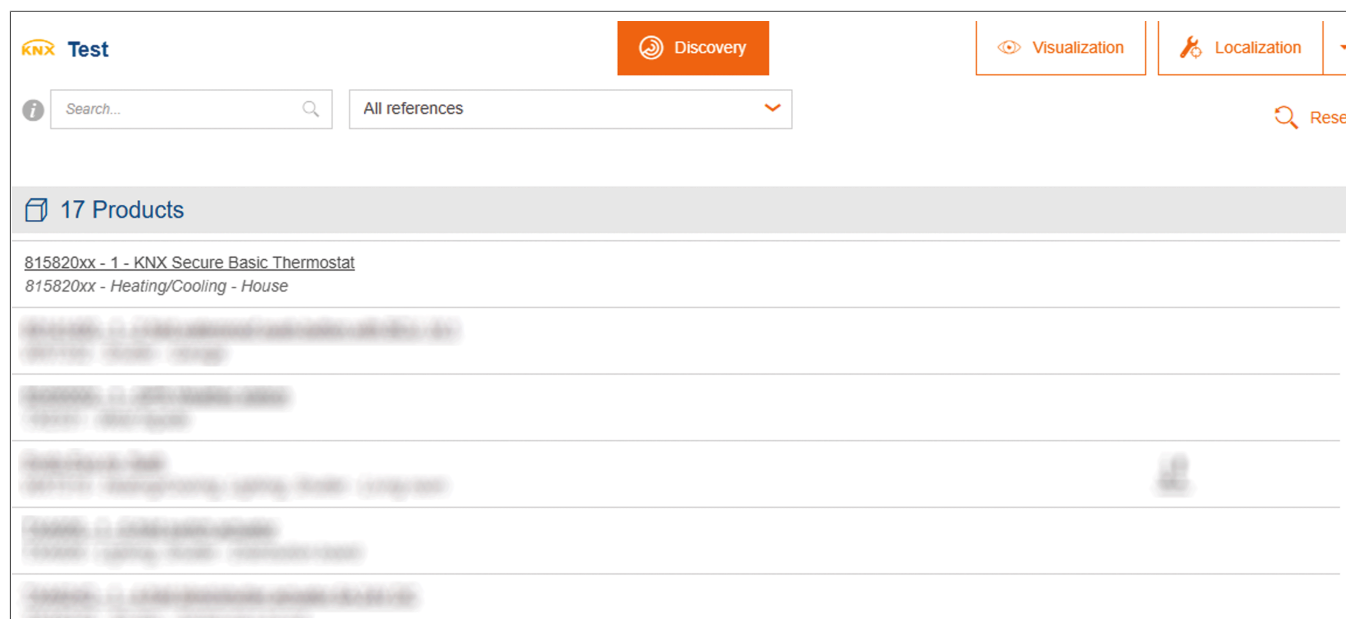


Fig. 3: Selecting the device

- In the device overview, select the KNX Secure basic thermostat device.
The following view opens.

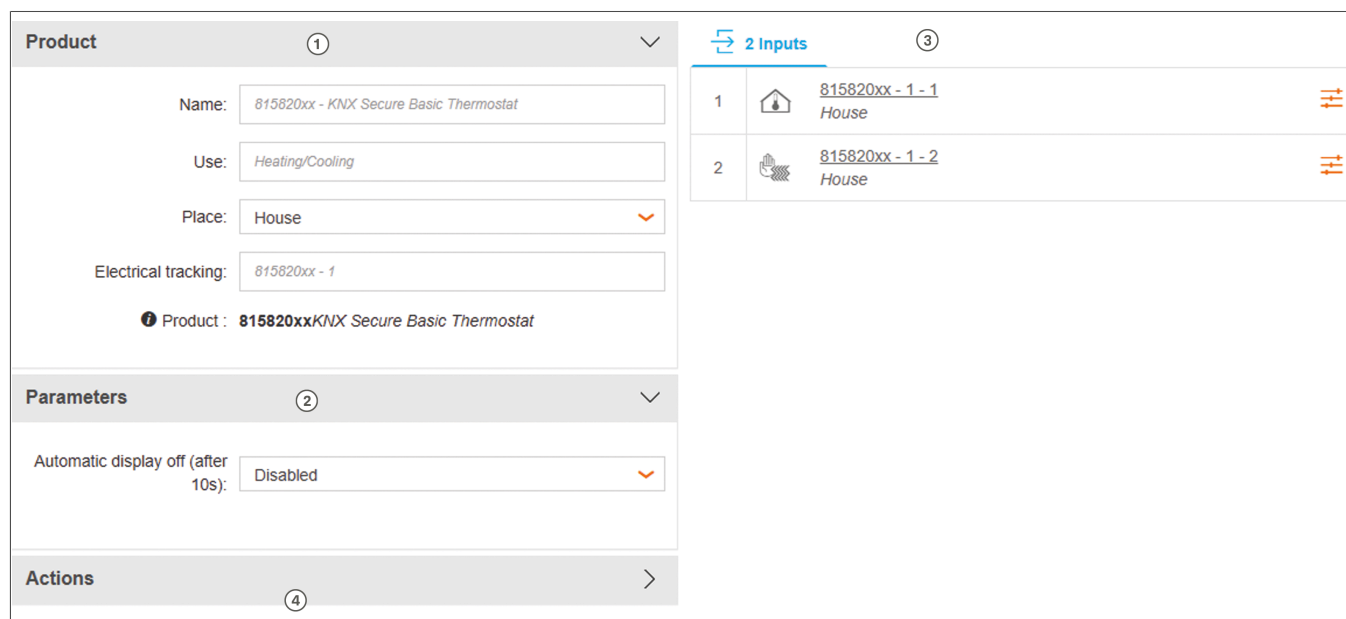


Fig. 4: Home page for KNX Secure basic thermostat

The view is divided into four sections.

Device (Fig. 4, ①)

- General information such as name, application, location of the device and name are listed under **Device**.

Parameters (Fig. 4, ②)

- Depending on the input selection, the parameters and values that can be set and changed are visible under **Parameters**.

Inputs (Fig. 4, ③)

- The available inputs of the device are listed under Inputs.
 - Input 1: Room temperature sensor 
 - Input 2: Room thermostat 

Actions (Fig. 4, ④)

- General settings on the device can be configured under menu Actions.

3.3 Home page

Menu section — Product

In the Product menu section, information about the name, the application and also the location of the device can be entered and changed.

Name

- The device can be assigned an individual name.

Application

- An individual name can be assigned to specify the application for which the device is used (in this case lighting).

Location

- The installation location of the device can be selected based on a previously defined building structure.

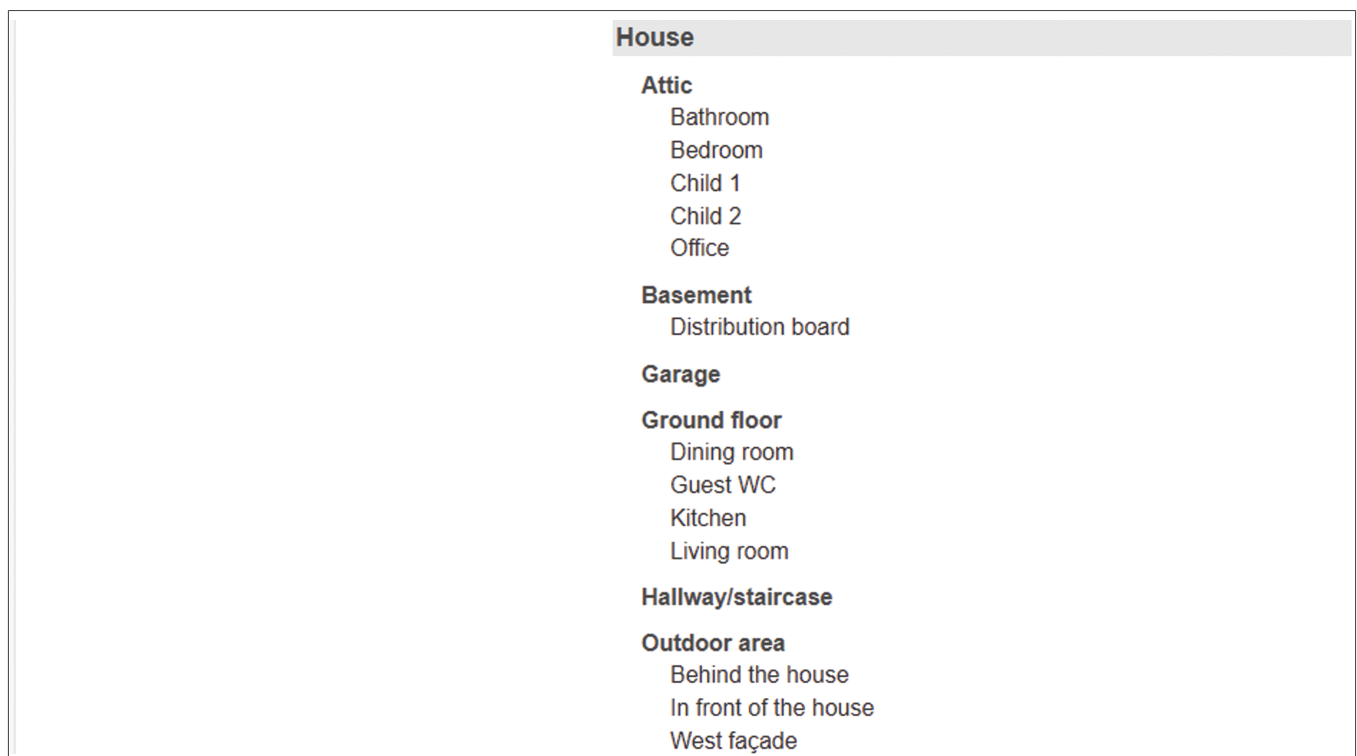


Fig. 5: Example of building structure

Designation

- Designation according to wiring diagram. This field contains the default name given to the device during the search. It can be modified to match the wiring diagram of the installation.

Product information

- Click **i** Product. Information about the device is displayed.

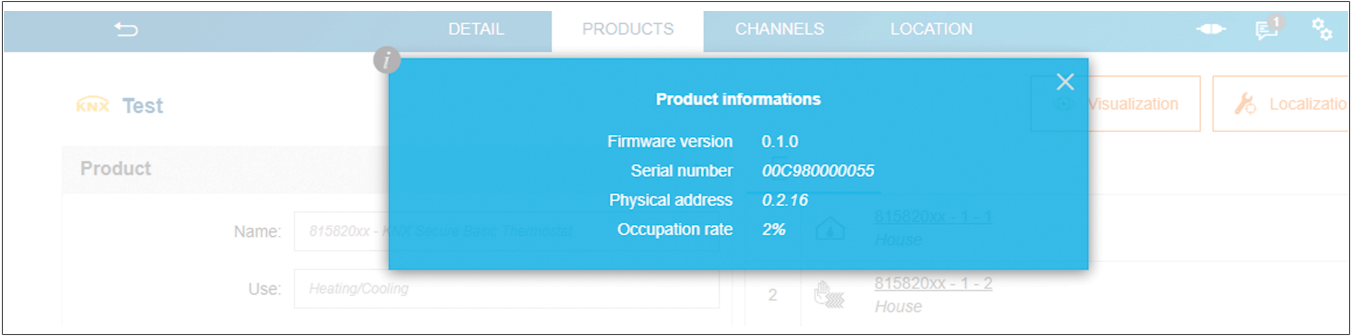


Fig. 6: Product information (i Product) (icon missing)

Menu section — Parameters

Under Parameters (Fig. 10,2), the automatic shutdown of the display (after 10 seconds) can be activated. The screen display is fixed by the system.

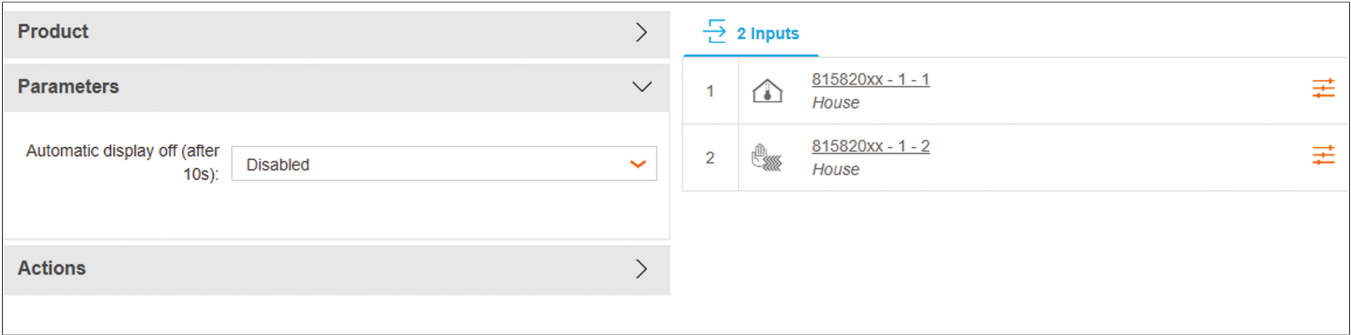


Fig. 7: Automatic display shutdown

Parameter	
Automatic display off (after 10s)	Disabled
	Enabled

Table 2: Menu section — Parameters

Menu section — Inputs

All the device inputs are listed on the right-hand side.

Product	>	 2 Inputs			
Parameters	>	1		<u>815820xx - 1 - 1</u> House	
Actions	>	2		<u>815820xx - 1 - 2</u> House	

Fig. 8: Image of Inputs view, right-hand side

2 inputs		
	815820xx - 1 - 1 Home	
	815820xx - 1 - 2 Home	

Table 3: Menu section — Inputs

Menu section — Other

The **Other Menu section** allows you to perform general functions related to the device as a whole.

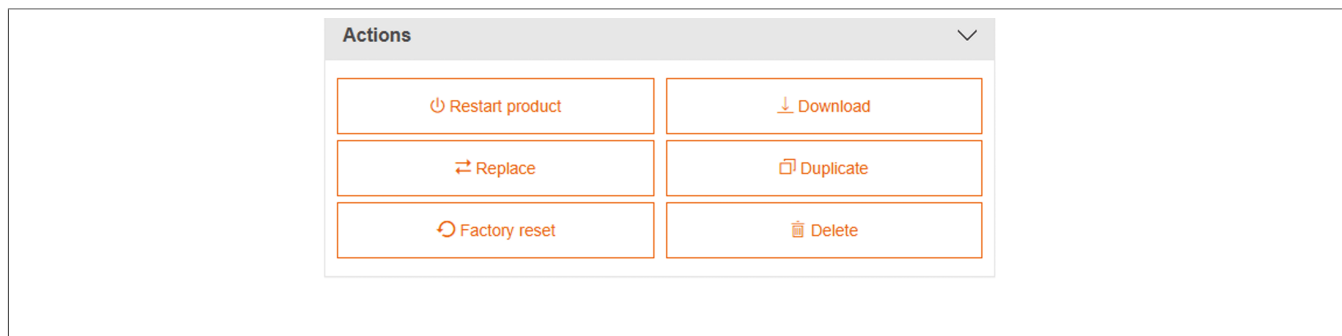


Fig. 9: Menu section — Other

-  Restart device
 - The devices can be switched ON/OFF remotely.
-  Download
 - Only the parameterization of the device can be downloaded.
-  Replace (icon missing)
 - Replace a product with another of the same reference. This function is usually used to replace a faulty device with a new device without restarting the entire parameterization from scratch.
-  Duplicate (icon missing)
 - Copy the setting of a device from a product with the same reference. This function is usually used to duplicate a device without restarting the entire setting process over again.
-  Factory reset (icon missing)

- Resetting to factory settings allows the default parameters to be reloaded (default factory configuration). The device can be reset by the configuration server.
-  Cancel
 - To remove the device from the project without connecting to the configuration server.

4 Functional overview of the room thermostat functions

The functions described in the following section enable the individual configuration of the room thermostat functions (RTR).

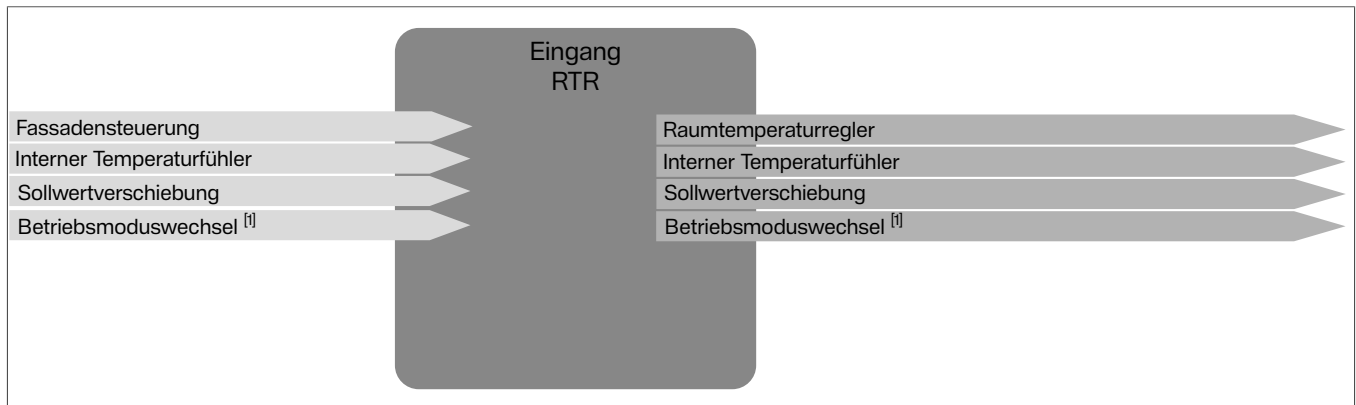


Fig. 10: Functional overview of room temperature controllers

[1] Operating modes:

-  Comfort
-  Standby
-  Eco
-  Frost/heat protection

4.1 Room temperature sensor

Input	>	Outputs 	
Settings	▼	5	 80490002 - 1 - 5 West façade
Temperature calibration (0.1°C):		-0.5	
domovea visualisation	>		

Fig. 11: Room temperature sensor

Parameter	
Temperature calibration (0.1°C)	-5.0 °C ... +5.0 °C

Table 4: Menu section — Parameters

4.2 Room thermostat

Two variants can be used to set the parameters for the room temperature controller input. Click **815820xx - 1 - 2** and the input configuration parameter window opens.

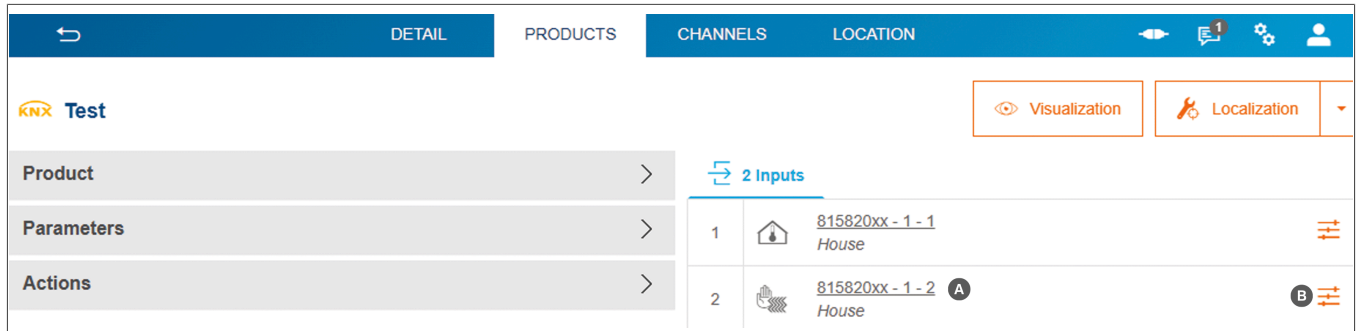


Fig. 12: Select the room temperature controller input

Variant **A**:

- Click 815820xx - 1 - 2

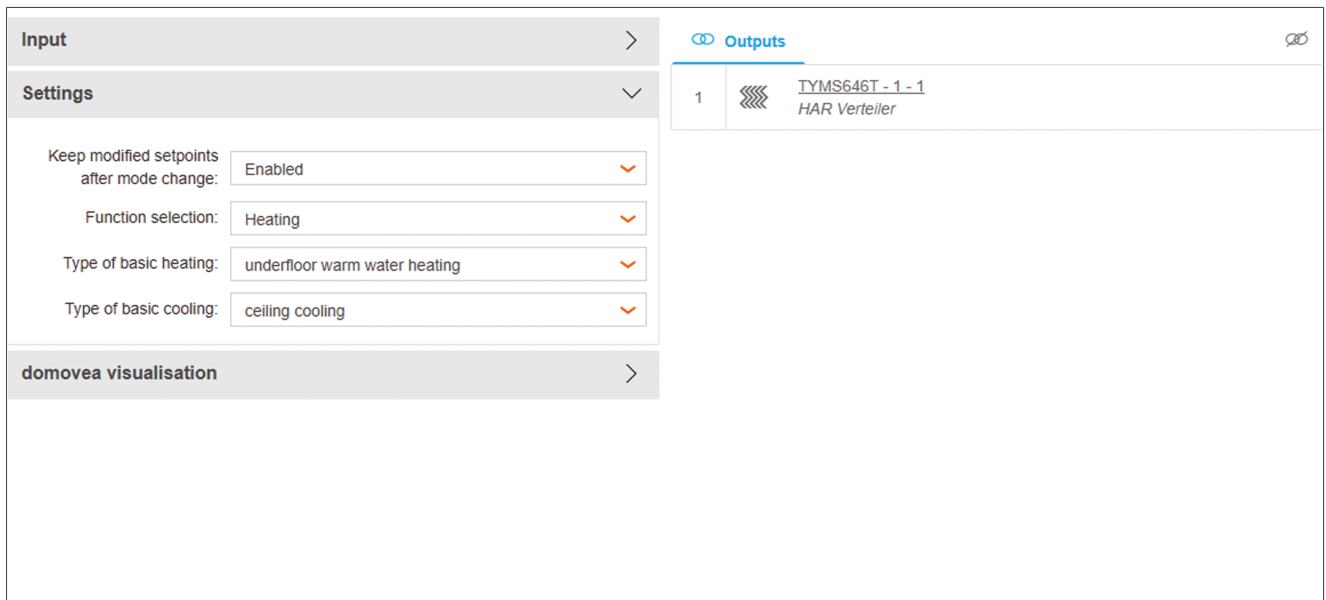


Fig. 13: Image of Parameters, option A

Variant **B**:

- Click .

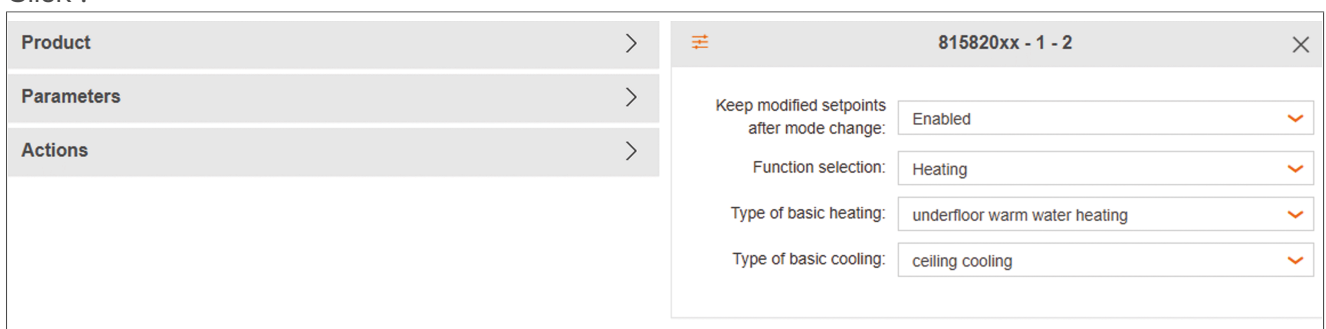


Fig. 14: Image of Parameters, option B

Input

The settings from the parameter under the Product section () are adopted or can be added here.

Input name

- This is adopted from the settings ()

Location

- This is adopted from the settings ()

Application

- This is adopted from the settings ()

Description

- An additional description of the input can be added.

Additional name

- An additional name for the input can be added here.

Device

- Specifies the item number and name of the device used.

Settings

The parameter window is used to set the heating or cooling system.

The device supports the heating or cooling functions.

	815820xx - 1 - 2	
	Keep modified setpoints after mode change	Inactive Active
	Functional release	heating Cooling
	Type of basic heating	Warm water heating Underfloor warm water heating Fan convector cooling Electric heating
	Type of basic cooling	Ceiling cooling

Table 5: Heating/cooling settings

Parameter	Description	Value
Maintain set points when changing mode	Save modified setpoints after mode change If activated : The local setpoint change is retained after a mode change regardless of the mode. If disabled : The local setpoint change is temporary and is reset after each mode change.	Inactive Active
Functional release	Determines the type of system.	heating Cooling Heating + cooling
Type of basic heating	This parameter determines the type of heating system.	Warm water heating Underfloor heating Electric heating Fan convector heating
Type of basic cooling	This parameter defines the type of cooling system.	Ceiling cooling

Table 6: Heating/cooling parameter

Possible connections with room temperature controllers

The device can be connected to other devices in two ways.

- Input - Output connection
- Input - Input connection

Input - Output connection

The main application is a connection between the input (812520xx — KNX Secure temperature thermostat) and an output (e.g. TYMS646T — heating actuator). The input 815820xx - 1 - 2 is connected to an output TYMS646T 1 - 1.

Inputs 		Output 	
815820xx - 1 - 2		All devices that can send a value to the input using the heating symbol.	
	815820xx - 1 - 2 Home		 heating

Table 7: Possible input - output connection

Input - Input connection

The device, the room temperature controller, can be connected to other inputs of the following functions via the room controller input . Furthermore, the internal temperature sensor installed in the device can  be linked to other internal temperature sensors of the same object.

- Comfort mode
- Standby mode
- Eco mode
- Frost/Heat protection mode
- AUTO mode
- Comfort/Standby mode
- Protection/Auto mode
- Heating/Cooling switch

Inputs 		Inputs 
 Internal temperature sensor		
 Comfort mode		
 ECO mode		
 Standby mode		
 Protection mode		
 Automatic heating		
 Switch heating		 81582005 - 1 - 2
 Toggle Comfort/Eco		
 Toggle Comfort/Standby		
 Automatic Protection mode		
 Priority Comfort		
 Priority Protection		
 Automatic Comfort mode		

Table 8: Linking input – input Heating/Cooling

Functional overview of the room thermostat functions

Room thermostat 



	Automatic Eco mode	
	Automatic Standby mode	
	Automatic mode switching	

Table 8: Linking input – input Heating/Cooling

4.3 domovea visualisation

The device or the complete settings made in easyTool are exported to domovea by default.

Input >	Outputs 
Settings >	1  TYMS646T - 1 - 1 Distribution board
domovea visualisation 	
☒ Export to domovea	

Fig. 15: domovea visualization

A group of **thermostats** is created in the domovea and the device is integrated.

Thermostat




815820xx - 1 - 2
House




Fig. 16: domovea group thermostat

5 Temperature sensor function parameters

The following section describes the configuration and parameterisation of the internal temperature sensor.

5.1 Internal temperature sensor

The device is directly fitted with a sensor for temperature measurement.



Note

After commissioning, voltage loss or download of the application software, 30 minutes may be needed until the ambient temperature defined is reached and the internal temperature sensor delivers the correct measured values.

The measured temperature can be transmitted directly to a KNX thermostat as a second measuring point (measurement result) and can be used to synchronise the global actual temperature (synchronisation in larger rooms).

Room temperature recorded as a measurement result for building visualisation

Input >	Outputs 	
Settings v	5  80490002 - 1 - 5 West façade	
Temperature calibration (0.1°C): -0.5		
domovea visualisation >		

Fig. 17: Room temperature sensor input

After the voltage is switched on and a waiting period of 30 minutes has elapsed, the device is adapted to the ambient conditions and can be calibrated.

To do this, the following steps must be carried out.

- Measure room temperature with a reference thermometer.
- Compare the measured value with the displayed value on the room temperature controller.
- Enter the temperature deviation in parameters. Proceed as follows:

Inputs 		Inputs 	
	815820xx - 1 - 2 Home		 815820xx - 1 - 2 Home

Table 9: Linking input – input Internal temperature sensor function

Inputs ↗		Inputs ↗	
	815820xx - 1 - 1 Home		 TXE530 - 1 - 1 Home

Table 10: Linking input – input Internal temperature sensor function

Example:

Measured temperature on the device greater than the measured reference temperature = **negative value temperature calibration**.

Measured temperature on the device 24.9 °C.

Measured reference temperature 24.0 °C.

Temperature calibration = -0.9°C.

The temperature calibration value must be entered as **-0.9**.

Example:

Measured temperature on the device is less than the measured reference temperature = **positive value temperature calibration**.

Measured temperature on the device 24.0 °C.

Measured reference temperature 24.9 °C.

Temperature calibration = 0.9°C.

The temperature calibration value must be entered as **0.9**.

6 Appendix

6.1 Accessories

Optional accessories

KNX bus connection terminals, 2-pole, red/black	TG008
Floor temperature sensor	EK090
KNX system line Y(ST)Y, 2x2x0.8	TG01x

6.2 Technical data

KNX Medium	TP1-256
Configuration mode	S-Mode, E-Controller
KNX supply voltage	21 ... 32 V $\overline{\text{SELV}}$
Current consumption	$\leq 19 \text{ mA}$
Temperature measuring range	-5 ... +60 °C
Energy efficiency class	IV (2%)
Operating height	Max. 2000 m
Contamination level	2
Overvoltage category	III
Degree of protection	IP20
Air humidity	0 ... 95 %, non-condensing
Operating temperature	-5 ... +45 °C
Storage/transport temperature	-25 ... +70 °C
Dimensions (W x H x D)	55 x 55 x 35 mm

6.3 Things to know

6.3.1 Control types

The control types are designed for heating and cooling. The temperature setpoints are permanently stored in the software for both systems. The



The specified set points for heating and cooling are permanently stored in the software and cannot be changed.

Operating mode	Heating setpoint values
Comfort	+21 °C
Standby	+18 °C
Eco/Night	+16 °C
Frost protection	+7 °C

Table 11: Heating setpoint values

Operating mode	Cooling setpoint values
Comfort	+21 °C
Standby	+24 °C
Eco/Night	+28 °C
Heat protection	+35 °C

Table 12: Cooling setpoint values

If the setpoints are exceeded or undershot, a reaction is caused in the connected heating actuator or the connected valve drive.

6.3.1.1 2-point control mode

The 2-point control or the 2-point controller is the simplest of the two controller types in terms of operation. The controller can only switch the thermostat ON or OFF. The controller switches the output value ON if the setpoint is undershot, or turns it OFF if the setpoint is exceeded (heating) (Fig. 18: 2-point control mode).

The controller is equipped with an in-built hysteresis in order to prevent the it from constantly switching the output value on and off. The controller calculates the switch-on and switch-off points using the hysteresis and the current setpoint. The hysteresis value is also stored permanently and cannot be changed.

The 2-point controller should be used where the output value can only accept the two states ON or OFF and the actual temperature does not have to be controlled precisely to the setpoint.

Due to the inertia of the heating system, the actual temperature swings slightly below the set switch-on point and exceeds the set switch-off point slightly. The actual temperature therefore always fluctuates in the 2-point controller within a range which is slightly greater than the set hysteresis.

Example of application:

- Warm water heating
- Underfloor heating
- Ceiling cooling

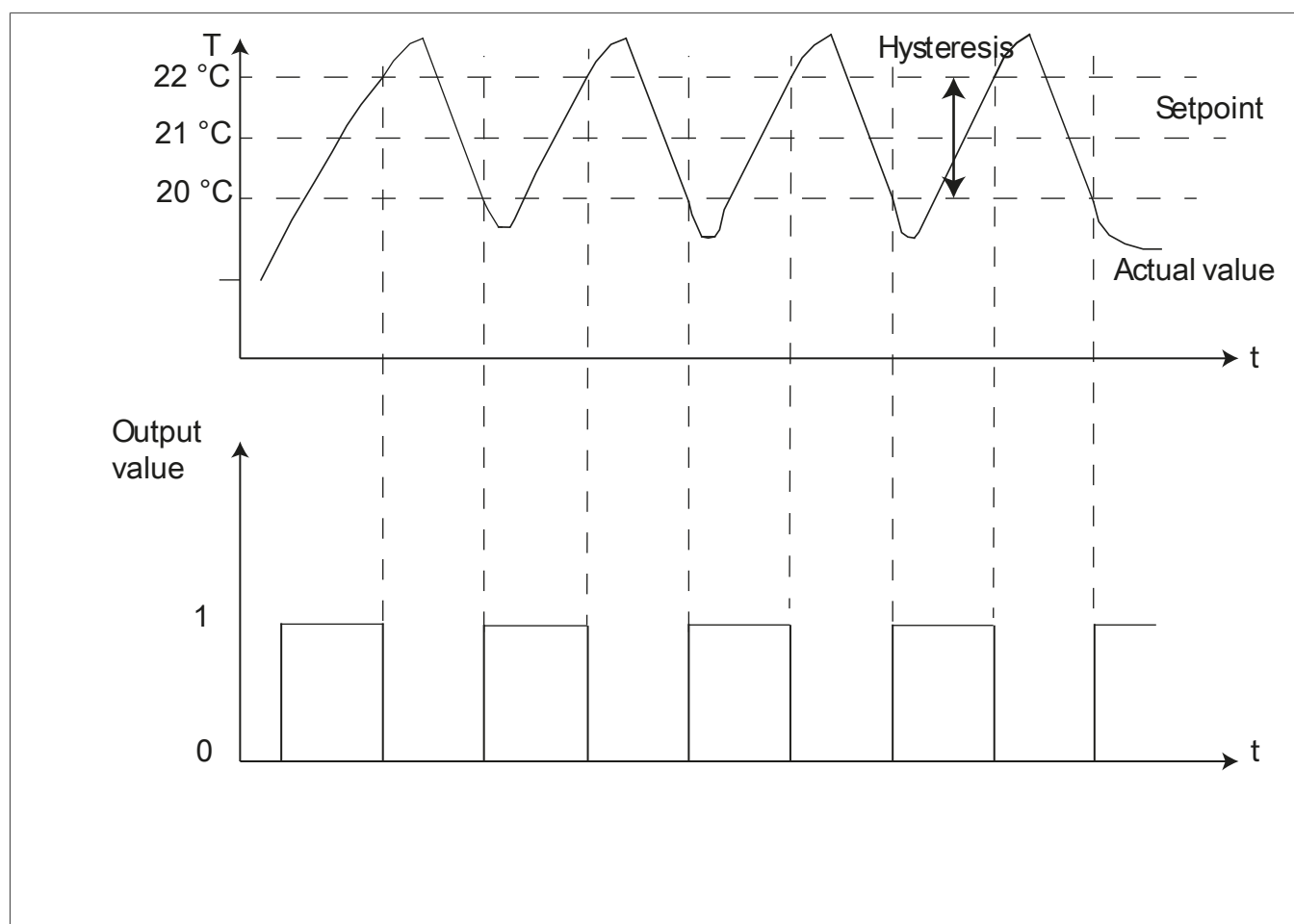


Fig. 18: 2-point control mode

6.3.1.2 Switching PI-control (PWM)

The switching PI control (PWM), pulse wide modulation control, also has continuous PI control.

However, with such a control, the output signal (0 to 100%) of the PI control is not passed on to the output value. The PWM control subsequently converts the output value from the output signal of the PI control into a switch ON/OFF pulse. However, this switch on/off pulse does not have a fixed switch on/off point as with the 2-point control, but the length of the pulses is determined by means of the output value calculated by the PI control (cycle time). The larger the calculated output value of the PI control, the greater is the ratio of the switch on/off times.

The cycle time is permanently stored in the system for the PWM control. The cycle time corresponds to the total duration of a switch-on and switch-off pulse together (Fig. 19: Switching PI-control (PWM)). The duration of the switch-on pulse is calculated from the product of the calculated manipulated variable and cycle time, e.g. for a cycle time of 10 minutes and a calculated manipulated variable of 70 %, the switch-on pulse is: $0.7 \times 10 \text{ min} = 7 \text{ min}$. The remaining 3 minutes of the cycle are therefore dedicated to the switch-off pulse. A short cycle time causes the switch-on pulses to occur at fairly short intervals. This prevents the temperature from lowering too much and the actual value remains stable. However, this can also lead to frequent switching pulses, which can adversely affect the system or can overload the bus.

The application area of the PWM control is where the advantages of the continuous PI control are required, but the heating system used can assume only the two states ON and OFF. The PWM control provides fairly good control results because it retains the advantages of continuous PI control (control to desired setpoint, no overshoot) in spite of limited switching states. For instance, one application field is electrothermal drives.

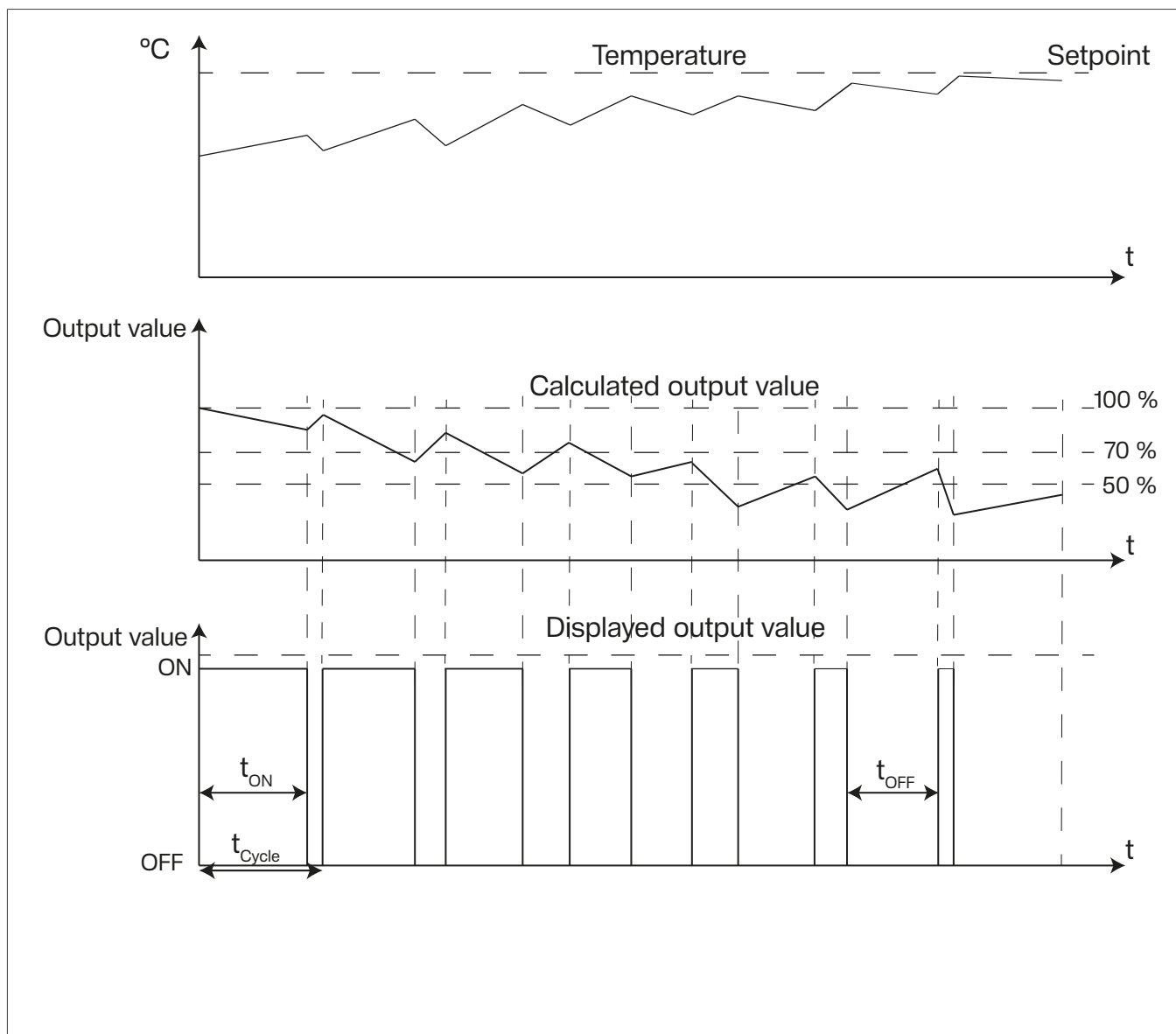


Fig. 19: Switching PI-control (PWM)

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