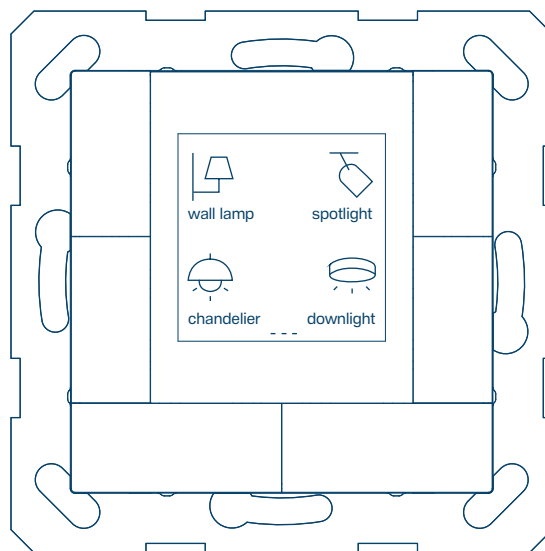


KNX building automation system

Room controller



Room controller KNX Secure, TFT, with integrated bus coupling unit

WAK5010xx



Product overview

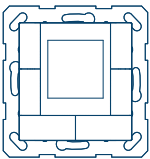
	Order number	Product designation	Application programme	TP product Radio product
	WAK5010WM	Room controller with integrated bus coupling unit, KNX Secure, white	SWAK5010	TP product
	WAK5010BM	Room controller with integrated bus coupling unit, KNX Secure, black	SWAK5010	TP product

Table 1: Product overview

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

1	General.....	4
1.1	General information about this application description.....	4
1.2	Programming software configuration tool.....	4
1.3	Commissioning.....	4
2	Function and device description.....	5
2.1	Device overview.....	5
2.2	Functional description.....	6
2.3	Functional overview of the room thermostat functions.....	6
2.4	Operating concept.....	7
3	Project preparation.....	8
3.1	Project editing.....	8
3.2	Selecting the device.....	8
4	Function parameters.....	16
4.1	Room temperature control.....	16
4.2	Temperature sensor function parameters.....	20
4.3	Internal humidity sensor.....	25
4.4	Binary inputs.....	27
4.5	domovea visualization.....	28
5	Appendix.....	31
5.1	Accessories.....	31
5.2	Technical data.....	32
5.3	Things to know.....	33
5.4	List of Figures.....	36
5.5	List of Tables.....	37

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

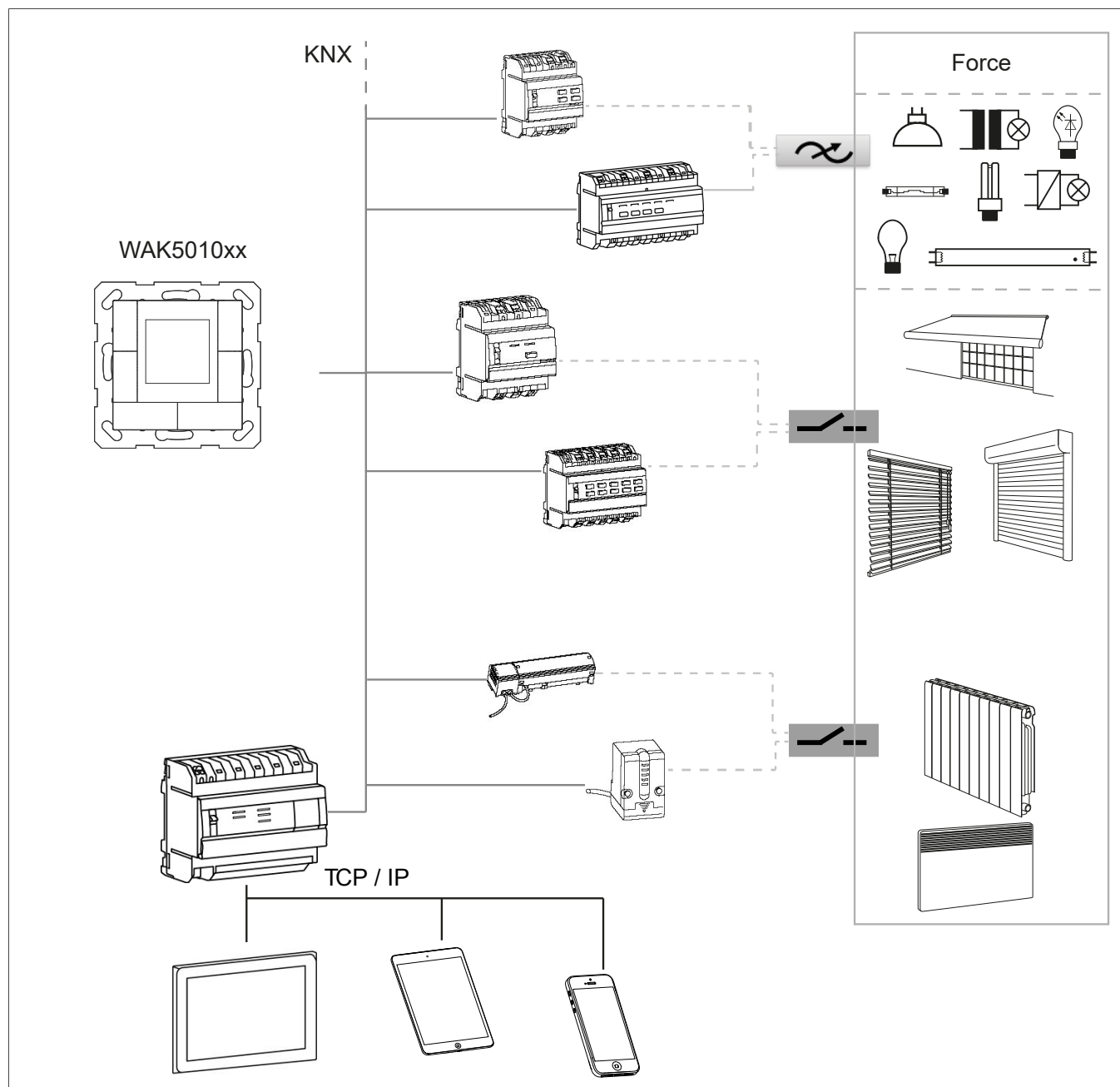


Fig. 1: Device overview

2.2 Functional description

The KNX room controller 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).

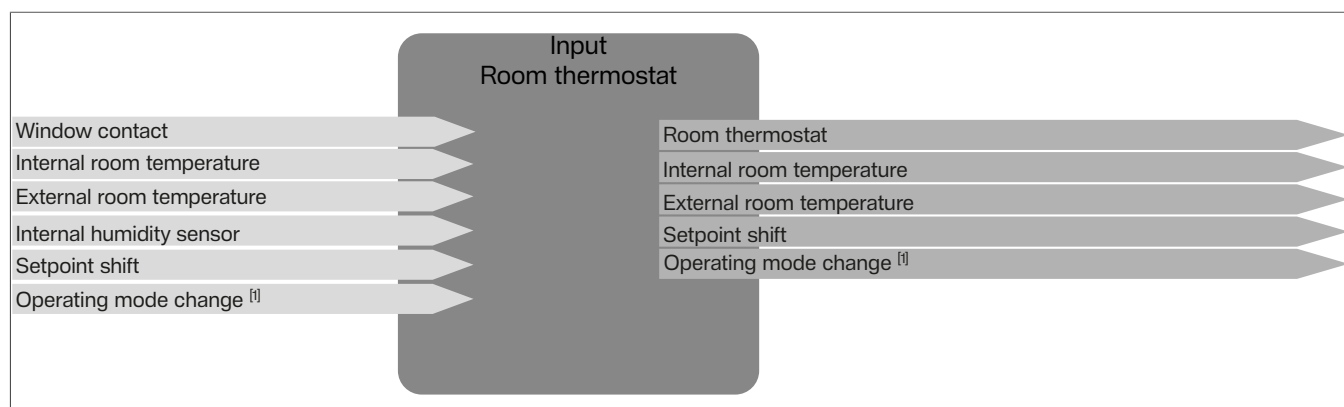


Fig. 2: Functional overview of room temperature controllers

[1] Operating modes:

-  Comfort
-  Standby
-  Eco / Night mode
-  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.

Function selection

The **Function selection** parameter can be used to select the type of system (heating or cooling, or heating and cooling) to be controlled.

Type of heating/cooling control

The 'Type of heating/cooling control' parameter is used to select the control type. The control parameters are fixed in the software and cannot be changed.

- Continuous PI control
- Switching PI-control (PWM)
- Switching two-point control

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
- Split unit

Type of basic cooling

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

- Ceiling cooling
- Split unit
- Convector fan cooling

2.4 Operating concept

The function of the individual inputs is dependent upon the programming of the device.

The functions of the individual buttons are defined by the parameterisation.

Operating guide

The device differentiates between short and long touches.

Short press operation

- Switch from screen saver view to menu view
- Change operating mode
- Switch menu view on/off
- Reduce/increase the room temperature

Long press operation

- Switch between heating and cooling



The detection time for a long key press is already configured in the system.

3 Project preparation

The configuration of the parameters for the room thermostat and room controller devices are described in the following sections. The only difference between the functions of the devices relates to their push-button functions. For this reason, the room controller with the push-button function is described in this document.



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 **configuration tool**.

The set parameters are updated continuously during the configuration.

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

3.1 Project editing

To ensure that the commissioning process with the *configuration tool* is successful, the following requirements must be met:

- ☑ A network connection to the **configuration tool** has been established.
- ☑ All of the devices used (wired or wireless) are connected to the **configuration tool**.
- ☑ Start the **configuration tool** software (browser version or tablet app).
- ☑ Create the project and enter the project-specific data (project name, address, customer data).
- Click on search to scan devices.
The **configuration tool** has scanned the device(s) and started parameterisation.

3.2 Selecting the device

First of all, the corresponding device must be selected in the device list to start the configuration.

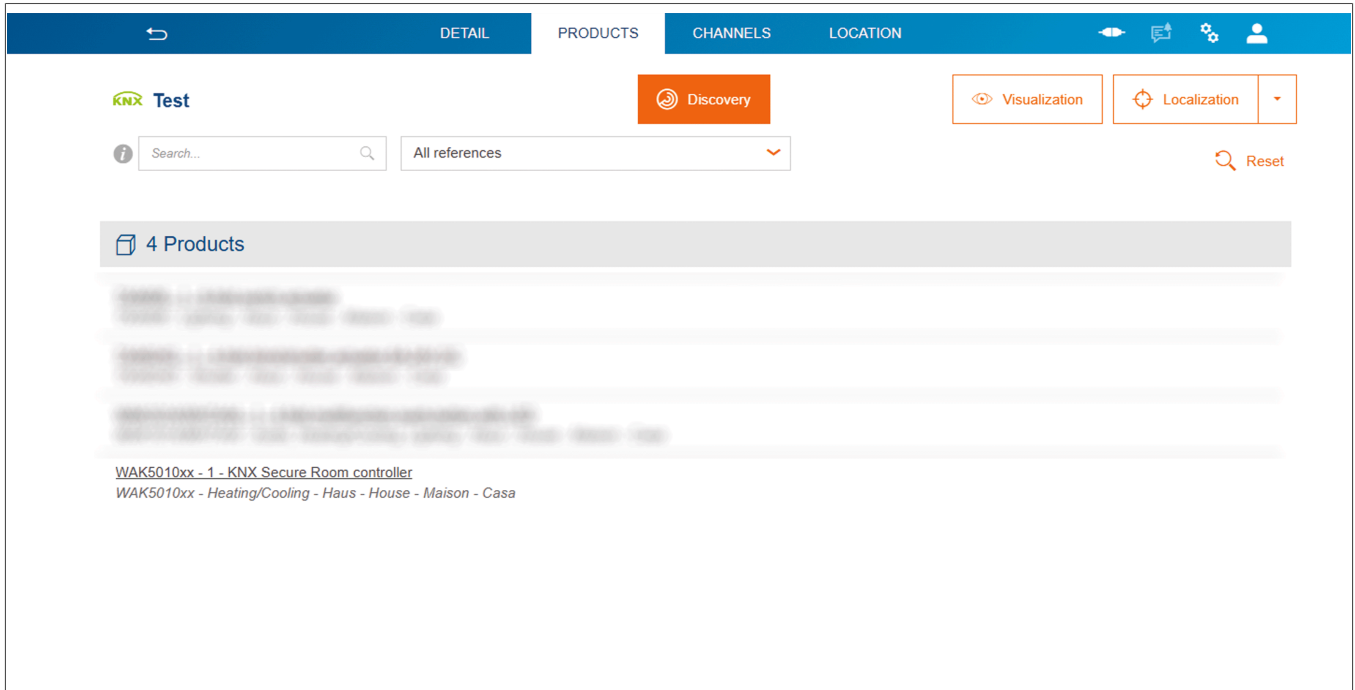


Fig. 3: Selecting the device

- Select the device in the device overview.
The following view opens.

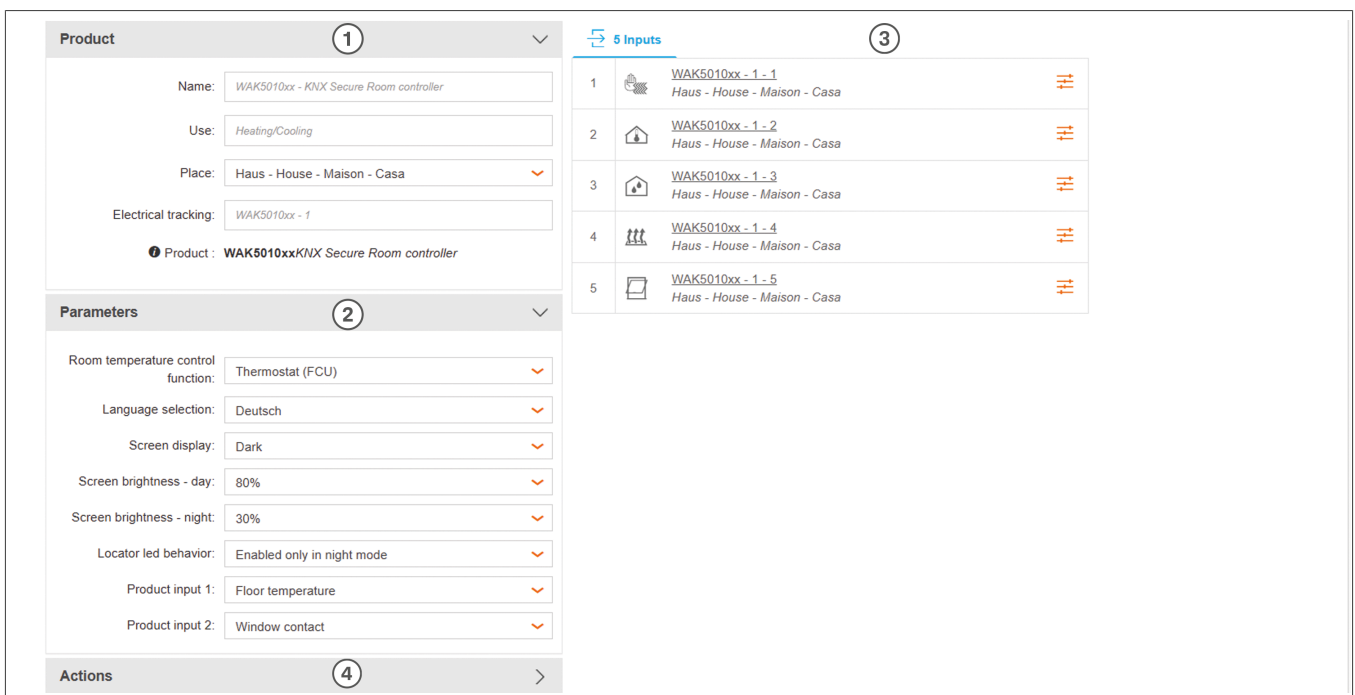


Fig. 4: Home page

The view is divided into four sections.

Device (1)

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

Parameter (2)

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

Inputs / outputs (3)

- The available inputs of the device are listed under Inputs.
 - Input 1: Room temperature control, symbol changes depending on the control type selected (FCU/VFR)
 - Input 2: Internal room temperature sensor
 - Input 3: Internal humidity sensor
 - Input 4: Only visible if the **Floor Temperature** value is selected under Product input. Connection of an external room temperature sensor (EK090)
 - Input 5: Only visible if the **Window contact** value is selected under Product input

Miscellaneous (4)

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

3.2.1 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.

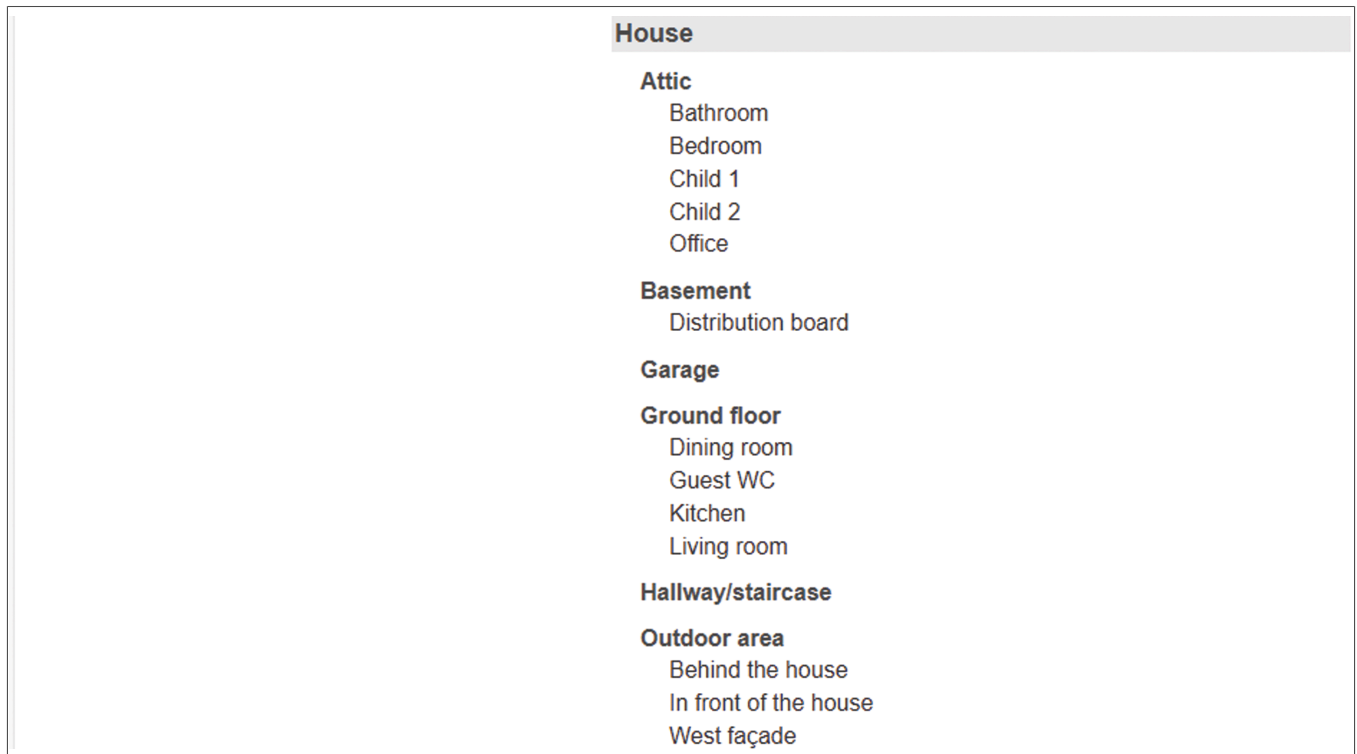


Fig. 5: Example of building structure

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 on **i Device**. Information about the device is displayed.

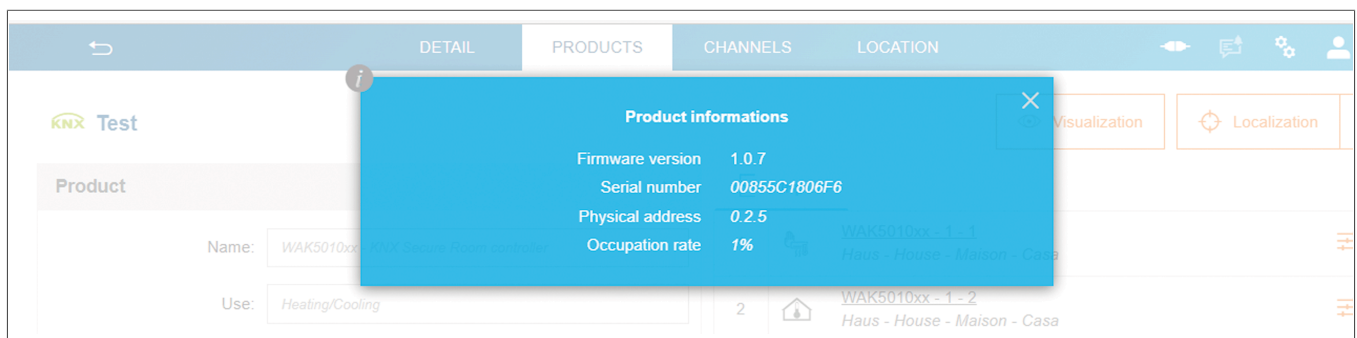


Fig. 6: Device Information (**i Device**)

Menu section — Inputs

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

5 Inputs				
1		<u>WAK5010xx - 1 - 1</u> Haus - House - Maison - Casa		
2		<u>WAK5010xx - 1 - 2</u> Haus - House - Maison - Casa		
3		<u>WAK5010xx - 1 - 3</u> Haus - House - Maison - Casa		
4		<u>WAK5010xx - 1 - 4</u> Haus - House - Maison - Casa		
5		<u>WAK5010xx - 1 - 5</u> Haus - House - Maison - Casa		

Fig. 7: Image of Inputs view, right-hand side

5 inputs		
	<u>WAK5010xx - 1 - 1</u> Home	
	<u>WAK5010xx - 1 - 2</u> Home	
	<u>WAK5010xx - 1 - 3</u> Home	
	<u>WAK5010xx - 1 - 4</u> ^[1] Home	
	<u>WAK5010xx - 1 - 5</u> ^[1] Home	

Table 2: Menu section — Inputs

[1] Input 4 or 5 is only visible if a value is selected under Product input 1 or 2.

5 inputs		
	<u>WAK5010xx - 1 - 1</u> Home	
	<u>WAK5010xx - 1 - 2</u> Home	
	<u>WAK5010xx - 1 - 3</u> Home	
	<u>WAK5010xx - 1 - 4</u> ^[1] Home	
	<u>WAK5010xx - 1 - 5</u> ^[1] Home	

Table 3: Menu section — Inputs

[1] Input 4 or 5 is only visible if a value is selected under Product input 1 or 2.

Menu section — Other

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

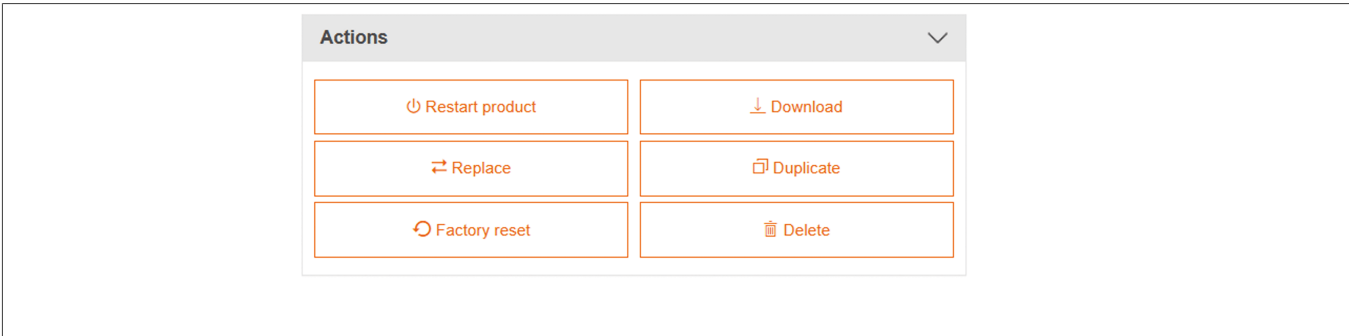


Fig. 8: Menu section — Other

- ⏻ 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
 - 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.

3.2.2 Menu section — Parameters

The general settings for the device are configured under Parameters.

Depending on the menu selection, the corresponding inputs are listed.

Room temperature control

The ‘Room temperature control’ parameter is used to select the room temperature control system used in the object. You can choose from two systems. The corresponding control parameters are fixed in the system and cannot be changed or adapted.

Room temperature control
Thermostat (FCU)
Air conditioning system command (VRF)

Table 4: Room temperature control



The following sections first describe the general parameters of the device. The actual description of the room temperature control is given in the next chapter.

Language selection

The 'Language selection' parameter can be used to select the language to be displayed.

Language selection
German
English
French
Portuguese
Italian
Polish
Turkish
Greek
Swedish

Table 5: Language selection

On-screen display

The 'On-screen display' parameter sets the colour of the display and the resulting font and symbol colour.

Display colour	Font/symbol colour
Black	White
White	Black

Table 6: On-screen display

Screen brightness

This setting is used to adjust the screen brightness for daytime and night-time use.

Day	Night
20 % ... 80 % ... 100 %	20 % ... 30 % ... 100 %

Table 7: Screen brightness

Behaviour of the Behaviour of the localisation LED

The localisation LED or Orientation LED is a small status LED at the top edge of the device. This can only be activated for night mode. This orientation LED is switched on from a brightness value defined in the software.

Behaviour of the localisation LED

Inactive

Only active in night mode

Table 8: Behaviour of the localisation LED

Product input

The device has a plug-in terminal at the rear for connecting two binary inputs. For easytool, a room temperature sensor (product input 1) and a window contact (product input 2) can be connected and activated in the software.

If these product inputs are selected, the respective inputs of the binary input contacts (**WAK5010 - 1 - 4/5**) appear accordingly in the **Inputs** menu section.

Product input 1 (WAK5010xx - 1 - 4)	Product input 2 (WAK5010xx - 1 - 5)
Inactive	Inactive
Floor Temperature	Window contact

Table 9: Product input 1/2

3.2.3 Overview inputs

The number of device inputs depends on the selection of the function parameters. The table below lists the maximum number of available inputs. The view of the inputs depends on the corresponding room temperature control.

5 inputs ↗

1		WAK5010xx - 1 - 1 Home
1		WAK5010xx - 1 - 1 Home
2		WAK5010xx - 1 - 2 Home
3		WAK5010xx - 1 - 3 Home
4		WAK5010xx - 1 - 4 Home
5		WAK5010xx - 1 - 5 Home

4 Function parameters

The following chapters describe the parameters for the device.

Display view

The following parameters are displayed by default.



Fig. 9: Display view

- ① Time display
- ② Day of the week display (abbreviated)
- ③ Humidity display
- ④ Room temperature display
- ⑤ Date display

4.1 Room temperature control

The device can support two different room temperature control systems.

- Thermostat (FCU) 🏠
- Air conditioning system command (VRF) 🏢

4.1.1 Thermostat (FCU)

Clicking on WAK5010xx - 1 - 1  opens the parameter window for room temperature control in thermostat (FCU) mode.

In this parameter window, you can configure settings for the type of heating, cooling, control type and system.

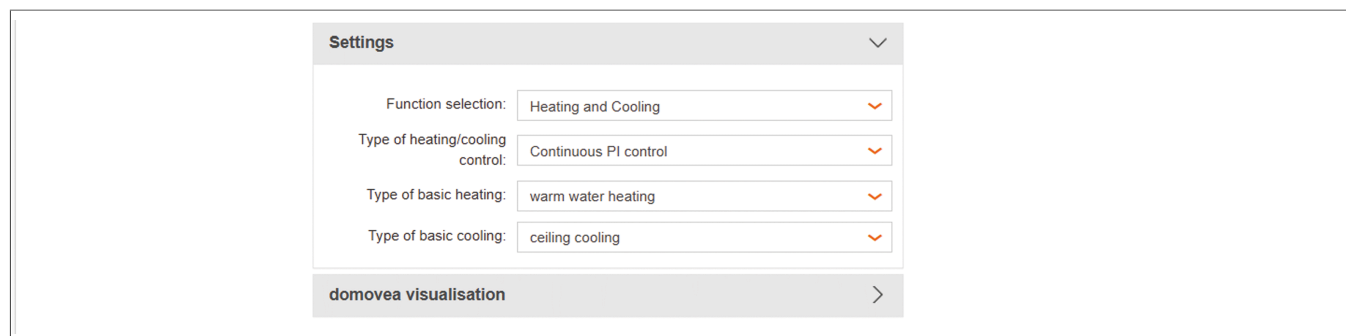


Fig. 10: Room temperature control — thermostat (FCU)

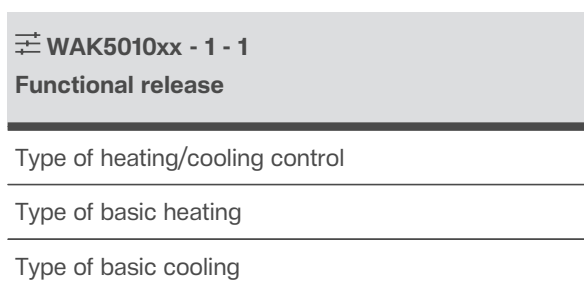


Table 10: Functional release of the thermostat (FCU)

Parameter	Description	Value
Functional release	Determines the type of system.	heating Cooling Heating and cooling
Type of heating/cooling control	This parameter determines the control type.	Switching two-point control Switching PI-control (PWM) Continuous PI control
Type of basic heating	This parameter determines the type of heating system.	Warm water heating Underfloor heating Electric heating Split unit Fan convector heating
Type of basic cooling	This parameter defines the type of cooling system.	Ceiling cooling Convactor fan cooling Split unit

Table 11: Thermostat settings (FCU)

4.1.1.1 Overview of all possible linking combinations (FCU)

The following overview shows all linking combination possibilities for the **Heating/cooling** function. It is worth noting that inputs can also be linked with inputs (depending on the function selection).

Linking	
Input 	Input 
 WAK5010xx - 1 - 1 Home	 Comfort mode
	 Eco mode
	 Standby mode
	 Protection mode
	 Automatic heating mode
	 Heating switching mode
	 Switching Comfort/Eco mode
	 Switching Comfort/Standby mode
	 Automatic protection mode
	 Setpoint Offset
	 Priority Comfort mode
	 Priority Protection mode
	 Priority Comfort toggle
	 Priority Protection toggle
	 Window status
	 Heating/cooling switching

Table 12: Linking input – input Heating/Cooling

	Heating/cooling toggle
	Automatic Comfort mode
	Automatic Eco mode
	Automatic Standby mode
	Automatic protection mode
	Automatic heating toggle
	HVAC mode switching
	Increase the setpoint value
	Decrease the setpoint value

Table 12: Linking input – input Heating/Cooling

4.1.2 Air conditioning system command (VRF)

This chapter describes the Air conditioning system command (VRF) function. This can be used to control what is known as a VRF air conditioning system can.

Clicking on WAK5010xx - 1 - 1  opens the parameter window for configuring the VRF system. Only the 'Room temperature reference from' parameter is to be set in this parameter window.

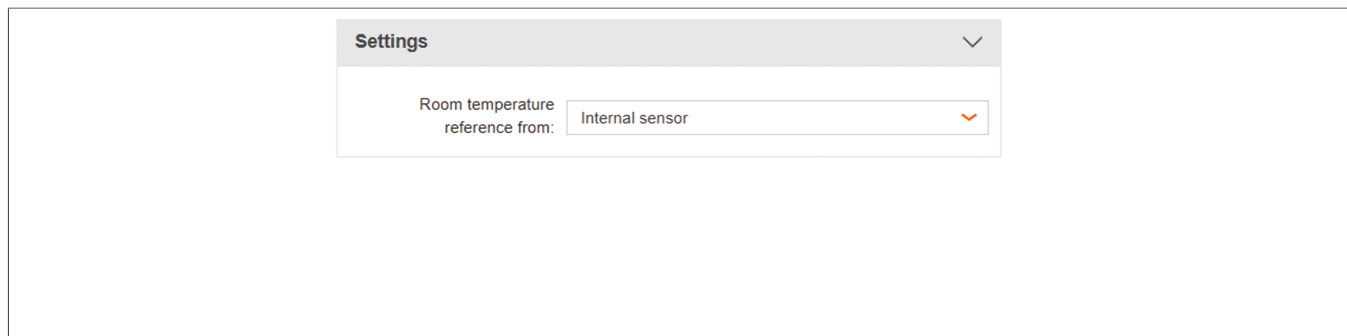


Fig. 11: 'Room temperature reference from' parameter

Parameter	Description	Value
Room temperature reference from	This parameter defines the measured temperature value above which the device is to control the VRF air conditioning system	Internal sensor External sensor

Table 13: Product input 1 — floor temperature

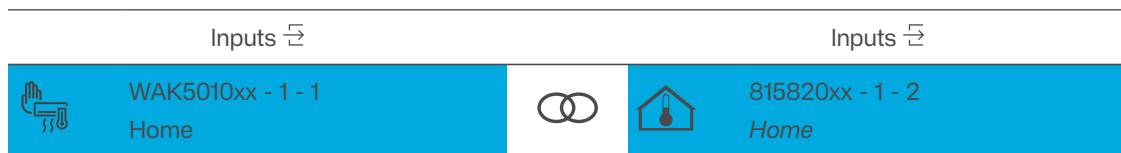


Table 14: Linking input – input Floor temperature function

4.2 Temperature sensor function parameters

The following section describes and explains the configuration and settings of the internal and external temperature sensors.



Both temperature sensors can be parameterised separately from each other.

The external temperature sensor is only visible if the **Floor temperature** value is selected under **Parameters — Product input**.

4.2.1 Internal temperature sensor

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



After commissioning, the voltage supply returning or downloading the application software, it may take up to 30 minutes for the device to adapt to the ambient temperature and for the internal temperature sensor to supply the correct measured values.

The measured temperature can be transmitted directly to an additional KNX room controller 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 >	No link
Settings v	
Temperature calibration: 0,0°C v	
domovea visualisation >	

Fig. 12: Room temperature sensor input — temperature calibration

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:

Example:

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

Measured temperature on the device 24.5 °C.

Measured reference temperature 24.0 °C.

Temperature calibration = -0.5°C.

The temperature calibration value must be entered as **-0.5**.

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 24.5 °C.

Temperature calibration = 0.5°C.

The temperature calibration value must be entered as **0.5**.

Inputs ↗		Inputs ↗	
	WAK5010xx - 1 - 2 Home — room beginning/end		WAK5010xx - 1 - 1 Home — room central
	WAK5010xx - 1 - 2 Home — room beginning/end		WAK5010xx - 1 - 1 Home — room central

Send the internal room temperature measured on a second device to a **master device** for evaluation of the overall room temperature

Table 15: Linking input – input Internal temperature sensor function

Inputs ↗		Inputs ↗	
	WAK5010xx - 1 - 2 Home		TXE530 - 1 - 1 Home

Table 16: Linking input – input Internal temperature sensor function

4.2.2 External temperature sensor

The external temperature sensor is a wired remote sensor that can be connected to the bus coupler (see accessories) directly. The measured temperature is processed internally and is used to monitor the floor temperature in underfloor heating (protection against high temperature).



After commissioning, the voltage supply returning or downloading the application software, it may take up to 30 minutes for the device to adapt to the ambient temperature and for the internal temperature sensor to supply the correct measured values.

The temperature measured externally can serve as a second measuring point (measurement result) (synchronisation in larger rooms).

Recording, for example, the ambient temperature as the measurement result when installation is carried out in an unfavourable location (e.g. outside).

Input	>	No link
Settings	▼	
Temperature calibration: 0,0°C		
domovea visualisation	>	

Fig. 13: External room temperature sensor input - temperature calibration

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 17: 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**.

4.3 Internal humidity sensor

The device is directly fitted with a sensor for measuring the humidity.



After commissioning, the voltage supply returning or downloading the application software, it may take up to 30 minutes for the device to adapt to the environmental conditions and for the internal humidity sensor to supply the correct measured values.

Input >	No link
Settings v	
Humidity calibration: 0% v	
domovea visualisation >	

Fig. 14: Room temperature sensor input — temperature calibration

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 the humidity using a hygrometer.
- Compare the measured value with the displayed value on the device.
- Enter the temperature deviation in parameters. Proceed as follows:

Example:

Measured humidity on the device is higher than the measured reference humidity = **negative humidity calibration value**.

Measured humidity on the device 40%

Measured reference humidity 36%

Humidity calibration = -10%

The humidity calibration value must be entered as **-10%**.

Example:

Measured humidity on the device is lower than the measured reference humidity = **positive humidity calibration value**.

Measured humidity on the device 40%

Measured reference humidity 44%

Humidity calibration = +10%

The humidity calibration value must be entered as **+10%**.

Inputs ↕	Inputs ↕
----------	----------

Table 18: Linking input – input Internal temperature sensor function

	WAK5010xx - 1 - 2 Home — room beginning/end			WAK5010xx - 1 - 1 Home — room central
	WAK5010xx - 1 - 2 Home — room beginning/end			WAK5010xx - 1 - 1 Home — room central

Send the internal room temperature measured on a second device to a **master device** for evaluation of the overall room temperature

Table 18: Linking input – input Internal temperature sensor function

Inputs ⇄		Inputs ⇄	
	WAK5010xx - 1 - 2 Home		 TXE530 - 1 - 1 Home

Table 19: Linking input – input Internal temperature sensor function

4.4 Binary inputs

The device has a plug-in terminal at the rear to which the connection cable included in the scope of delivery can be connected. Via this, additional devices such as

- Temperature sensors (recommendation: EK090),
- Potential-free contacts,
- Binary inputs can be connected.

Screen brightness - day: 80%

Screen brightness - night: 30%

Locator led behavior: Enabled only in night mode

Product input 1: Floor temperature ①

Product input 2: Window contact ②

Actions >

4		WAK5010xx - 1 - 4 Haus - House - Maison - Casa	
5		WAK5010xx - 1 - 5 Haus - House - Maison - Casa	

Fig. 15: Overview of binary inputs

Binary input 1 — Floor temperature

Only an external room temperature sensor can be connected to binary input 1 (recommendation: EK090).

In easytool, the value of the **Product input 1** parameter must be changed from **Inactive** to **Floor temperature**.

Parameter	Description	Value
Product input 1	This parameter is used to integrate the temperature sensor connected to binary input 1 into easytool and to process the measured value accordingly.	Inactive Floor Temperature

Table 20: Product input 1 — floor temperature

If the **Floor temperature** value is selected, the fourth input WAK5010xx - 1 - 4 is visible in the **Inputs** view.

1		WAK5010xx - 1 - 1 Haus - House - Maison - Casa	
2		WAK5010xx - 1 - 2 Haus - House - Maison - Casa	
3		WAK5010xx - 1 - 3 Haus - House - Maison - Casa	
4		WAK5010xx - 1 - 4 Haus - House - Maison - Casa	

Fig. 16: Inputs view — input 4 floor temperature

Inputs ↗		Inputs ↗	
	WAK5010xx - 1 - 4 Home		815820xx - 1 - 2 Home

Table 21: Linking input – input Floor temperature function

Binary input 2 — Window contact

Only an external window contact can be connected to binary input 2 (recommendation: EK090).

In easytool, the value of the **Product input 2** parameter must be changed from **Inactive** to **Window contact**.

Parameter	Description	Value
Product input 2	This parameter is used to integrate the window contact connected to binary input 2 into easytool and to process the measured value accordingly.	Inactive Window contact

Table 22: Product input 2 — window contact

If the **Window contact** value is selected, the fifth input WAK5010xx - 1- 5 is visible in the **Inputs** view.

1		WAK5010xx - 1 - 1 Haus - House - Maison - Casa	
2		WAK5010xx - 1 - 2 Haus - House - Maison - Casa	
3		WAK5010xx - 1 - 3 Haus - House - Maison - Casa	
5		WAK5010xx - 1 - 5 Haus - House - Maison - Casa	

Fig. 17: Inputs view — input 5 window contact

Inputs ↗		Inputs ↗	
	WAK5010xx - 1 - 5 Home		815820xx - 1 - 2 Home

Table 23: Linking input – input Window contact function

4.5 domovea visualization

The device or the settings made in easytool can be exported to domovea. To do this, the tick box for **Export to domovea** must be activated in the inputs in the **domovea visualisation** parameter

Input	>	No link
Settings	>	
domovea visualisation	✓	
☒ Export to domovea		

Fig. 18: Export to domovea

These five parameters can be exported to the domovea:



The following three parameters / / are activated by default and are automatically exported to domovea.

- ① Input WAK5010xx - 1 - 1
- ② Input WAK5010xx - 1 - 2
- ③ Input WAK5010xx - 1 - 3



The following two parameters input 1 and input 2 must be actively selected in order to be exported to domovea.

- ④ Input WAK5010xx - 1 - 4
- ⑤ Input WAK5010xx - 1 - 5

Thermostat			
☐		WAK5010xx - 1 - 1 Haus - House - Maison - Casa	①
Temperatur			
☐		WAK5010xx - 1 - 2 Haus - House - Maison - Casa	②
☐		WAK5010xx - 1 - 4 Haus - House - Maison - Casa	④
Feuchtigkeit			
☐		WAK5010xx - 1 - 3 Haus - House - Maison - Casa	③
Binäreingang			
☐		WAK5010xx - 1 - 5 Haus - House - Maison - Casa	⑤

Fig. 19: Result after exporting to domovea



The following parameter Air conditioning system command (VRF) **cannot** be exported to domovea.

① Input WAK5010xx - 1 - 1 

5 Appendix

5.1 Accessories

Optional accessories

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

5.2 Technical data

KNX Medium	TP1-256
Configuration mode	S-Mode, E-Controller
KNX supply voltage	21 ... 32 V $\overline{\text{SELV}}$
Current consumption	$\leq 18 \text{ mA}$ -24 V, $\leq 15 \text{ mA}$ -30 V
Power consumption	< 450 mW
Temperature measuring range	-5 ... +60°C
Energy efficiency class	IV (2%)
Operating height	Max. 2000 m
Degree of contamination	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
Air humidity	< 93%, condensation-free
Dimensions (W x H x D)	70.8 x 70.8 x 19.3 mm

5.3 Things to know

5.3.1 Control types

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

Operating mode	Heating setpoint values
Comfort	+21 °C
Standby	+19 °C
Eco/Night	+16 °C
Frost protection	+7 °C

Table 24: Heating setpoint values

Operating mode	Cooling setpoint values
Comfort	+22 °C
Standby	+23 °C
Eco/Night	+27 °C
Heat protection	+35 °C

Table 25: Cooling setpoint values

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

5.3.2 2-point control

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 and turns it off again if the setpoint is exceeded (heating) ((Figure) 18).

The controller is equipped with an in-built hysteresis in order to prevent 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 slightly the set switch-off point. 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

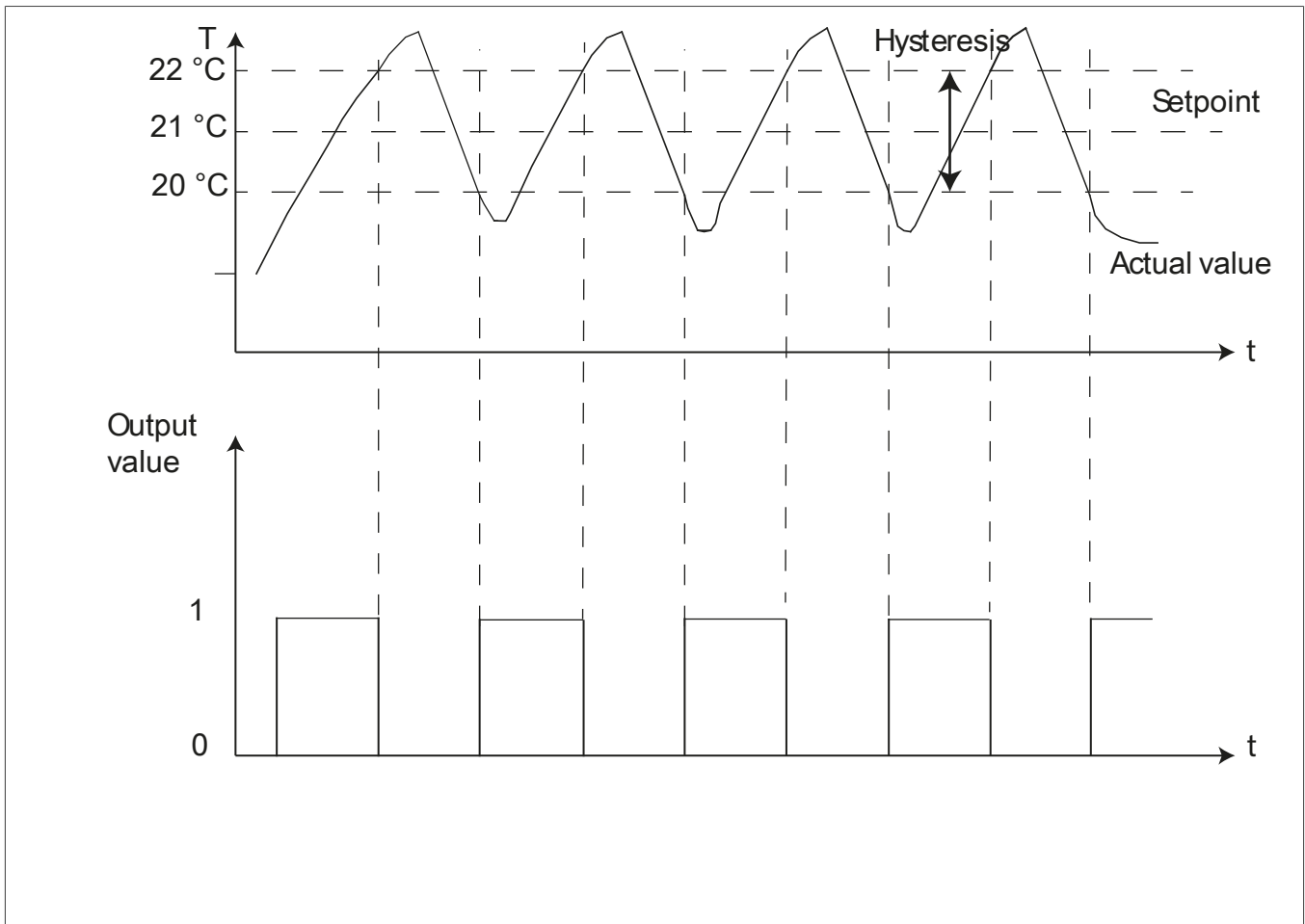


Fig. 20: 2-point control

5.3.3 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, but is only processed internally. 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 (Figure 19). The duration of the switch-on pulse is calculated from the product of the calculated output value and the cycle time, e.g. for a cycle time of 10 min. and a calculated output value 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 dropping too much and the actual value remains largely 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. PWM control provides fairly good control results because it largely retains the advantages of continuous PI control (con-

trol to desired setpoint, no overshoot) in spite of limited switching states. One area of application is, for example, electro-thermal drives.

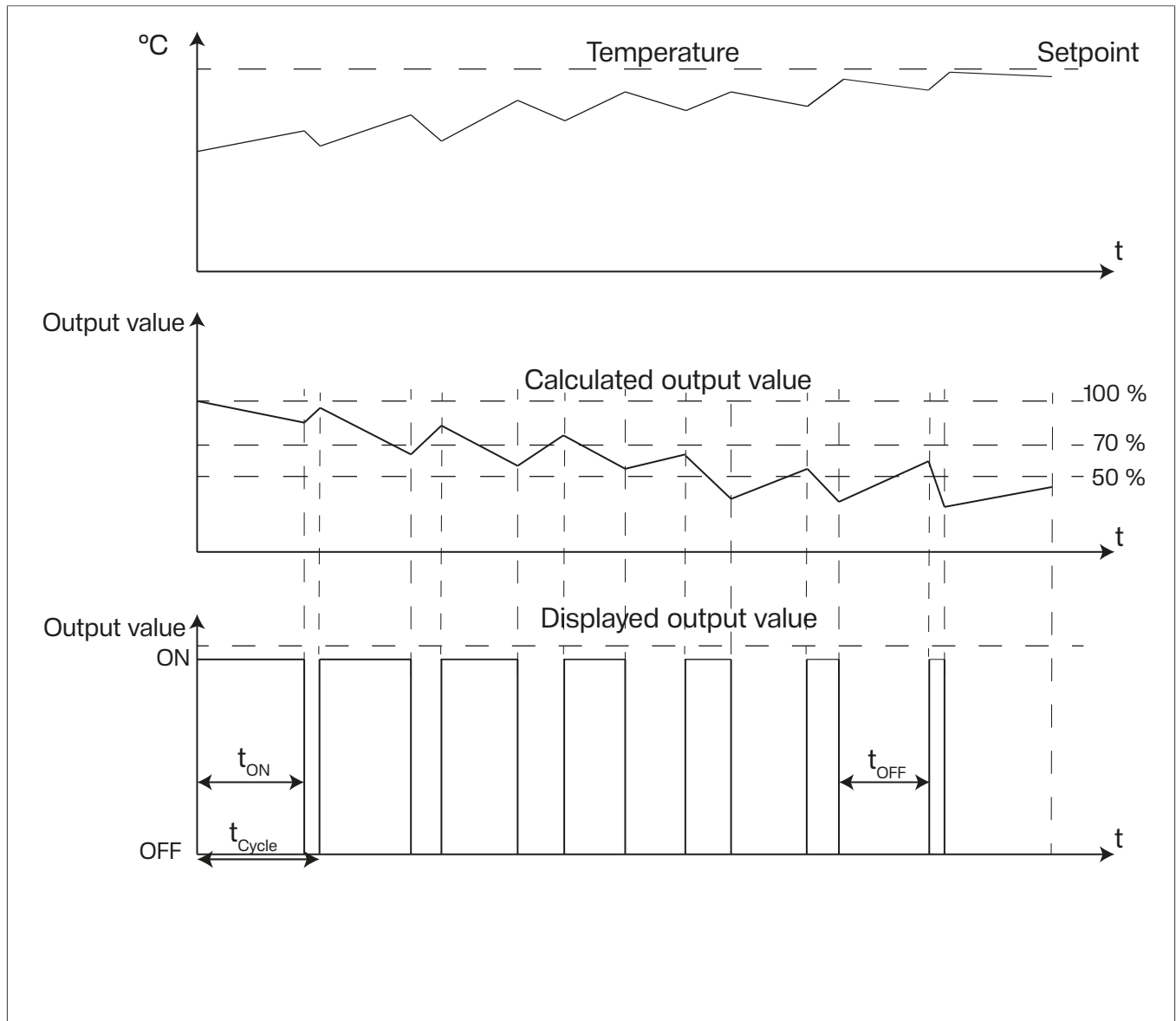


Fig. 21: Switching PI-control (PWM)

5.4 List of Figures

Fig. 1:	Device overview.....	5
Fig. 2:	Functional overview of room temperature controllers.....	6
Fig. 3:	Selecting the device.....	9
Fig. 4:	Home page.....	9
Fig. 5:	Example of building structure.....	11
Fig. 6:	Device Information (i Device).....	11
Fig. 7:	Image of Inputs view, right-hand side.....	12
Fig. 8:	Menu section — Other.....	13
Fig. 9:	Display view.....	16
Fig. 10:	Room temperature control — thermostat (FCU).....	17
Fig. 11:	‘Room temperature reference from’ parameter.....	20
Fig. 12:	Room temperature sensor input — temperature calibration.....	21
Fig. 13:	External room temperature sensor input - temperature calibration.....	23
Fig. 14:	Room temperature sensor input — temperature calibration.....	25
Fig. 15:	Overview of binary inputs.....	27
Fig. 16:	Inputs view — input 4 floor temperature.....	27
Fig. 17:	Inputs view — input 5 window contact.....	28
Fig. 18:	Export to domovea.....	29
Fig. 19:	Result after exporting to domovea.....	29
Fig. 20:	2-point control.....	34
Fig. 21:	Switching PI-control (PWM).....	35

5.5 List of Tables

Tab. 1:	Product overview.....	2
Tab. 2:	Menu section — Inputs.....	12
Tab. 3:	Menu section — Inputs.....	12
Tab. 4:	Room temperature control.....	13
Tab. 5:	Language selection.....	14
Tab. 6:	On-screen display.....	14
Tab. 7:	Screen brightness.....	14
Tab. 8:	Behaviour of the localisation LED	15
Tab. 9:	Product input 1/2.....	15
Tab. 10:	Functional release of the thermostat (FCU).....	17
Tab. 11:	Thermostat settings (FCU).....	17
Tab. 12:	Linking input – input Heating/Cooling.....	18
Tab. 13:	Product input 1 — floor temperature.....	20
Tab. 14:	Linking input – input Floor temperature function.....	20
Tab. 15:	Linking input – input Internal temperature sensor function.....	22
Tab. 16:	Linking input – input Internal temperature sensor function.....	22
Tab. 17:	Linking input – input Internal temperature sensor function.....	23
Tab. 18:	Linking input – input Internal temperature sensor function.....	25
Tab. 19:	Linking input – input Internal temperature sensor function.....	26
Tab. 20:	Product input 1 — floor temperature.....	27
Tab. 21:	Linking input – input Floor temperature function.....	28
Tab. 22:	Product input 2 — window contact.....	28
Tab. 23:	Linking input – input Window contact function.....	28
Tab. 24:	Heating setpoint values.....	33
Tab. 25:	Cooling setpoint values.....	33



Berker GmbH & Co. KG

Zum Gunterstal

66440 Blieskastel

Germany

T +49 6842 945 0

F +49 6842 945 4625

info@hager.com

hager.com