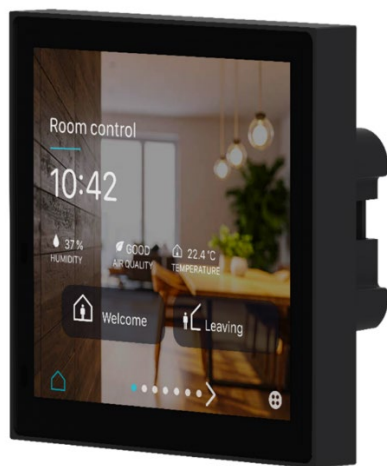


User Manual

Room Controller

iONprime CP 4 KNX



4969300

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1 General information

This manual provides detailed technical information about the function, installation and programming of the iONprime CP 4 KNX room controller (4969300).

The iONprime CP 4 KNX room controller with a 4-inch touchscreen is used to control and display up to 48 functions across 6 individually configurable pages. It also features humidity, brightness, and proximity sensors, as well as temperature measurement and a temperature controller. The user interface can be personalized with custom background images.

- KNX room controller with integrated bus coupler
- 4-inch touchscreen with a resolution of 480 x 480
- Custom background images can be imported via SD card
- Display and control of up to 48 functions across up to 6 pages
- Integrated temperature, humidity, brightness, and proximity sensors
- Configurable thresholds each for temperature and humidity
- Integrated temperature controller for regulating and controlling operating mode, temperature, and fan speed
- Freely assign icons to functions
- Control of switching, dimming, blind, value transmitter, and scene functions
- Scene module for up to 8 scenes with 8 output objects
- Password protection for device settings and screensaver
- Function monitoring via object (signaling of disassembly)



The physical address is assigned, and the parameters are set using the Engineering Tool Software (ETS).

2 Proper use

The iONprime CP 4 KNX devices are room controllers measuring and controlling temperature, humidity in the room via integrated sensors.

The room controller activates many functions. Switching, Dimming, RGB Control, Tunable White, Thermostat Functionality, AC Control, Blinds, Jalousie, Scene, Energy Display, Audio, Air Quality.

They are used in residential buildings, meeting rooms and offices, as well as in commercial buildings (in closed, dry rooms).

3 Security

3.1 Explanation of symbols used

The symbols in this document are defined as follows:

Symbol	Description
 Caution	Indication of a dangerous situation which, if not avoided, will or may result in serious injury.
 Caution	Indication of a potentially dangerous situation which, if not avoided, may result in damage to the device, loss of data, etc.
 Note	Additional information to emphasize or supplement important points in the main text.



Danger of electric shock!

Direct or indirect contact with live parts will result in a dangerous electric current passing through the body. This can result in electric shock, burns, or death. There is a risk of fire if work on live parts is carried out improperly.



Assembly and installation must only be carried out by a qualified electrician or a person with appropriate professional training, knowledge, and experience to recognize and avoid the dangers posed by electricity.



Before commissioning and using the product, read the instructions completely and observe them. These instructions are part of the product and must remain with the end user.



Disconnect the power supply before assembly and disassembly!



Work on the 110–240 V mains supply must only be carried out by qualified personnel.

3.2 Environment

Please protect the environment!

Used electrical and electronic devices must not be disposed of with household waste. The device contains valuable raw materials that can be reused.



Dispose of the device separately from household waste at an official Collection point.

3.3 Cleaning and maintenance

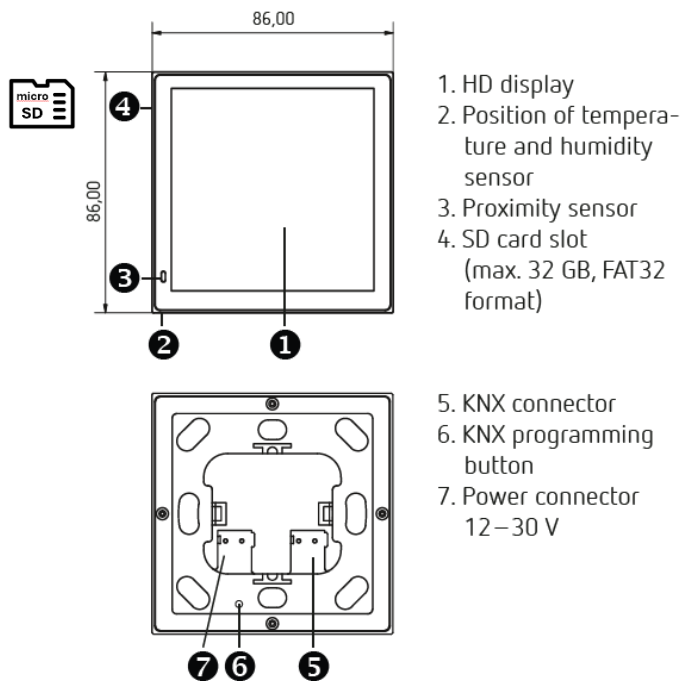
- Clean the device surface only with a dry, soft cloth.
- Do not use cleaning agents or solvents.

4 Technical data

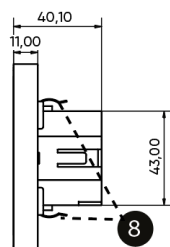
Bus voltage KNX Power input KNX bus	21-32 V DC < 5 mV
Operating voltage Current consumption	12 ... 30 V DC < 70 mA at 30 V DC
Display	4" – 480 x 480 px, 300 cd/m ²
Connectivity	KNX-TP
KNX bus cable diameter	0,6 ... 0,8 mm, single-wire
KNX terminal stripping length	6 mm
Dimensions	86 x 86 x 11 mm
Operating temperature	0 °C ... +45 °C
Protection rating	IP 20
Protection class	III
Connection type	Cable with KNX bus terminal
Pollution degree	2

 Programming requires the Engineering Tool Software ETS, version ETS 4 or higher, and the current application for the device. The current application can be found with the corresponding software information for download on the Internet at www.theben.de or in the ETS online catalogue.

5 Description



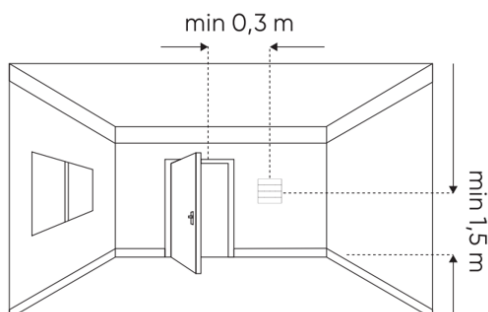
i SD card contacts must face forward.



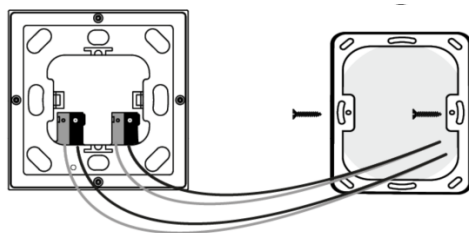
8. Mounting clips

6 Installation and electrical connection

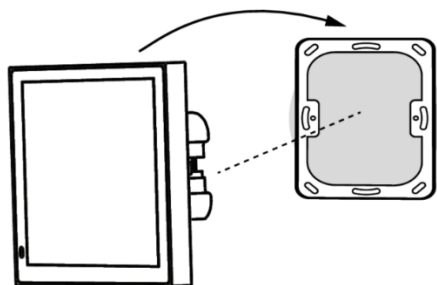
6.1 Installation site



- The device should be positioned approximately 150 cm above the ground and 30 cm away from the door.
- The device should not be installed close to the heat source. The wall opposite the heat source will be appropriate for the installation.

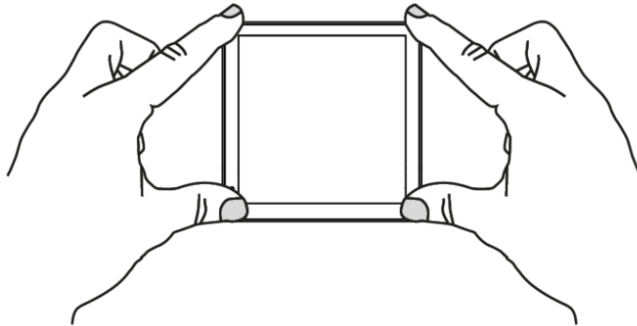


- Attach the metal frame to the wall using the two screws (included).
- Connect the power cable and KNX cable to the device.
Pay attention to the polarity!



- Place the device on the metal frame.

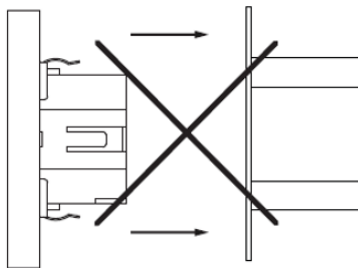
- Place over the lower clips.
- Attach the top clips.



- Press and place the device with both hands simultaneously on the right and left sides.



Pushing the device straight into the clips might damage.



7 ETS parameters

The room controller is configured and set up using the standard KNX configuration tool ETS. You can download the ETS database for this device from the ETS online catalogue or from the Theben website.

7.1 General

Display Temperature Unit: [Celsius, Fahrenheit]

Temperature units can be selected for the device. Once selected, the device will use your preferred temperature unit for all temperature values displayed on the room controller.

Delay after bus voltage recovery: [5...10...65535 s]

The parameter defines the behavior of the switch after bus power returns. The delay time determines the period between bus voltage recovery and the point after which telegrams can be sent.

Send Alive Beacon: [5...10...65535 s]

Parameter used to observe that the device and the application are running. It is disabled by default. When activated, Object Number 1 "Send Alive Beacon" will send selected value with defined time interval.

7.1.1 Temperature sensor

Temperature unit can be selected as Celsius or Fahrenheit.

Sensor Compensation (x0.1K):

Measured temperature value can be shifted up or down by using sensor calibration value.
[-100...+100]

Example: Assume that "10" is written to the sensor compensation box. Calculation: $10 \times 0.1 = 1$ Celsius, measured temperature will be increased "+ 1 °C". If "-10" is written measured temperature will be decreased "-1 °C".

Send Temperature:

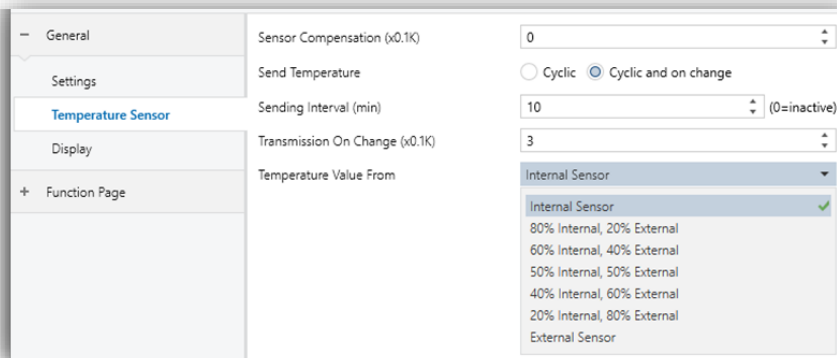
Object Number 8 "Actual Temperature – Internal Value" can be sent cyclically or by change of measured temperature.

Sending Interval (min) [0...10...255]

Transmission On Change (x0.1K) [1...3...100]

Temperature Value from:

Temperature value can be received from an external temperature sensor directly or partially according to selected percentage. Object Number 9 "External Temperature – External Value".



i Prolonged LCD activity can lead to internal heat generation and temporarily impair the accuracy of the temperature sensor. Therefore, temperature measurement and calculation are paused when the display is active and resumed 10 minutes after the display activity ends to allow for thermal stabilization.
This can be optimized by using an external temperature value (e.g. from iONprime PB KNX).

Temperature Alarm:

Two independent thresholds can be activated. For each threshold the following parameters can be set:

Temperature Alarm

Threshold 1
☐ Disable ☒ Enable

Value (°C)

Hysteresis ± (x0.1K)

Output Value Data Type

Action On Below Threshold 1
☐ Disable ☒ Enable

Value
☐ 0 ☒ 1

Delay For Action (s)

Action On Above Threshold 1
☐ Disable ☒ Enable

Value
☒ 0 ☐ 1

Delay For Action (s)

Threshold 2
☒ Disable ☐ Enable

7.1.2 Humidity sensor

Humidity sensor tab contains following parameters.

General
Settings
Temperature Sensor
Humidity Sensor
Display
Function Page
Settings
Page 1-

Sensor Compensation (%)

Send Humidity
☐ Cyclic ☒ Cyclic and on change

Sending Interval (min)
 (0=inactive)

Transmission On Change (%)

Humidity Value From

Humidity Alarm

Threshold 1
☒ Disable ☐ Enable

Threshold 2
☒ Disable ☐ Enable

Sensor Compensation (%):

Measured humidity value can be shifted up or down by using sensor compensation value. [-5...0...+5]

Example: Assume that "3" is written to the sensor compensation box. Measured humidity percentage will be increased + 3 %. If "-3" is written to the sensor compensation box. Measured humidity percentage will be decreased - 3 %.

Send Humidity:

Object "Humidity Value – Internal Value (%)" can be sent cyclically or by change of measured humidity.

Sending Interval (min) [0...10...255]

Transmission On Change (%) [1...5...255]

Humidity Value From:

Humidity value can be received by an external humidity sensor directly or partially according to selected percentage.

Humidity Alarm:

Two independent thresholds can be activated. For each threshold the following parameters can be set:

General	Sensor Compensation (%)	0
Settings	Send Humidity	☐ Cyclic ☒ Cyclic and on change
Temperature Sensor	Sending Interval (min)	10 (0=inactive)
Humidity Sensor	Transmission On Change (%)	5
Display	Humidity Value From	Internal Sensor
Function Page	Humidity Alarm	☐ Disable ☒ Enable
	Threshold 1	☐ Disable ☒ Enable
	Value (%)	60
	Hysteresis ± (%)	3
	Output Value Data Type	1 Bit
	Action On Below Threshold 1	☐ Disable ☒ Enable
	Value	☐ 0 ☒ 1
	Delay For Action (s)	0
	Action On Above Threshold 1	☐ Disable ☒ Enable
	Value	☒ 0 ☐ 1
	Delay For Action (s)	0
	Threshold 2	☒ Disable ☐ Enable

7.1.3 Proximity sensor

Through the proximity sensor it is possible to reactivate the display automatically only when the user approaches the switch.

General	Character Encoding	Western European (ISO 8859-1)
Settings	Display Temperature Unit	☒ Celcius ☐ Fahrenheit
Temperature Sensor	Delay After Bus Recovery (s)	3
Proximity	Send Alive Beacon	☒ Disable ☐ Enable
Display	Humidity Sensor	☒ Disable ☐ Enable
Function Page	Proximity Sensor	☐ Disable ☒ Enable
	Brightness Sensor	☒ Disable ☐ Enable
	Time is provided from KNX	☒ No ☐ Yes
	Scenes	☒ Disable ☐ Enable

Approach Detection: [Disable, Enable]

Action when the user approaches the device (Object 5).

General	Approach Detection	☐ Disable ☒ Enable
Settings	Output Value Data Type	1 Bit
Temperature Sensor	Action On Detection	☐ Disable ☒ Enable
Proximity	Value	☐ 0 ☒ 1
Display	Delay For Action (s)	0
Function Page	Action After Timeout	☒ Disable ☐ Enable

7.1.4 Brightness sensor

Brightness Sensor [Disable, Enable]

Brightness sensors can be enabled to activate auto adjustment of display brightness according to ambient lux level which is measured by built-in light sensors.

General	Character Encoding	Western European (ISO 8859-1)
Settings	Display Temperature Unit	☒ Celsius ☐ Fahrenheit
Temperature Sensor	Delay After Bus Recovery (s)	3
Brightness Sensor	Send Alive Beacon	☒ Disable ☐ Enable
Display	Humidity Sensor	☒ Disable ☐ Enable
Function Page	Proximity Sensor	☒ Disable ☐ Enable
Settings	Brightness Sensor	☐ Disable ☒ Enable
Page 1-	Time is provided from KNX	☒ No ☐ Yes
	Scenes	☒ Disable ☐ Enable

Darkness Recognition: [Disable, Enable]

Object "Darkness Switching Value – (0-Active)" can be activated by enabling "Darkness Recognition" parameter. If the measured lux value is less than 10 lux, darkness will be recognized and transmitted via this object to KNX bus. Object value can be used inverse. [True, False]

General	Darkness Recognition	☐ Disable ☒ Enable
Settings	Dark will be recognised below 10 lux	
Temperature Sensor	Output Value Data Type	1 Bit
Brightness Sensor	Action On Darkness Recognition	☐ Disable ☒ Enable
Display	Value	☐ 0 ☒ 1
Function Page	Delay For Action (s)	0
Settings	Action After End of Darkness Recognition	☒ Disable ☐ Enable
Page 1-		

7.1.5 Time

Time is provided by KNX:

If "yes" is selected, Object "General - Time" will be activated to receive time information from KNX bus. Received time will be shown on the Main page of the device.

Time is provided from KNX ☐ No ☒ Yes

Otherwise, Room Controller uses built-in RTC (real time clock) for the clock on main page. Use KNX Group Monitor to adjust the time via writing "correct time" value to Object Number 10 "General - Time".

2 General Time 3 bytes

7.1.6 Scenes

Room Controller has 8 scene outputs (KNX objects) to send commands to KNX bus. Scene outputs are defined in 8 different scenes and can be used to send different values by recalling each scene separately.

Data type of each Scene Output can be selected as "1 Bit, 1 Byte Unsigned and 1 Byte Percentage".

Scene	Scene Output Data Type	Data Type
Scene 1	Scene Output 1 Data Type	1 Bit
Scene 2	Scene Output 2 Data Type	1 Bit
Scene 3	Scene Output 3 Data Type	1 Byte Unsigned
Scene 4	Scene Output 4 Data Type	1 Byte Percentage
Scene 5	Scene Output 5 Data Type	1 Bit
Scene 6	Scene Output 6 Data Type	1 Byte Unsigned
Scene 7	Scene Output 7 Data Type	1 Byte Percentage
Scene 8	Scene Output 8 Data Type	1 Bit

The scene number can be individually selected between 1 and 64 for each scene. Thus, scenes can be recalled by using "Scene number" via Object "Scenes – Scene Recall".

Any scene which is recalled by Object will send value of enabled "Scene output" via Object to KNX bus.

617	Scenes	Scene Recall	1 byte
618	Scenes	Scene Output 1 (1 Bit)	1 bit
619	Scenes	Scene Output 2 (1 Bit)	1 bit
620	Scenes	Scene Output 3 (1 Bit)	1 bit
621	Scenes	Scene Output 4 (1 Bit)	1 bit
622	Scenes	Scene Output 5 (1 Bit)	1 bit
623	Scenes	Scene Output 6 (1 Bit)	1 bit
624	Scenes	Scene Output 7 (1 Bit)	1 bit
625	Scenes	Scene Output 8 (1 Bit)	1 bit

7.1.7 Display

Display parameter tab contains the following parameters.

Screen saver time (s): [1...30...120]

Display goes into stand-by position when screen saver time is over.

Password for settings: (4 digits)

A "4 digit" password can be created to protect device settings. Settings can be changed only if the correct password is entered.

Unlocked Trigger Output:

If settings page is unlocked by entering password, then Object "Settings Password - Trigger" will send selected data to KNX bus.

Unlocked Trigger Output	
	☐ Disable ☒ Enable
Data Type	1 Bit
Value	1 Bit ✓
Password for screen saver	1 Byte Scene Control 1 Byte Value 1 Byte Percentage

Password for screen saver: (4 digits)

A "4 digit" password can be created to protect the Room Controller. Screen can be activated only if the correct password is entered.

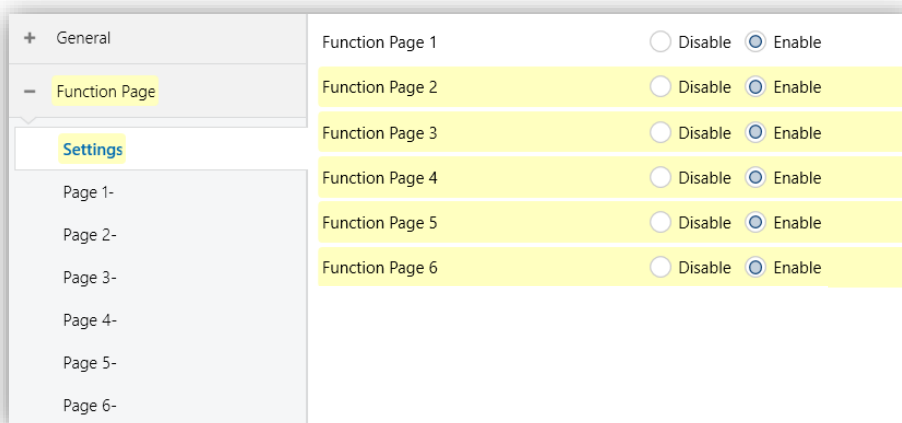
Unlocked Trigger Output:

If screen saver is unlocked by entering password on the device, then Object "Screen Saver Password - Trigger" will send selected data to KNX bus.

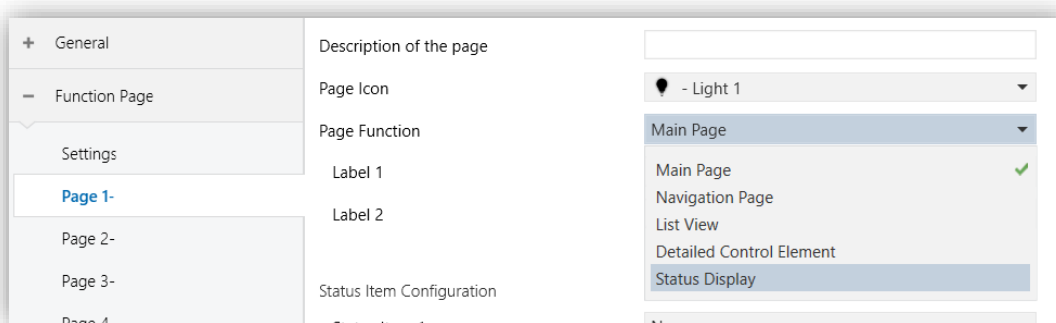
Password for screen saver	
	☐ Disable ☒ Enable
Password (4 Digits)	1234
Unlocked Trigger Output	
	☐ Disable ☒ Enable
Data Type	1 Bit
Value	1 Bit ✓
	1 Byte Scene Control 1 Byte Value 1 Byte Percentage

7.2 Function Page

Function pages can be enabled under “Function Page - Settings” parameter tab. Room Controller has a maximum of 6 identical function pages.



Each of the function pages has the following parameters.



Description of the page: (14 characters allowed)

Description will be visible on the left-top corner of the screen. Example: “Living Room”.

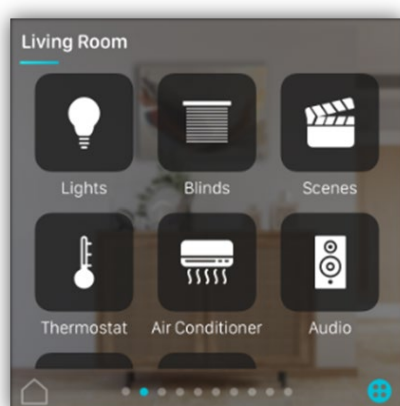
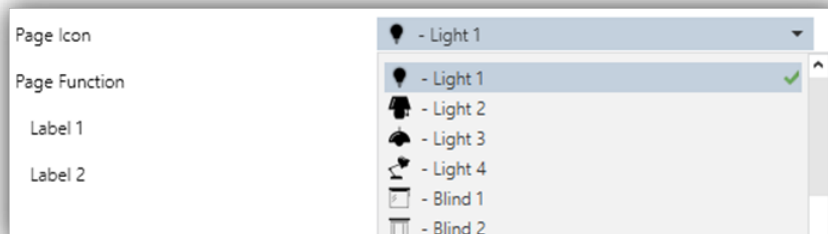


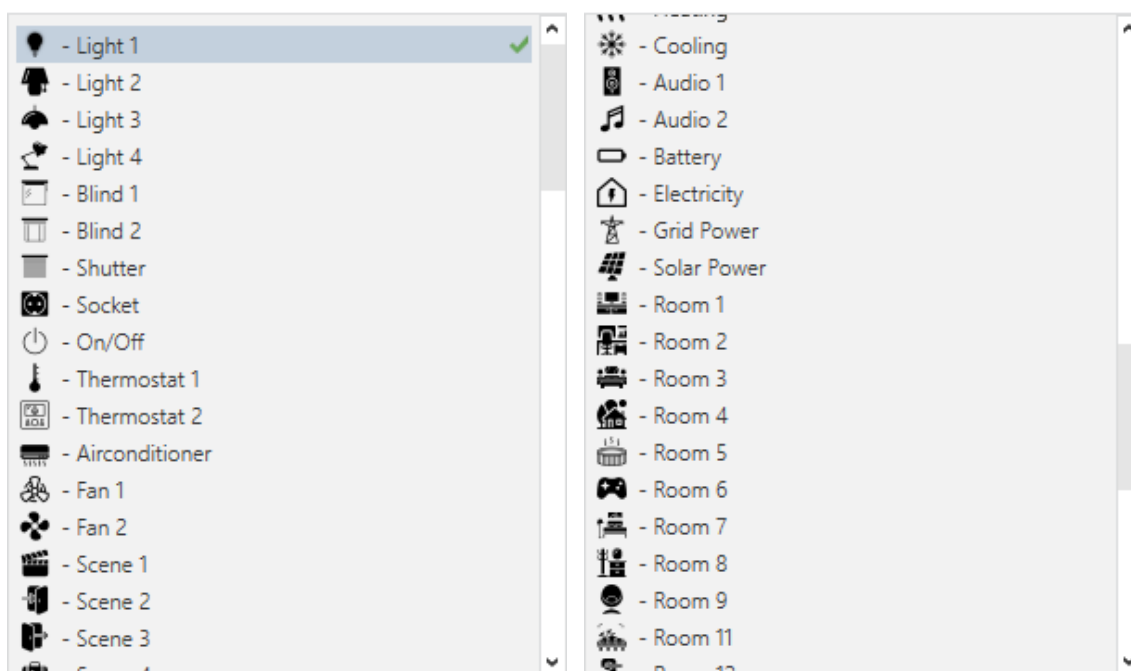
Fig. 1 Description of the page

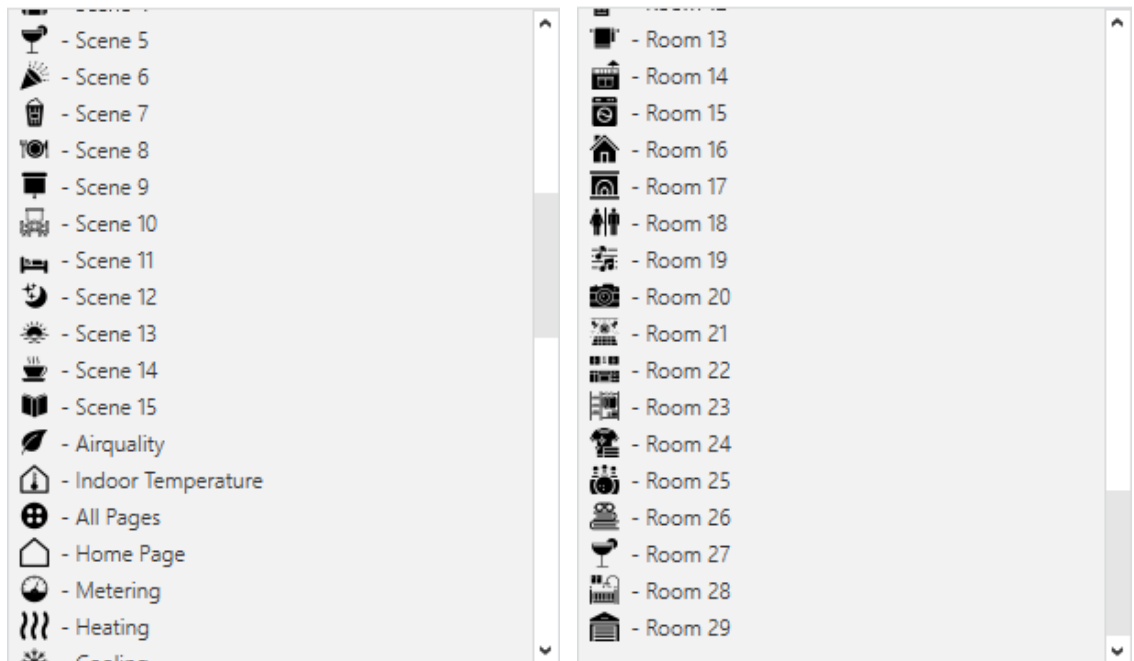
Page Icon:

A specific icon can be selected for the page from ready to use icon list. Selected icon will be visible on "Navigation Page" if page is added to navigation page (see Figure 1 Lights, Blinds etc.).



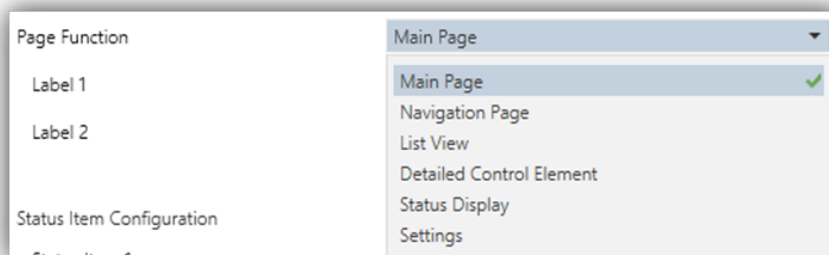
All available icons are listed below.





Page Function:

The following options are available for page function.



7.2.1 Page 1 – Main Page

Main Page contains “two of customized labels”, “clock”, “three of status items” and “two functional buttons”.

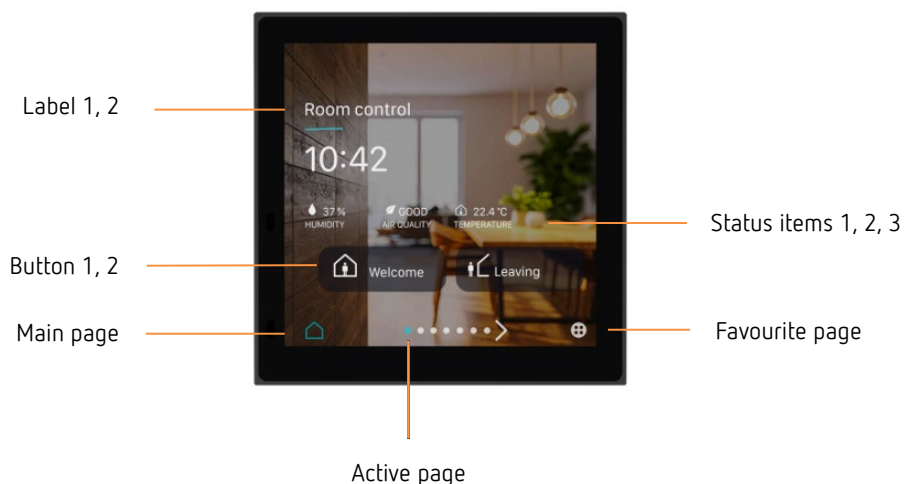


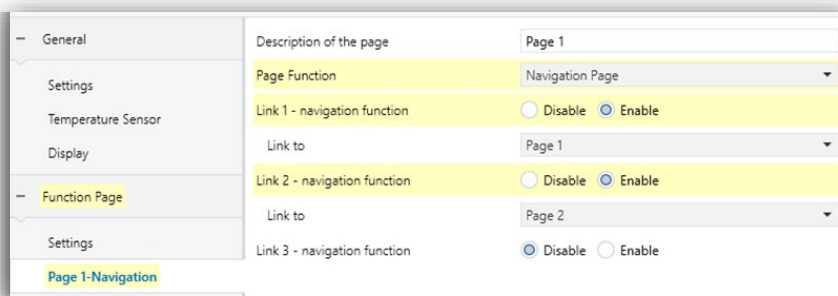
Fig. 2 Main page view

+ General - Function Page - Settings Page 1-Main Page	Description of the page Page Icon: - Light 1 Page Function: Main Page Label 1: Label 2: Status Item Configuration Status Item 1: None Status Item 2: None Status Item 3: None Button Configuration Button 1 Function: None Button 2 Function: None
---	---

Parameter	Possible Values	Description
Label 1	User defined (14 characters max.)	Displayed on top-left of main page view.
Label 2	User defined (14 characters max.)	Displayed on top-left of main page view.
Status Item Configuration:		
Status item 1 Status item 2 Status item 3	The following options are selectable for each item. Temperature Humidity Air Quality CO2 VOC PM2.5 PM10 Brightness Wind speed	Status items are displayed on the main page view with customized text and received or measured value of selected unit.
Status item 1, 2, 3 (Text)	User defined (14 characters max.)	Text is visible under measured value of selected unit. Check above Main page view on Figure 2.
Status item 1, 2, 3 (Sensor)	Internal, External	Value can be received from an external sensor using related object. Example: "Page 1- Main Page Status item 1 – Temperature".
Button Configuration:		
Button 1 Function Button 2 Function	The following datatypes are selectable for each button. 1 bit 1 Byte Scene Control 1 Byte Value 1 Byte Percentage	Two buttons can be used as "Scene button" on Main page view. Check above Main page view on Figure 2. (Enter Room, Leave Room)
1 bit 1 Byte Scene 1 Byte Value 1 Byte Percentage	[0, 1] [1...64] scene number [0...255] value [0%...100%] percentage	Selected data will be sent with button press.
Button 1 Function (Icon)	icon options (81)	Selected icon will be visible on the button.
Button 1 Function (Text)	User defined (14 characters max.)	Text will be visible on the button.

7.2.2 Page 1 – Navigation Page

Basically, "Navigation Page" contains shortcuts of other pages. 6 pages can be added to a navigation page at the same time. Each of pages is added with its own icon to "Navigation Page".



7.2.3 Page 1 – List View

Different type of control elements can be added to same page thanks to "List View". Following control elements can be used. Figure 3

"Switch, Dimming, Shutter / Blind, Scene, Value, Tunable White Control".

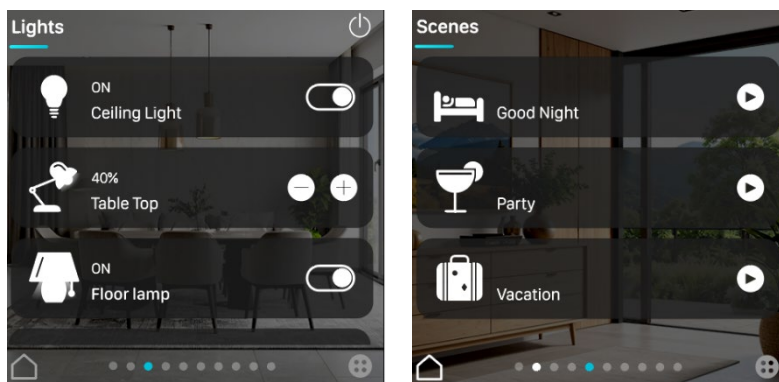
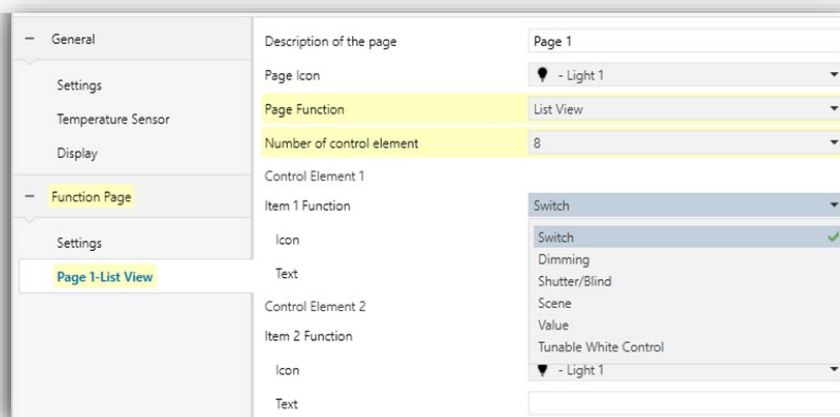


Fig. 3 List view



Parameter	Possible Values	Description
Control Element 1 (up to 8)		
Item 1 Function	Switch Dimming Shutter/Blind Scene Value Tunable White Control	The following functions are selectable for each control element.
Icon	icon options (81)	Selected icon will be visible on the control element. Figure 4, 5, 6
Text	User defined (14 characters max.)	Text will be visible on the control element. Figure 4, 5, 6
Item 1 Function (Shutter Blind) Blind position	Disable, Enable	Enables status object for blind position.
Item 1 Function (Shutter Blind) Slat position	Disable, Enable	Enables status object for Slat position.
Item 1 Function (Scene) Scene Number	1..64	Selected scene number is used to recall.
Item 1 Function (Scene) Mode	1. Send scene 2. Send scene and save at long press	If option 2 is selected, current position of lighting, blinds etc. can be saved on the actuator.
Item 1 Function (Tunable White Control) Colour Temperature Min.	1000...10000	Defines the minimum colour temperature that can be selected on control element.
Item 1 Function (Tunable White Control) Colour Temperature Max.	1000...10000	Defines the maximum colour temperature that can be selected on control element.

7.2.4 Page 1 – Detailed Control Element

“Detailed Control Element” can be used to focus only one control type in detail with all available functions.

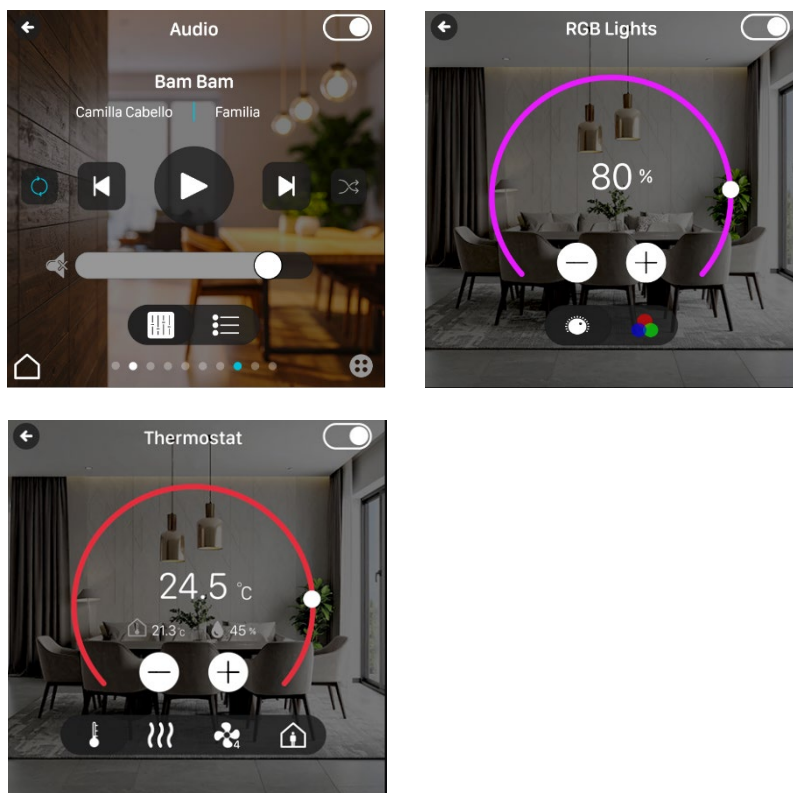


Fig. 4 Detailed control elements

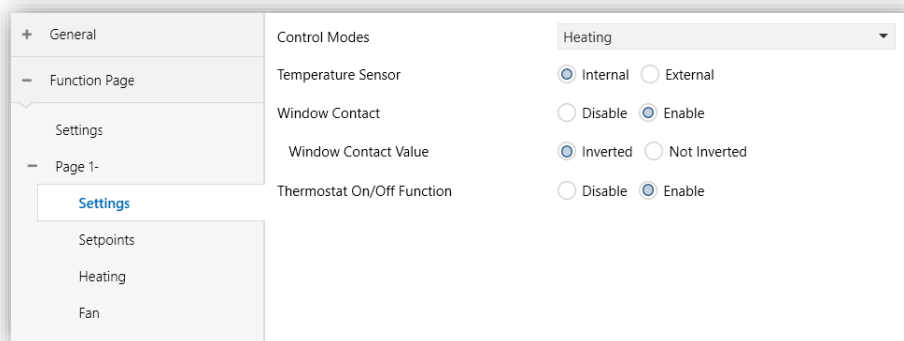
Parameter	Possible Values	Description
Detailed Control Element		
Page Function	Switch Dimming Shutter/Blind Scene Value Tunable White Control RGBW Control General Thermostat (RTC) Slave Thermostat Air Conditioner Control Audio Control	Following functions are selectable for each detailed control element.
Shutter Blind		
Blind position	Disable, Enable	Enables status object for blind position.

Slat position	Disable, Enable	Enables status object for Slat position.
Scene		
Scene Number	1..64	Sets scene number will be recalled via scene object.
Mode	1. Send scene 2. Send scene and save at long press	If option 2 is selected, current position of lighting, blinds etc. can be saved on the actuator.
Tunable White Control		
Colour Temperature Min.	1000...2000...10000	Defines the minimum colour temperature that can be selected on control element.
Colour Temperature Min.	1000...6000...10000	Defines the maximum colour temperature that can be selected on control element.
RGBW Control		
Control Type	RGB, RGBW	Sets the control type according to lighting source.
Data Type	1x3 Byte 3x1 Byte	Sets the data type to control RGB lighting.
General Thermostat (RTC)		Activates parameter tabs for RTC under Page 1.
Settings		
Control Mode	Heating Cooling Heating and Cooling	Control mode of the thermostat can be selected for Heating, Cooling, and Heating and Cooling together.
Heating and Cooling Control Value Output	Via 1 object Via 2 objects	Output value for Heating and Cooling can be sent via same object or 2 separate objects. In this way, heating and cooling control value commands can be sent separately.
Behavior of Control Mode at Bus Recovery	As before voltage failure Heating Cooling	The parameter defines the behavior of the control mode after bus power returns.
Switchover of Control Mode	Only via Object Local and via object Automatic	Parameter makes it possible to switch between the heating and cooling mode of the device.

7.2.4.1 General Thermostat (RTC)

Settings

Control Modes: Heating, Cooling, Heating and Cooling]



Temperature Sensor:

i Prolonged LCD activity can lead to internal heat generation and temporarily impair the accuracy of the temperature sensor. Therefore, temperature measurement and calculation are paused when the display is active and resumed 10 minutes after the display activity ends to allow for thermal stabilization. This can be optimized by using an external temperature value (e.g., from iONprime PB KNX).

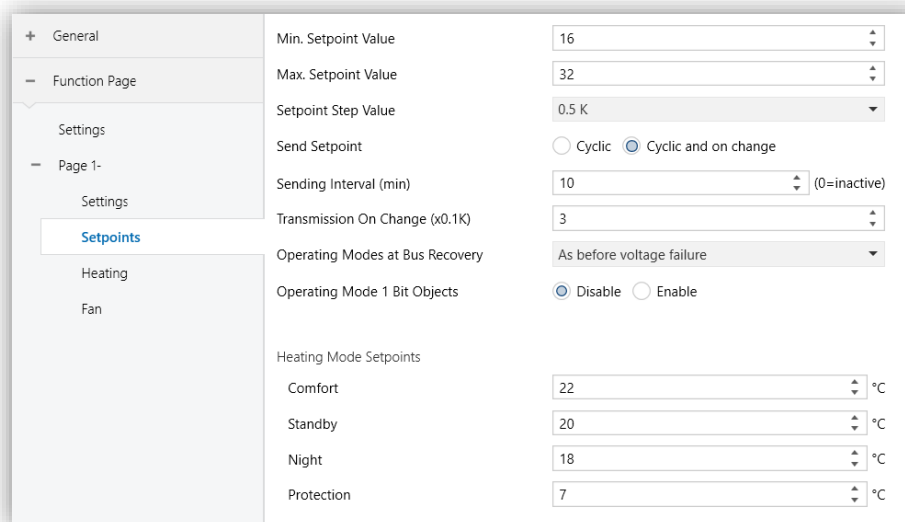
Window Contact:

Window Contact (1-Open) object can be used to take thermostat control in stand-by position according to window status. If the window is open the thermostat will stop working.

Thermostat ON/OFF Function:

Thermostat ON/OFF Function is used to turn the thermostat ON and OFF. Switch object and status object will be created after enabling this parameter.

Setpoints



Min. Setpoint Value	16
Max. Setpoint Value	32
Setpoint Step Value	0.5 K
Send Setpoint	☐ Cyclic ☒ Cyclic and on change
Sending Interval (min)	10 (0=inactive)
Transmission On Change (x0.1K)	3
Operating Modes at Bus Recovery	As before voltage failure
Operating Mode 1 Bit Objects	☒ Disable ☐ Enable
Heating Mode Setpoints	
Comfort	22 °C
Standby	20 °C
Night	18 °C
Protection	7 °C

Min. Setpoint Value: [5...16...40]

Defines the minimum temperature setpoint value for the thermostat function. Any temperature value lower than Min. Setpoint Value cannot be written or selected on setpoint temperature objects.

Max. Setpoint Value: [5...32...40]

Defines the maximum temperature setpoint value for the thermostat function. Any temperature value higher than Max. Setpoint Value cannot be written or selected on temperature objects.

Setpoint Step Value: [0.1...0.5...1]

Increase/Decrease value of current setpoint by pressing -/+ button on the page of Detailed Control Element.

Send Setpoint (°C): [Cyclic...Cyclic on change]

Current setpoint can be sent cyclically or by change of measured temperature via status Setpoint object.

Sending interval (min): [0...10...255] 0 = Inactive

Defines the time period of sending setpoint value via "Status Setpoint" object.

Transmission on change (x0.1 K): [1...3...100]

Defines the minimum temperature change to send setpoint value via "Status Setpoint" object.

Operating Mode at Bus Recovery:

The parameter defines the behavior of the thermostat after bus power returns. Operating mode can be changed to the following options after a power return:

- As before voltage failure
- Comfort
- Standby
- Night
- Protection

Each operating mode has a different temperature setpoint.

Operating Mode 1 Bit Objects:

Parameter determines the data type of operating mode objects. Data type of operating mode objects can be used as "1 bit" with separate objects for each operating mode if this parameter is enabled. Status Objects will send current status of operating mode after the change.

32	Page 1-General Thermostat (RTC)	Comfort Mode	1 bit
33	Page 1-General Thermostat (RTC)	Status Comfort Mode	1 bit
34	Page 1-General Thermostat (RTC)	Standby Mode	1 bit
35	Page 1-General Thermostat (RTC)	Status Standby Mode	1 bit
36	Page 1-General Thermostat (RTC)	Economy/Night Mode	1 bit
37	Page 1-General Thermostat (RTC)	Status Economy/Night M...	1 bit
38	Page 1-General Thermostat (RTC)	Building Protection Mode	1 bit
39	Page 1-General Thermostat (RTC)	Status Building Protectio...	1 bit

As default,

1 Byte Object [DPT_HVACMode];

Object "Page 1 General Thermostat (RTC) – Operating Mode" can be used to change between different modes. Object "Status Operating Mode" will send current status of operating mode after change.

\$01 – Comfort	[20.102 DPT_HVAC]
\$02 – Standby	[20.102 DPT_HVAC]
\$03 – Economy	[20.102 DPT_HVAC]
\$04 – Protection	[20.102 DPT_HVAC]

30	Page 1-General Thermostat (RTC)	Operating Mode	1 byte
31	Page 1-General Thermostat (RTC)	Status Operating Mode	1 byte

Heating Mode Setpoints:

General Thermostat (RTC) has 4 operating modes: "Comfort Mode, Standby Mode, Night Mode and Protection Mode". Each operating mode has their own predefined setpoint temperature. Changeover of operating modes can be achieved through "Operating Mode" communication objects.

Rocker 3
Rocker 4
Temperature Sensor
Thermostat
Thermostat Settings
Setpoint Temperature
Heating

Heating Mode Setpoints

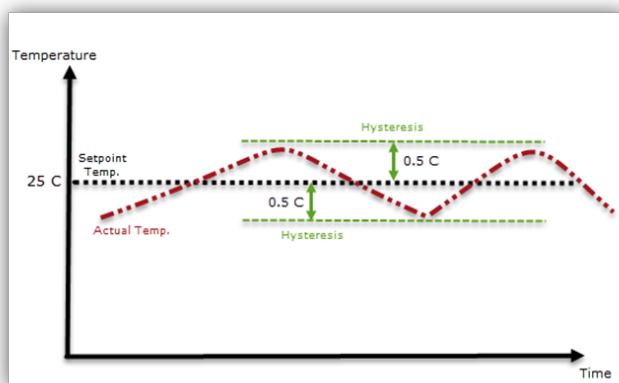
Comfort	22	°C
Standby	20	°C
Night	18	°C
Protection	7	°C

Heating - Control Type: [2-Point Control ON/OFF]

Control Type: [2-Point Control (On/Off), Switching PI Control (PWM), Continuous PI Control]

Operates as a simple switch around the setpoint temperature using hysteresis values.

"Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool on and off. If the system is more an active system, hysteresis values should be given larger and more inactive values.



Sending Interval (min): [0...15...255] 0 = inactive

Determines cyclic sending period of Object "General Thermostat - Heating 2 Point Control Value".

Hysteresis +/- (x 0.1 °C): [1...5...255]

Determines Hysteresis value to control "Heating 2 Point Control Value" output more accurate.

"Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool ON and OFF. If the system is more an active system, hysteresis values should be given larger and more inactive values.

+ General - Function Page Settings - Page 1-RTC Settings Setpoints Heating Fan	Control Type 2 Point On/Off Sending Interval (min) 15 (0=inactive) Hysteresis ± (x0.1K) 5 Additional Stage ☒ Disable ☐ Enable
---	---

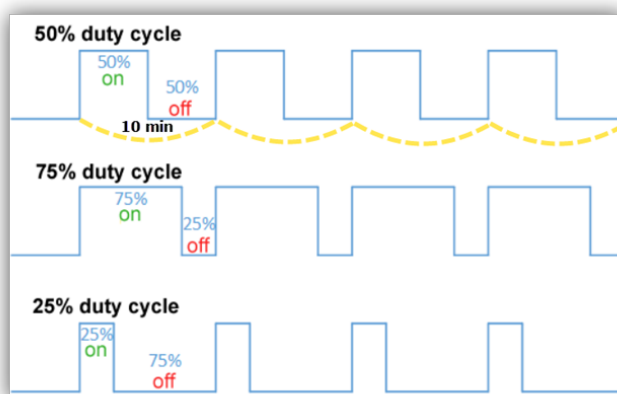
Additional Stage: Explained in [Heating - Additional Stage](#)

Heating - Control Type: [Switching PI Control PWM]

PI algorithm is used to calculate control signal. After calculation, the control signal is converted into a pulse-interval signal. This means PWM cycle is divided into "1 bit ON/OFF" output commands based on control value. The PWM period and type of heating should be selected according to the room used and type of heating.

PWM Period Time (min): [1...10...255]

Defines PWM period time. If control value is calculated 50 %. Then control value will be ON for 5 minutes and OFF for second 5 minutes. Please check the following graphic.



Heating Type: Multiple heating types with preset parameters are available to the user.

- Floor Heating (5K/240)
- How Water Heating (5K/150)
- Electrical Heating (4K/100)
- Fan coil (4K/90)
- User Defined

If the required heating type is not available, individual parameters can be specified in the "User Defined" configuration.

Proportional Range (x0.1 °C): [10...50...100]

Defines the proportional range of control. The parameter changes the control speed of the controller.

Integration Time (min): [1...240...255]

Defines the reset time of controller. Integration Time has the effect of moving the room temperature slowly toward and ultimately reaching the setpoint value. Depending on the type of system used, parameter needs to have different values. In general, the more inactive the overall system is, the greater time is needed.

Control Type	PWM-Switching PI Control
PWM Period Time (min)	10
Heating Type	User Defined
Proportional Range (x0.1K)	50
Integration Time (min)	240
Additional Stage	☒ Disable ☐ Enable

Additional Stage: Explained in [Heating - Additional Stage](#)

Heating - Control Type: [Continuous PI Control PWM]

PI algorithm is used to calculate control signals and adjusts its output value between 0 % and 100 % to match the difference between the actual temperature and the setpoint temperature and enables an accurate regulation of the room temperature to the setpoint value. PI values should be selected compatible with the room and the type of heating system that needs to be controlled. Default PI values are defined as the most common heating types. User-defined values can be used for different rooms and different types of heating for better performance. Using default values as a reference point and adjusting these values according to system might increase controller performance.

Control Type	PI Continuous
Heating Type	User Defined
Proportional Range (x0.1K)	50
Integration Time (min)	240
Send Value On Change (%)	4 (0=inactive)
Sending Interval (min)	15 (0=inactive)
Additional Stage	☒ Disable ☐ Enable

Heating Type: Multiple heating types with preset parameters are available to the user.

- Floor Heating (5K/240)
- How Water Heating (5K/150)
- Electrical Heating (4K/100)
- Fan coil (4K/90)
- User Defined

If the required heating type is not available, individual parameters can be specified in the "User Defined" configuration.

Proportional Range (x0.1 °C): [10...50...100]

Defines the proportional range of control. The parameter changes the control speed of the controller.

Integration Time (min): [1...240...255]

Defines the reset time of controller. Integration Time has the effect of moving the room temperature slowly toward and ultimately reaching the setpoint value. Depending on the type of system used, parameter needs to have different values. In general, the more inactive the overall system is, the greater time is needed.

Send Value on Change (%): [0...4...100] 0 = inactive

Heating control value will be sent on change of percentage via Object "General Temperature (RTC) – Heating PI Control Value".

Sending Interval (min): [0...15...255]

Determines cyclic sending period of Object "General Temperature (RTC) – Heating PI Control Value".

Additional Stage: Explained in Additional Stage

Heating - Additional Stage
Additional Stage: [Disable...Enable]

Additional Heating Control objects can be enabled if an extra Heating Control Value is needed on top of the main Heat Control Value.

Object "General Temperature (RTC) – Heating Additional Stage Value" is created when parameter is enabled.

Disable from Bus: Object "General Temperature (RTC) – Heating Additional Stage (0-Disable)" can be used to disable additional heating control any time by writing True/False.

Offset from Setpoint (x 0.1 °C): [1...15...255]

Defines a separate setpoint value based on main Setpoint temperature for Object "General Temperature (RTC) – Heating Additional Stage Value". In this way, Additional Heating Source will be activated/deactivated depending on the new temperature setpoint.

Example: Assume that a room has two types of different heating sources. (Main heating source, additional heating source)

Setpoint temperature is 24 degrees for the "Heating Control Value" (main heating source.)

If "Offset from Setpoint" parameter is $-20 \times 0.1 \text{ °C} = -2 \text{ °C}$.

In this scenario, the setpoint for heating is set to 24 °C. When the temperature falls below 22 °C, additional heating should be switched on so that the room heats up again rapidly.

Hysteresis +/- (x 0.1 °C): [1...5...255]

Determines Hysteresis value to control Heating Additional Stage Value more accurately.

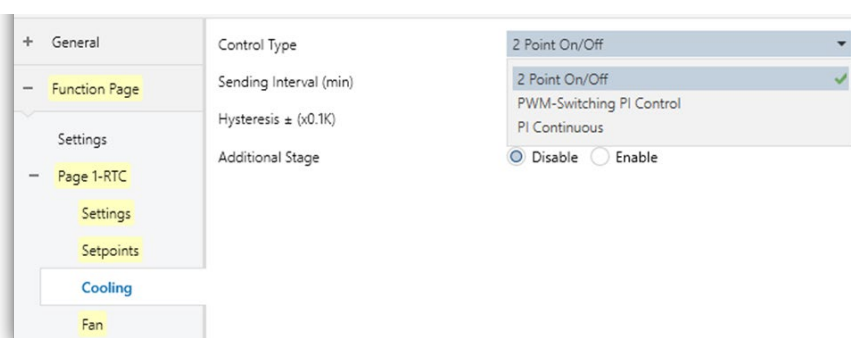
"Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool ON and OFF. If the system is more an active system, hysteresis values should be given larger and more inactive values.

Sending Interval (min): [0...15...255]

Determines cyclic sending period of Object "General Temperature (RTC) – Heating Additional Stage Value".

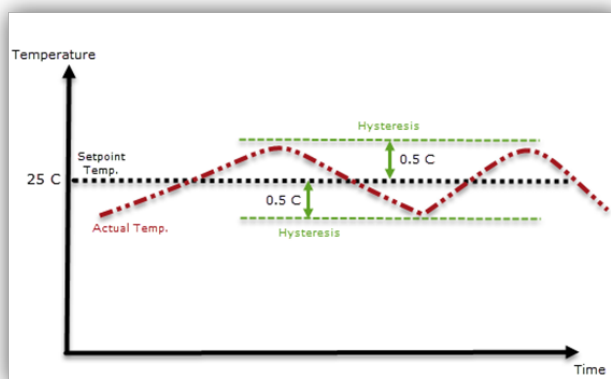
Cooling - Control Type: [2-Point Control ON/OFF]

Control Type: [2-Point Control (On/Off), Switching PI Control (PWM), Continuous PI Control]



Operates as a simple switch around the setpoint temperature using hysteresis values.

"Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool on and off. If the system is more an active system, hysteresis values should be given larger and more inactive values.



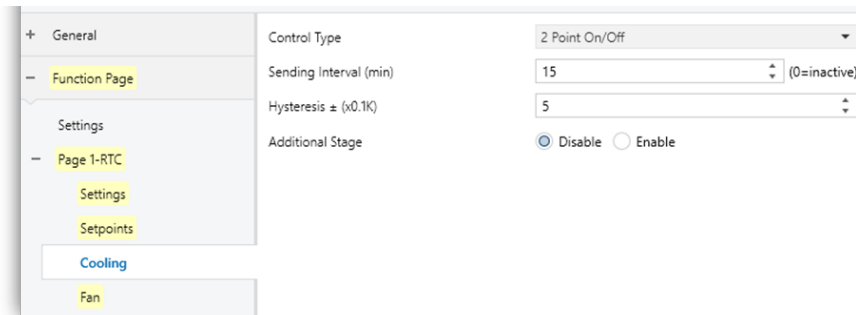
Sending Interval (min): [0...15...255] 0 = inactive

Determines cyclic sending period of Object "General Thermostat - Cooling 2 Point Control Value".

Hysteresis +/- (x 0.1 °C): [1...5...255]

Determines Hysteresis value to control "Heating 2 Point Control Value" output more accurate.

"Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool ON and OFF. If the system is more an active system, hysteresis values should be given larger and more inactive values.



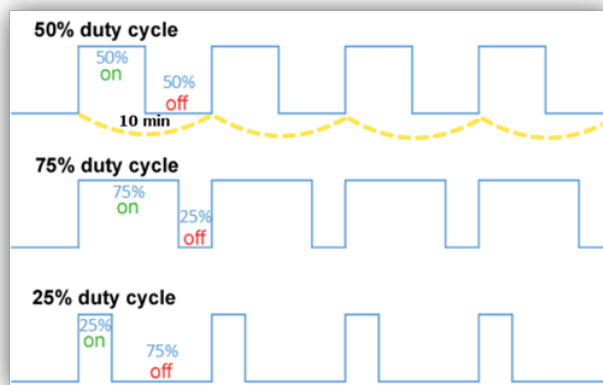
Additional Stage: Explained in [Cooling - Additional Stage](#)

Cooling - Control Type: [Switching PI Control PWM]

PI algorithm is used to calculate control signals. After calculation, the control signal is converted into a pulse-interval signal. This means PWM cycle is divided into "1 bit ON/OFF" output commands based on control value. PWM period and type of cooling should be selected according to the room used and type of cooling source.

PWM Period Time (min): [1...10...255]

Defines PWM period time. If control value is calculated 50 %. Then control value will be ON for 5 minutes and OFF for second 5 minutes. Please check the following graphic.



Type of Cooling: Multiple cooling types with preset parameters are available to the user.

- Cooling Ceiling (5K/240)
- Fan coil (4K/90)
- User Defined

If required cooling type is not available, individual parameters can be specified in the "User Defined" configuration.

Proportional Range (x0.1 °C): [10...50...100]

Defines the proportional range of control. The parameter changes the control speed of the controller.

Integration Time (min): [1...240...255]

Defines the reset time of controller. Integration Time has the effect of moving the room temperature slowly toward and ultimately reaching the setpoint value. Depending on the type of

system used, parameter needs to have different values. In general, the more inactive the overall system is, the greater time is needed.

Additional Stage: Explained in [Cooling - Additional Stage](#)

Cooling - Control Type: [Continuous PI Control PWM]

PI algorithm is used to calculate control signals and adjusts its output value between 0 % and 100 % to match the difference between the actual temperature and the setpoint temperature and enables an accurate regulation of the room temperature to the setpoint value. PI values should be selected compatible with the room and the type of heating system that needs to be controlled. Default PI values are defined as the most common cooling types. User-defined values can be used for different rooms and different cooling types for better performance. Using default values as a reference point and adjusting these values according to system might increase controller performance.

Cooling Type: Multiple cooling types with preset parameters are available to the user.

- Cooling Ceiling (5K/240)
- Fan coil (4K/90)
- User Defined

If the required cooling type is not available, individual parameters can be specified in the "User Defined" configuration.

Send Value On Change (%): [0...4...100] 0 = inactive

Cooling control value will be sent on change of percentage via Object "General Temperature (RTC) – Cooling PI Control Value".

Sending Interval (min): [0...15...255]

Determines cyclic sending period of Object "General Temperature (RTC) – Cooling PI Control Value".

Additional Stage: Explained in [Cooling - Additional Stage](#)

General	Control Type	PI Continuous
Function Page	Cooling Type	User Defined
Settings	Proportional Range (x0.1K)	50
Page 1-RTC	Integration Time (min)	240
Settings	Send Value On Change (%)	4 (0=inactive)
Setpoints	Sending Interval (min)	15 (0=inactive)
Cooling	Additional Stage	☒ Disable ☐ Enable
Fan		

Cooling - Additional Stage

Additional Stage: [Disable...Enable]

Additional Cooling Control object can be enabled if an extra Cooling Control Value is needed on top of main Cooling Control Value.

Object "General Temperature (RTC) – Cooling Additional Stage Value" is created when parameter is enabled.

Disable from Bus: Object "General Temperature (RTC) – Cooling Additional Stage (0-Disable)" can be used to disable additional heating control any time by writing True/False.

General	Control Type	PI Continuous
Function Page	Heating Type	User Defined
Settings	Proportional Range (x0.1K)	50
Page 1-RTC	Integration Time (min)	240
Settings	Send Value On Change (%)	4 (0=inactive)
Setpoints	Sending Interval (min)	15 (0=inactive)
Heating	Additional Stage	☐ Disable ☒ Enable
Fan	Disable From Bus	☐ No ☒ Yes
	Offset From Setpoint (x0.1K)	15
	Hysteresis ± (x0.1K)	5
	Sending Interval (min)	15 (0=inactive)

Offset from Setpoint (x 0.1 °C): [1...15...255]

Defines a separate setpoint value based on main Setpoint temperature for Object "General Temperature (RTC) – Cooling Additional Stage Value". In this way, Additional Cooling Source will be activated/deactivated depending on the new temperature setpoint.

Example: Assume that a room has two types of different heating sources. (Main cooling source, additional cooling source)

Setpoint temperature is 24 degrees for the "Cooling Control Value" (main cooling source.)

If "Offset from Setpoint" parameter is $-20 \times 0.1 \text{ °C} = -2 \text{ °C}$.

In this scenario, the setpoint for cooling is set to 24 °C. When the temperature rises above 26 °C, additional cooling should be switched on so that the room cools off again rapidly.

Hysteresis +/- (x 0.1 °C): [1...5...255]

Determines Hysteresis value to control Cooling Additional Stage Value more accurately. "Hysteresis" prevents the output value from oscillation and give larger margin to turning heat or cool ON and OFF. If the system is more an active system, hysteresis values should be given larger and more inactive values.

Sending Interval (min): [0...15...255]

Determines cyclic sending period of Object "General Temperature (RTC) – Cooling Additional Stage Value".

Heating & Cooling

The control mode of thermostat can be selected for Heating, Cooling, and Heating & Cooling. If Heating & Cooling control mode is selected parameter tabs of "Heating" and "Cooling" will place with same parameters. However, parameter tabs of "Thermostat Settings" and "Setpoint Temperature" will have some additional parameters.

Please check below.

Thermostat Settings

Heating & Cooling Control Value Output: Output value for Heating and Cooling can be sent via same object or 2 separate objects.

If "via 1 Object" option is selected Object "General Thermostat (RTC) – Heating/Cooling Control Value" will be activated.

26	Page 1-General Thermostat (RTC)	Heating/Cooling PI Control Value	1 byte
----	---------------------------------	----------------------------------	--------

If "via 2 Objects" option is selected Object "General Thermostat (RTC) – Heating Control Value" and Object "General Thermostat (RTC) – Cooling Control Value" will be activated.

24	Page 1-General Thermostat (RTC)	Heating PI Control Value	1 byte
25	Page 1-General Thermostat (RTC)	Cooling PI Control Value	1 byte

Behavior of Control Mode at Bus Recovery:

The parameter defines the behavior of the control mode after the bus power return. Control mode can be changed to following options after a power return:

- As before voltage failure
- Heating
- Cooling

Switchover Control Mode: [Only via Object, Local and via Object, Automatic]

Parameter makes it possible to switch between the heating and cooling mode of the general thermostat.

Only via Object:

Switchover can be applied only "via Object" manually using Object "General Thermostat (RTC)–Heat/Cool Switchover".

\$01= Heating [1.100 DPT_cooling/heating]

\$00= Cooling [1.100 DPT_cooling/heating]

18	Page 1-General Thermostat (RTC)	Heat/Cool Switchover	1 bit	cooling/heating
----	---------------------------------	----------------------	-------	-----------------

Local and via Object:

Switchover can be applied locally on Control Element Page and also "via Object" manually using Object "General Thermostat (RTC) – Heat/Cool Switchover".

Automatic: The thermostat switches automatically between heating and cooling and to the associated setpoint according to defined "Deadband". Object "Thermostat – Heat/Cool Status" will transmit the status after switchover.

i "Automatic switchover" function performs only if current operation mode is "Comfort Mode". Otherwise, the thermostat is not going to switch over heating and cooling!

Heating & Cooling Control Value Output	☐ via 1 Object ☒ via 2 Objects
Behaviour of Control Mode at Bus Recovery	As before voltage failure
Switchover Control Mode	☒ Automatically ☐ via Object
Heating / Cooling Deadband (x0.1°C)	20
Operating Mode at Bus Recovery	As before voltage failure
Operating Mode Object	☐ 1 bit Objects ☒ 1 Byte Object [DPT_HVACMode]

Heating Cooling Deadband (x 0.1 °C): [0...20...255]

Deadband defines the range between setpoint temperature and measured temperature. If the deadband is exceeded, switchover will be applied.

▪ Heating/Cooling Object Description

Heating / Cooling Indication

Object "General Thermostat (RTC) – Heating Indication" defines a state for recent heating command. It indicates that heating sources are recently having an active command of heat. In same way, object "General Thermostat (RTC) – Cooling Indication" defines a state for recent cooling command. It indicates that cooling source is recently having an active command to cool.

27	Page 1-General Thermostat (RTC)	Heating Indication	1 bit
28	Page 1-General Thermostat (RTC)	Cooling Indication	1 bit

Heating control value is sending ON command to heat source and "heating indication" is instantly informing about heating command.

Fan

Fan Control	☐ Disable ☒ Enable
Fan Display	Heating
Control Unit has Fan Off	☐ No ☒ Yes
Fan Off Control Object	☒ Inverted ☐ Not Inverted
Control Unit has Fan Auto	☐ No ☒ Yes
Fan Auto/Manual Object	☐ Disable ☒ Enable
Fan Auto/Manual Control Value	☒ Inverted ☐ Not Inverted
Number of Fan Stages	4
Fan Stage Object Type	☐ 1 Bit ☒ 1 Byte ☒ Enumerated ☐ Scaling

Fan Display: [Heating, Cooling, Heating and Cooling]
Fan can be visible only for selected control modes.

Number of Fan Stages: [1...3...5]

The number of Fan levels can be changed according to the control unit. The object will be available according to selection.

Fan Stage Object Type: [1 bit, 1 Byte]

Type of Fan stage object can be changed as 1 bit or 1 Byte. 1 Byte object can be used as "Enumerated" or "Scaling".

- Fan Speed Enumerated (0, 1, 2, 3, 4)
- Fan Speed Scaling (0, 25, 50, 75, 100) %

Control Unit has Fan Off:

Parameter can be activated if actuator has a "Fan OFF" object. "Fan OFF" command can be sent to the actuator via Object "General Thermostat (RTC) –Fan Off (1-Off)" will be visible.

Fan off Control Object:

Fan off command can be used inverse. [True or False]

Fan Auto/Manual Object:

"Fan auto" command can be sent to the actuator via Object "General Thermostat (RTC) –Fan Auto/Manual (1-Auto)" will be visible.

Fan Auto/Manual Control Value:

Fan auto command can be used inverse. [True or False]

7.2.4.2 Slave Thermostat

“Slave Thermostat” function does not actively control the HVAC actuator. Instead, it is used to display and send commands to another “Thermostat” which is actively controlling the HVAC actuator. Basically, “Slave thermostat” function is a copy of main “Thermostat”.

Temperature Sensor:

Temperature value can be received from an external temperature sensor directly or internal sensor can be used as default.

Operating Mode 1 Bit Objects:

Parameter determines the data type of operating mode objects. Data type of operating mode objects can be used as “1 bit” with separate objects for each operating mode if this parameter is enabled. Status Objects will send current status of operating mode after change.

32	Page 1-Slave Thermostat	Comfort Mode	1 bit
33	Page 1-Slave Thermostat	Status Comfort Mode	1 bit
34	Page 1-Slave Thermostat	Standby Mode	1 bit
35	Page 1-Slave Thermostat	Status Standby Mode	1 bit
36	Page 1-Slave Thermostat	Economy/Night Mode	1 bit
37	Page 1-Slave Thermostat	Status Economy/Night Mode	1 bit
38	Page 1-Slave Thermostat	Building Protection Mode	1 bit
39	Page 1-Slave Thermostat	Status Building Protection Mode	1 bit

Fan Control: [Disable, Enable]

Check Fan section for description of fan parameters, see [Fan](#).

Heat/Cool Switchover:

Parameter makes it possible to switch between the heating and cooling mode of the main thermostat.

Thermostat ON/OFF Function:

Thermostat ON/OFF Function is used to turn the thermostat on/off. Switch object and status object will be created after this parameter is enabled.

7.2.4.3 Air Conditioner Control

“Function” contains special communication objects to control an air conditioner via a KNX gateway.

Control Mode Object Type: [1 bit, 1 Byte]

Control mode can be selected using Object “Control Modes (0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry)” Heating, Cooling, and Heating & Cooling.

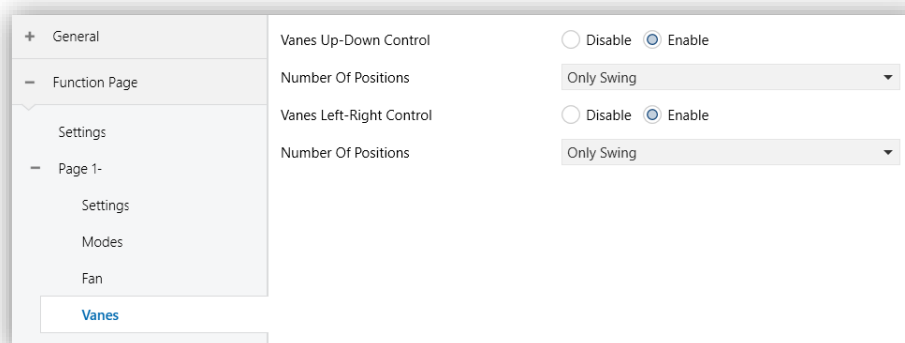
28	Page 1-Air Conditioner	Control Modes (0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry)	1 byte
29	Page 1-Air Conditioner	Status Control Modes (0-Auto, 1-Heat, 3-Cool, 9-Fan, 14-Dry)	1 byte

Heat/Cool Mode 1 Bit Object: [Disable, Enable]

Parameter enables the switchover object to change between heating and cooling mode.

Control Unit has Fan Auto:

Check Fan section for Fan parameters, see [Fan](#).

**Vanes Up-Down Control:**

Up-Down vane control can be activated using Object Vanes Up-Down (1-Swing, 0-Off)

Number of positions: [Only swing, 1...8]

Number of positions can be defined using parameters. Object type will change to 1 byte.

Vanes Left-Right Control:

Left-Right vane control can be activated using Object Vanes Left-Right (1-Swing, 0-Off)

Number of positions: [Only swing, 1...8]

Number of positions can be defined using parameters. Object type will change to 1 byte.

Temperature Sensor:

Temperature value can be received from an external temperature sensor directly or internal sensor can be used as default.

7.2.4.4 Audio Control

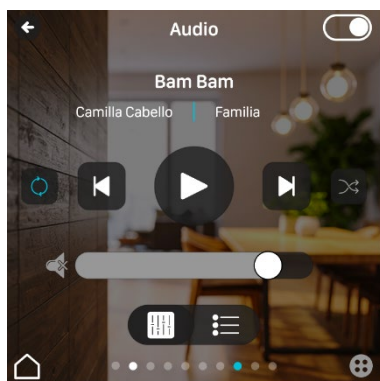


Fig. 5 Audio Control

Audio Control page allows you to manage any KNX audio controller via following KNX objects.

17	Page 1-Audio	Play/Pause	1 bit
18	Page 1-Audio	Status Play/Pause	1 bit
19	Page 1-Audio	Volume	1 byte
20	Page 1-Audio	Status Volume	1 byte
21	Page 1-Audio	Mute/Unmute	1 bit
22	Page 1-Audio	Status Mute/Unmute	1 bit
23	Page 1-Audio	Next/Previous	1 bit
26	Page 1-Audio	Shuffle/No Shuffle	1 bit
27	Page 1-Audio	Status Shuffle/No Shuffle	1 bit
28	Page 1-Audio	Repeat/No Repeat	1 bit
29	Page 1-Audio	Status Repeat/No Repeat	1 bit
30	Page 1-Audio	Song Name	14 bytes
31	Page 1-Audio	Artist Name	14 bytes
32	Page 1-Audio	Album Name	14 bytes
34	Page 1-Audio	Disconnect Slave Mode	1 bit
35	Page 1-Audio	Status Slave Mode	1 bit
36	Page 1-Audio	Source	1 byte
37	Page 1-Audio	Status Source	1 byte
38	Page 1-Audio	Preset Selection	1 byte
39	Page 1-Audio	Status Preset Selection	1 byte

7.2.5 Page 1 – Status Display

“Status Display” can be used to show customized status information using selectable icons and data point types.

Number of status element: [1...8]

A maximum of 8 status elements can be added to the same page.

Icon:

Selected icons will be visible near status element. Figure 13, 14

Text: (14 characters allowed)

Description will be visible below the value and unit. Figure 13, 14

Data point type of status item 1: Following data types can be used:

- DPT 7 (2 Byte Unsigned)
- DPT 9 (2 Byte Float)
- DPT 13 (4 Byte Signed)
- DPT 14 (4 Byte Float)

Unit: (16 characters allowed)

“Unit” will be visible near the value.

The screenshot shows the configuration window for 'Page 1-Status Display'. The left sidebar contains a tree view with 'General', 'Function Page', 'Settings', and 'Page 1-Status Display' (selected). The main area is divided into two columns. The left column lists configuration parameters, and the right column shows their values.

Parameter	Value
Description of the page	
Page Icon	- Thermostat 1
Page Function	Status Display
Number of status element	1
Status Item 1	
Icon	- Light 1
Text	
Data point type of status item 1	DPT 7 (2 Byte Unsigned)
Unit	

8 Commissioning

For commissioning the device, the following activities are required:

- Make electrical connections.
- Turn on the bus power supply.
- Switch the device operation to programming mode.

 As an alternative to using the programming button, the device can also be put into programming mode by activating it in the 'Settings' menu.

- Download into device the physical address and the configuration with ETS program.
- At the end of the download operation of the device returns to normal mode.
- Now the device is programmed and ready to use.

 Configuration and commissioning of the device require the use of ETS 4 or later releases.

9 Contact

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